Mathematica 11.3 Integration Test Results

on the problems in "4 Trig functions\4.5 Secant"

Test results for the 299 problems in "4.5.0 (a sec)^m (b trg)^n.m"

- **Problem 1: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[a+b\,x]\,dx$$

Optimal (type 3, 11 leaves, 1 step):

$$\frac{\text{ArcTanh}[\text{Sin}[a+b\,x]]}{b}$$

Result (type 3, 68 leaves):

$$-\frac{\text{Log}\left[\text{Cos}\left[\frac{a}{2}+\frac{b\,x}{2}\right]-\text{Sin}\left[\frac{a}{2}+\frac{b\,x}{2}\right]\right]}{b}+\frac{\text{Log}\left[\text{Cos}\left[\frac{a}{2}+\frac{b\,x}{2}\right]+\text{Sin}\left[\frac{a}{2}+\frac{b\,x}{2}\right]\right]}{b}$$

- **Problem 3: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[a+b\,x]^3\,dx$$

Optimal (type 3, 34 leaves, 2 steps):

$$\frac{\text{ArcTanh}[\text{Sin}[a+b\,x]]}{2\,b}+\frac{\text{Sec}[a+b\,x]\,\text{Tan}[a+b\,x]}{2\,b}$$

Result (type 3, 69 leaves):

$$\frac{-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(a+b\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(a+b\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(a+b\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(a+b\,x)\right]\right]+\text{Sec}[a+b\,x]\,\text{Tan}[a+b\,x]}{2\,b}$$

- **Problem 41: Result more than twice size of optimal antiderivative.**

$$\int \left(\text{Sec}[x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 22 leaves, 3 steps):

$$\frac{1}{2}\,\text{ArcSinh}[\text{Tan}[x]]+\frac{1}{2}\,\sqrt{\text{Sec}[x]^2}\,\text{Tan}[x]$$

Result (type 3, 52 leaves) :

$$\frac{1}{2}\operatorname{Cos}[x]\sqrt{\operatorname{Sec}[x]^2}\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{x}{2}\right]-\operatorname{Sin}\left[\frac{x}{2}\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{x}{2}\right]+\operatorname{Sin}\left[\frac{x}{2}\right]\right]+\operatorname{Sec}[x]\operatorname{Tan}[x]\right)$$

- **Problem 42: Result more than twice size of optimal antiderivative.**

$$\int\sqrt{\operatorname{Sec}[x]^2}\,dx$$

Optimal (type 3, 3 leaves, 2 steps) :

$$\operatorname{ArcSinh}[\operatorname{Tan}[x]]$$

Result (type 3, 44 leaves) :

$$\operatorname{Cos}[x]\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{x}{2}\right]-\operatorname{Sin}\left[\frac{x}{2}\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{x}{2}\right]+\operatorname{Sin}\left[\frac{x}{2}\right]\right]\right)\sqrt{\operatorname{Sec}[x]^2}$$

- **Problem 136: Result more than twice size of optimal antiderivative.**

$$\int\sqrt{\operatorname{Sec}[c+d x]}\,\sqrt{b\operatorname{Sec}[c+d x]}\,dx$$

Optimal (type 3, 33 leaves, 2 steps) :

$$\frac{\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]\sqrt{b\operatorname{Sec}[c+d x]}}{d\sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 3, 75 leaves) :

$$\frac{\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\sqrt{b\operatorname{Sec}[c+d x]}}{d\sqrt{\operatorname{Sec}[c+d x]}}$$

- **Problem 146: Result more than twice size of optimal antiderivative.**

$$\int\frac{(b\operatorname{Sec}[c+d x])^{3/2}}{\sqrt{\operatorname{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 34 leaves, 2 steps) :

$$\frac{b\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]\sqrt{b\operatorname{Sec}[c+d x]}}{d\sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 3, 75 leaves) :

$$\frac{\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)(b\operatorname{Sec}[c+d x])^{3/2}}{d\operatorname{Sec}[c+d x]^{3/2}}$$

Problem 156: Result more than twice size of optimal antiderivative.

$$\int \frac{(b \operatorname{Sec}[c+d x])^{5/2}}{\operatorname{Sec}[c+d x]^{3/2}}\, dx$$

Optimal (type 3, 36 leaves, 2 steps):

$$\frac{b^2 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]] \sqrt{b \operatorname{Sec}[c+d x]}}{d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 3, 75 leaves):

$$\frac{\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)(b \operatorname{Sec}[c+d x])^{5/2}}{d \operatorname{Sec}[c+d x]^{5/2}}$$

Problem 163: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x]^{3/2}}{\sqrt{b \operatorname{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 33 leaves, 2 steps):

$$\frac{\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]] \sqrt{\operatorname{Sec}[c+d x]}}{d \sqrt{b \operatorname{Sec}[c+d x]}}$$

Result (type 3, 75 leaves):

$$\frac{\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\sqrt{\operatorname{Sec}[c+d x]}}{d \sqrt{b \operatorname{Sec}[c+d x]}}$$

Problem 170: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x]^{5/2}}{(b \operatorname{Sec}[c+d x])^{3/2}}\, dx$$

Optimal (type 3, 36 leaves, 2 steps):

$$\frac{\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]] \sqrt{\operatorname{Sec}[c+d x]}}{b d \sqrt{b \operatorname{Sec}[c+d x]}}$$

Result (type 3, 75 leaves):

$$\frac{\left(-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\operatorname{Sec}[c+d x]^{3/2}}{d (b \operatorname{Sec}[c+d x])^{3/2}}$$

- **Problem 178: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{7/2}}{(b\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 36 leaves, 2 steps):

$$\frac{\text{ArcTanh}[\text{Sin}[c+d x]]\,\sqrt{\text{Sec}[c+d x]}}{b^2\,d\,\sqrt{b\,\text{Sec}[c+d x]}}$$

Result (type 3, 78 leaves):

$$\frac{\left(-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\sqrt{\text{Sec}[c+d x]}}{b^2\,d\,\sqrt{b\,\text{Sec}[c+d x]}}$$

- **Problem 230: Result unnecessarily involves higher level functions.**

$$\int (d\,\text{Csc}[a+b x])^{9/2}\,\sqrt{c\,\text{Sec}[a+b x]}\,dx$$

Optimal (type 4, 128 leaves, 5 steps):

$$-\frac{4\,c\,d^3\,(d\,\text{Csc}[a+b x])^{3/2}}{7\,b\,\sqrt{c\,\text{Sec}[a+b x]}}-\frac{2\,c\,d\,(d\,\text{Csc}[a+b x])^{7/2}}{7\,b\,\sqrt{c\,\text{Sec}[a+b x]}}+\frac{4\,d^4\,\sqrt{d\,\text{Csc}[a+b x]}\;\text{EllipticF}\left[a-\frac{\pi}{4}+b x,\,2\right]\sqrt{c\,\text{Sec}[a+b x]}\,\sqrt{\text{Sin}[2 a+2 b x]}}{7\,b}$$

Result (type 5, 122 leaves):

$$\frac{1}{7\,b\,\left(-2+\text{Csc}[a+b x]^2\right)}2\,d^4\,\text{Cos}[2\,(a+b x)]\,\text{Cot}[a+b x]\,\sqrt{d\,\text{Csc}[a+b x]}\,\sqrt{c\,\text{Sec}[a+b x]}$$
$$\left((-2+\text{Cos}[2\,(a+b x)])\,\text{Csc}[a+b x]^4-2\,\left(-\text{Cot}[a+b x]^2\right)^{3/4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{3}{2},\text{Csc}[a+b x]^2\right]\,\text{Sec}[a+b x]^2\right)$$

- **Problem 232: Result unnecessarily involves higher level functions.**

$$\int (d\,\text{Csc}[a+b x])^{5/2}\,\sqrt{c\,\text{Sec}[a+b x]}\,dx$$

Optimal (type 4, 93 leaves, 4 steps):

$$-\frac{2\,c\,d\,(d\,\text{Csc}[a+b x])^{3/2}}{3\,b\,\sqrt{c\,\text{Sec}[a+b x]}}+\frac{2\,d^2\,\sqrt{d\,\text{Csc}[a+b x]}\;\text{EllipticF}\left[a-\frac{\pi}{4}+b x,\,2\right]\sqrt{c\,\text{Sec}[a+b x]}\,\sqrt{\text{Sin}[2 a+2 b x]}}{3\,b}$$

Result (type 5, 109 leaves):

$$-\frac{1}{3\,b\,\left(-2+\text{Csc}[a+b x]^2\right)}d\,(\text{Cos}[a+b x]+\text{Cos}[3\,(a+b x)])\,(d\,\text{Csc}[a+b x])^{3/2}$$
$$\left(\text{Cot}[a+b x]^2+\left(-\text{Cot}[a+b x]^2\right)^{3/4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{3}{2},\text{Csc}[a+b x]^2\right]\right)\,\text{Sec}[a+b x]^2\,\sqrt{c\,\text{Sec}[a+b x]}$$

Problem 234: Result unnecessarily involves higher level functions.

$$\int \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \, dx$$

Optimal (type 4, 53 leaves, 3 steps):

$$\frac{\sqrt{d \operatorname{Csc}[a+b x]} \operatorname{EllipticF}\left[a-\frac{\pi}{4}+b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}{b}$$

Result (type 5, 68 leaves):

$$\frac{1}{b}\left(-\operatorname{Cot}[a+b x]^2\right)^{7/4} \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right] \sqrt{c \operatorname{Sec}[a+b x]} \operatorname{Tan}[a+b x]^3$$

Problem 235: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{c \operatorname{Sec}[a+b x]}}{\sqrt{d \operatorname{Csc}[a+b x]}} \, dx$$

Optimal (type 3, 270 leaves, 12 steps):

$$-\frac{\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{c \operatorname{Sec}[a+b x]}}{\sqrt{2} b \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}+\frac{\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{c \operatorname{Sec}[a+b x]}}{\sqrt{2} b \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}+\frac{\operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{c \operatorname{Sec}[a+b x]}}{2 \sqrt{2} b \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}-\frac{\operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{c \operatorname{Sec}[a+b x]}}{2 \sqrt{2} b \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}$$

Result (type 5, 69 leaves):

$$\frac{\operatorname{Hypergeometric2F1}\left[\frac{3}{4}, \frac{3}{4}, \frac{7}{4}, \operatorname{Sin}[a+b x]^2\right] \sqrt{c \operatorname{Sec}[a+b x]} \operatorname{Sin}[2(a+b x)]}{3 b \left(\operatorname{Cos}[a+b x]^2\right)^{1/4} \sqrt{d \operatorname{Csc}[a+b x]}}$$

Problem 236: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{c \operatorname{Sec}[a+b x]}}{(d \operatorname{Csc}[a+b x])^{3/2}} \, dx$$

Optimal (type 4, 93 leaves, 4 steps):

$$-\frac{c}{b d \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]}}+\frac{\sqrt{d \operatorname{Csc}[a+b x]} \operatorname{EllipticF}\left[a-\frac{\pi}{4}+b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}{2 b d^2}$$

Result (type 5, 80 leaves):

$$-\frac{1}{2 b c d \sqrt{d \operatorname{Csc}[a+b x]}}\left(1+\operatorname{Cos}[2(a+b x)]+\left(-\operatorname{Cot}[a+b x]^2\right)^{3/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right)(c \operatorname{Sec}[a+b x])^{3/2}$$

Problem 237: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{(d\,\mathrm{Csc}[a+b\,x])^{5/2}}\,dx$$

Optimal (type 3, 322 leaves, 13 steps):

$$-\frac{c}{2\,b\,d\,(d\,\mathrm{Csc}[a+b\,x])^{3/2}\sqrt{c\,\mathrm{Sec}[a+b\,x]}}-\frac{3\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}\right]\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{4\,\sqrt{2}\,b\,d^2\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{\mathrm{Tan}[a+b\,x]}}+\frac{3\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}\right]\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{4\,\sqrt{2}\,b\,d^2\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{\mathrm{Tan}[a+b\,x]}}+$$
$$\frac{3\,\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}+\mathrm{Tan}[a+b\,x]\right]\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{8\,\sqrt{2}\,b\,d^2\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{\mathrm{Tan}[a+b\,x]}}-\frac{3\,\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}+\mathrm{Tan}[a+b\,x]\right]\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{8\,\sqrt{2}\,b\,d^2\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{\mathrm{Tan}[a+b\,x]}}$$

Result (type 5, 87 leaves):

$$-\frac{\left(\left(\mathrm{Cos}[a+b\,x]^2\right)^{1/4}-\mathrm{Hypergeometric2F1}\left[\frac{3}{4},\frac{3}{4},\frac{7}{4},\mathrm{Sin}[a+b\,x]^2\right]\right)\sqrt{c\,\mathrm{Sec}[a+b\,x]}\,\mathrm{Sin}[2\,(a+b\,x)]}{4\,b\,d^2\,\left(\mathrm{Cos}[a+b\,x]^2\right)^{1/4}\sqrt{d\,\mathrm{Csc}[a+b\,x]}}$$

Problem 239: Result unnecessarily involves higher level functions.

$$\int (d\,\mathrm{Csc}[a+b\,x])^{7/2}\,(c\,\mathrm{Sec}[a+b\,x])^{3/2}\,dx$$

Optimal (type 4, 166 leaves, 6 steps):

$$\frac{24\,c\,d^5\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{5\,b\,(d\,\mathrm{Csc}[a+b\,x])^{3/2}}-\frac{12\,c\,d^3\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{5\,b}-$$
$$\frac{2\,c\,d\,(d\,\mathrm{Csc}[a+b\,x])^{5/2}\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{5\,b}-\frac{24\,c^2\,d^4\,\mathrm{EllipticE}\left[a-\frac{\pi}{4}+b\,x,2\right]}{5\,b\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}\,\sqrt{\mathrm{Sin}[2\,a+2\,b\,x]}}$$

Result (type 5, 87 leaves):

$$\frac{1}{5\,b}2\,c\,d\,(d\,\mathrm{Csc}[a+b\,x])^{5/2}\sqrt{c\,\mathrm{Sec}[a+b\,x]}$$
$$\left(2-3\,\mathrm{Cos}[2\,(a+b\,x)]-6\,\left(-\mathrm{Cot}[a+b\,x]^2\right)^{1/4}\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{3}{2},\mathrm{Csc}[a+b\,x]^2\right]\mathrm{Sin}[a+b\,x]^2\right)$$

Problem 241: Result unnecessarily involves higher level functions.

$$\int (d\,\mathrm{Csc}[a+b\,x])^{3/2}\,(c\,\mathrm{Sec}[a+b\,x])^{3/2}\,dx$$

Optimal (type 4, 125 leaves, 5 steps):

$$\frac{4\,c\,d^3\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{b\,(d\,\mathrm{Csc}[a+b\,x])^{3/2}}-\frac{2\,c\,d\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{b}-\frac{4\,c^2\,d^2\,\mathrm{EllipticE}\left[a-\frac{\pi}{4}+b\,x,2\right]}{b\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}\,\sqrt{\mathrm{Sin}[2\,a+2\,b\,x]}}$$

Result (type 5, 66 leaves) :

$$-\frac{1}{b}2\,c\,d\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\left(-1+\left(-\mathrm{Cot}[a+b\,x]^2\right)^{1/4}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{3}{2},\mathrm{Csc}[a+b\,x]^2\right]\right)\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}$$

- **Problem 243: Result unnecessarily involves higher level functions.**

$$\int\frac{(c\,\mathrm{Sec}[a+b\,x])^{3/2}}{\sqrt{d\,\mathrm{Csc}[a+b\,x]}}\,dx$$

Optimal (type 4, 89 leaves, 4 steps) :

$$\frac{2\,c\,d\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{b\,(d\,\mathrm{Csc}[a+b\,x])^{3/2}}-\frac{2\,c^2\,\mathrm{EllipticE}\left[a-\frac{\pi}{4}+b\,x,2\right]}{b\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}\,\sqrt{\mathrm{Sin}[2\,a+2\,b\,x]}}$$

Result (type 5, 70 leaves) :

$$-\frac{\mathrm{Cot}[a+b\,x]\,\left(-2+\left(-\mathrm{Cot}[a+b\,x]^2\right)^{1/4}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{3}{2},\mathrm{Csc}[a+b\,x]^2\right]\right)\,(c\,\mathrm{Sec}[a+b\,x])^{3/2}}{b\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}}$$

- **Problem 244: Result unnecessarily involves higher level functions.**

$$\int\frac{(c\,\mathrm{Sec}[a+b\,x])^{3/2}}{(d\,\mathrm{Csc}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 3, 327 leaves, 13 steps) :

$$\frac{2\,c\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{b\,d\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}}+\frac{c^2\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}\right]\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{\mathrm{Tan}[a+b\,x]}}{\sqrt{2}\,b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}-$$
$$\frac{c^2\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}\right]\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\sqrt{\mathrm{Tan}[a+b\,x]}}{\sqrt{2}\,b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}+\frac{c^2\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}+\mathrm{Tan}[a+b\,x]\right]\,\sqrt{\mathrm{Tan}[a+b\,x]}}{2\,\sqrt{2}\,b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}-$$
$$\frac{c^2\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\,\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[a+b\,x]}+\mathrm{Tan}[a+b\,x]\right]\,\sqrt{\mathrm{Tan}[a+b\,x]}}{2\,\sqrt{2}\,b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}$$

Result (type 5, 86 leaves) :

$$\frac{2\,c\,\left(\left(\mathrm{Cos}[a+b\,x]^2\right)^{3/4}-\mathrm{Cos}[a+b\,x]^2\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{4},\frac{5}{4},\mathrm{Sin}[a+b\,x]^2\right]\right)\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}{b\,d\,\left(\mathrm{Cos}[a+b\,x]^2\right)^{3/4}\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}}$$

- **Problem 245: Result unnecessarily involves higher level functions.**

$$\int\frac{(c\,\mathrm{Sec}[a+b\,x])^{3/2}}{(d\,\mathrm{Csc}[a+b\,x])^{5/2}}\,dx$$

Optimal (type 4, 94 leaves, 4 steps) :

$$\frac{2 c \sqrt{c \operatorname{Sec}[a+b x]}}{b d (d \operatorname{Csc}[a+b x])^{3/2}}-\frac{3 c^2 \operatorname{EllipticE}\left[a-\frac{\pi}{4}+b x, 2\right]}{b d^2 \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}$$

Result (type 5, 79 leaves):

$$\frac{1}{2 b d^3} c \sqrt{d \operatorname{Csc}[a+b x]} \left(5+\operatorname{Cos}[2 (a+b x)]-3 \left(-\operatorname{Cot}[a+b x]^2\right)^{1/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) \sqrt{c \operatorname{Sec}[a+b x]}$$

- **Problem 246: Result unnecessarily involves higher level functions.**

$$\int (d \operatorname{Csc}[a+b x])^{9/2} (c \operatorname{Sec}[a+b x])^{5/2} \, dx$$

Optimal (type 4, 166 leaves, 6 steps):

$$\frac{40 c d^5 (c \operatorname{Sec}[a+b x])^{3/2}}{21 b \sqrt{d \operatorname{Csc}[a+b x]}}-\frac{20 c d^3 (d \operatorname{Csc}[a+b x])^{3/2} (c \operatorname{Sec}[a+b x])^{3/2}}{21 b}-\frac{2 c d (d \operatorname{Csc}[a+b x])^{7/2} (c \operatorname{Sec}[a+b x])^{3/2}}{7 b}+\frac{40 c^2 d^4 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{EllipticF}\left[a-\frac{\pi}{4}+b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}{21 b}$$

Result (type 5, 92 leaves):

$$-\frac{1}{21 b \sqrt{d \operatorname{Csc}[a+b x]}} 2 c d^5 \left(-7+\operatorname{Cot}[a+b x]^2 \left(13+3 \operatorname{Csc}[a+b x]^2\right)+20 \left(-\operatorname{Cot}[a+b x]^2\right)^{3/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) (c \operatorname{Sec}[a+b x])^{3/2}$$

- **Problem 248: Result unnecessarily involves higher level functions.**

$$\int (d \operatorname{Csc}[a+b x])^{5/2} (c \operatorname{Sec}[a+b x])^{5/2} \, dx$$

Optimal (type 4, 131 leaves, 5 steps):

$$\frac{4 c d^3 (c \operatorname{Sec}[a+b x])^{3/2}}{3 b \sqrt{d \operatorname{Csc}[a+b x]}}-\frac{2 c d (d \operatorname{Csc}[a+b x])^{3/2} (c \operatorname{Sec}[a+b x])^{3/2}}{3 b}+\frac{4 c^2 d^2 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{EllipticF}\left[a-\frac{\pi}{4}+b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}{3 b}$$

Result (type 5, 87 leaves):

$$-\frac{1}{3 b \sqrt{c \operatorname{Sec}[a+b x]}} 2 c^3 d (d \operatorname{Csc}[a+b x])^{3/2} \left(-1+\operatorname{Cot}[a+b x]^2+2 \left(-\operatorname{Cot}[a+b x]^2\right)^{3/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) \operatorname{Tan}[a+b x]^2$$

- **Problem 250: Result unnecessarily involves higher level functions.**

$$\int \sqrt{d \operatorname{Csc}[a+b x]} (c \operatorname{Sec}[a+b x])^{5/2} \, dx$$

Optimal (type 4, 93 leaves, 4 steps) :

$$\frac{2\,c\,d\,(c\,\text{Sec}[a+b\,x])^{3/2}}{3\,b\,\sqrt{d\,\text{Csc}[a+b\,x]}}+\frac{2\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\;\text{EllipticF}\left[a-\frac{\pi}{4}+b\,x,\,2\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}\;\sqrt{\text{Sin}[2\,a+2\,b\,x]}}{3\,b}$$

Result (type 5, 68 leaves) :

$$-\frac{2\,c\,d\,\left(-1+\left(-\text{Cot}[a+b\,x]^2\right)^{3/4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{3}{2},\,\text{Csc}[a+b\,x]^2\right]\right)\,(c\,\text{Sec}[a+b\,x])^{3/2}}{3\,b\,\sqrt{d\,\text{Csc}[a+b\,x]}}$$

- **Problem 252: Result unnecessarily involves higher level functions.**

$$\int\frac{(c\,\text{Sec}[a+b\,x])^{5/2}}{(d\,\text{Csc}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 4, 98 leaves, 4 steps) :

$$\frac{2\,c\,(c\,\text{Sec}[a+b\,x])^{3/2}}{3\,b\,d\,\sqrt{d\,\text{Csc}[a+b\,x]}}-\frac{c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\;\text{EllipticF}\left[a-\frac{\pi}{4}+b\,x,\,2\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}\;\sqrt{\text{Sin}[2\,a+2\,b\,x]}}{3\,b\,d^2}$$

Result (type 5, 70 leaves) :

$$\frac{c\,\left(2+\left(-\text{Cot}[a+b\,x]^2\right)^{3/4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{3}{2},\,\text{Csc}[a+b\,x]^2\right]\right)\,(c\,\text{Sec}[a+b\,x])^{3/2}}{3\,b\,d\,\sqrt{d\,\text{Csc}[a+b\,x]}}$$

- **Problem 253: Result unnecessarily involves higher level functions.**

$$\int\frac{(c\,\text{Sec}[a+b\,x])^{5/2}}{(d\,\text{Csc}[a+b\,x])^{5/2}}\,dx$$

Optimal (type 3, 329 leaves, 13 steps) :

$$\frac{2\,c\,(c\,\text{Sec}[a+b\,x])^{3/2}}{3\,b\,d\,(d\,\text{Csc}[a+b\,x])^{3/2}}+\frac{c^2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}}{\sqrt{2}\,b\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}-\frac{c^2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}}{\sqrt{2}\,b\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}-$$
$$\frac{c^2\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}}{2\,\sqrt{2}\,b\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}+\frac{c^2\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}}{2\,\sqrt{2}\,b\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}$$

Result (type 5, 88 leaves) :

$$\frac{2\,c\,\left(\left(\text{Cos}[a+b\,x]^2\right)^{1/4}-\text{Cos}[a+b\,x]^2\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,\frac{3}{4},\,\frac{7}{4},\,\text{Sin}[a+b\,x]^2\right]\right)\,(c\,\text{Sec}[a+b\,x])^{3/2}}{3\,b\,d\,\left(\text{Cos}[a+b\,x]^2\right)^{1/4}\,(d\,\text{Csc}[a+b\,x])^{3/2}}$$

Problem 255: Result unnecessarily involves higher level functions.

$$\int \frac{(d \operatorname{Csc}[a+b x])^{7/2}}{\sqrt{c \operatorname{Sec}[a+b x]}} \, dx$$

Optimal (type 4, 128 leaves, 5 steps):

$$-\frac{4 c d^3 \sqrt{d \operatorname{Csc}[a+b x]}}{5 b (c \operatorname{Sec}[a+b x])^{3/2}}-\frac{2 c d (d \operatorname{Csc}[a+b x])^{5/2}}{5 b (c \operatorname{Sec}[a+b x])^{3/2}}-\frac{4 d^4 \operatorname{EllipticE}\left[a-\frac{\pi}{4}+b x, 2\right]}{5 b \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}$$

Result (type 5, 79 leaves):

$$-\frac{1}{5 b c} 2 d^3 \sqrt{d \operatorname{Csc}[a+b x]} \left(\operatorname{Cot}[a+b x]^2+\left(-\operatorname{Cot}[a+b x]^2\right)^{1/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) \sqrt{c \operatorname{Sec}[a+b x]}$$

Problem 257: Result unnecessarily involves higher level functions.

$$\int \frac{(d \operatorname{Csc}[a+b x])^{3/2}}{\sqrt{c \operatorname{Sec}[a+b x]}} \, dx$$

Optimal (type 4, 89 leaves, 4 steps):

$$-\frac{2 c d \sqrt{d \operatorname{Csc}[a+b x]}}{b (c \operatorname{Sec}[a+b x])^{3/2}}-\frac{2 d^2 \operatorname{EllipticE}\left[a-\frac{\pi}{4}+b x, 2\right]}{b \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}$$

Result (type 5, 65 leaves):

$$-\frac{d \left(-\operatorname{Cot}[a+b x]^2\right)^{1/4} \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right] \sqrt{c \operatorname{Sec}[a+b x]}}{b c}$$

Problem 258: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{d \operatorname{Csc}[a+b x]}}{\sqrt{c \operatorname{Sec}[a+b x]}} \, dx$$

Optimal (type 3, 270 leaves, 12 steps):

$$-\frac{\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{\sqrt{2} b \sqrt{c \operatorname{Sec}[a+b x]}}+$$
$$\frac{\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{\sqrt{2} b \sqrt{c \operatorname{Sec}[a+b x]}}-\frac{\sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{2 \sqrt{2} b \sqrt{c \operatorname{Sec}[a+b x]}}+$$
$$\frac{\sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{2 \sqrt{2} b \sqrt{c \operatorname{Sec}[a+b x]}}$$

Result (type 5, 66 leaves):

$$\frac{\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{4},\frac{5}{4},\mathrm{Sin}[a+b\,x]^2\right]\mathrm{Sin}[2\,(a+b\,x)]}{b\,\left(\mathrm{Cos}[a+b\,x]^2\right)^{3/4}\sqrt{c\,\mathrm{Sec}[a+b\,x]}}$$

- **Problem 259: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \sqrt{c\,\mathrm{Sec}[a+b\,x]}}\,dx$$

Optimal (type 4, 53 leaves, 3 steps):

$$\frac{\mathrm{EllipticE}\left[a-\frac{\pi}{4}+b\,x,\,2\right]}{b\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \sqrt{c\,\mathrm{Sec}[a+b\,x]}\ \sqrt{\mathrm{Sin}[2\,a+2\,b\,x]}}$$

Result (type 5, 81 leaves):

$$-\frac{1}{2\,b\,c\,d}\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \left(1+\mathrm{Cos}[2\,(a+b\,x)]-\left(-\mathrm{Cot}[a+b\,x]^2\right)^{1/4}\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{3}{2},\mathrm{Csc}[a+b\,x]^2\right]\right)\sqrt{c\,\mathrm{Sec}[a+b\,x]}$$

- **Problem 260: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{(d\,\mathrm{Csc}[a+b\,x])^{3/2}\sqrt{c\,\mathrm{Sec}[a+b\,x]}}\,dx$$

Optimal (type 3, 322 leaves, 13 steps):

$$-\frac{c}{2\,b\,d\,\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ (c\,\mathrm{Sec}[a+b\,x])^{3/2}}-\frac{\mathrm{ArcTan}\left[1-\sqrt{2}\ \sqrt{\mathrm{Tan}[a+b\,x]}\right]\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \sqrt{\mathrm{Tan}[a+b\,x]}}{4\,\sqrt{2}\ b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}+$$
$$\frac{\mathrm{ArcTan}\left[1+\sqrt{2}\ \sqrt{\mathrm{Tan}[a+b\,x]}\right]\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \sqrt{\mathrm{Tan}[a+b\,x]}}{4\,\sqrt{2}\ b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}-\frac{\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \mathrm{Log}\left[1-\sqrt{2}\ \sqrt{\mathrm{Tan}[a+b\,x]}+\mathrm{Tan}[a+b\,x]\right]\sqrt{\mathrm{Tan}[a+b\,x]}}{8\,\sqrt{2}\ b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}+$$
$$\frac{\sqrt{d\,\mathrm{Csc}[a+b\,x]}\ \mathrm{Log}\left[1+\sqrt{2}\ \sqrt{\mathrm{Tan}[a+b\,x]}+\mathrm{Tan}[a+b\,x]\right]\sqrt{\mathrm{Tan}[a+b\,x]}}{8\,\sqrt{2}\ b\,d^2\,\sqrt{c\,\mathrm{Sec}[a+b\,x]}}$$

Result (type 5, 82 leaves):

$$-\frac{\mathrm{Cot}[a+b\,x]\left(\left(\mathrm{Cos}[a+b\,x]^2\right)^{3/4}-\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{4},\frac{5}{4},\mathrm{Sin}[a+b\,x]^2\right]\right)}{2\,b\,\left(\mathrm{Cos}[a+b\,x]^2\right)^{3/4}(d\,\mathrm{Csc}[a+b\,x])^{3/2}\sqrt{c\,\mathrm{Sec}[a+b\,x]}}$$

- **Problem 261: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{(d\,\mathrm{Csc}[a+b\,x])^{5/2}\sqrt{c\,\mathrm{Sec}[a+b\,x]}}\,dx$$

Optimal (type 4, 95 leaves, 4 steps):

$$-\frac{c}{3\,b\,d\,(d\,\text{Csc}[a+b\,x])^{3/2}\,(c\,\text{Sec}[a+b\,x])^{3/2}}+\frac{\text{EllipticE}\left[a-\frac{\pi}{4}+b\,x,\,2\right]}{2\,b\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{c\,\text{Sec}[a+b\,x]}\,\sqrt{\text{Sin}[2\,a+2\,b\,x]}}$$

Result (type 5, 99 leaves) :

$$\left(2\,(-4+\text{Cos}[2\,(a+b\,x)])\,\text{Cot}[a+b\,x]+3\,\left(-\text{Cot}[a+b\,x]^2\right)^{1/4}\,\text{Csc}[a+b\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{3}{2},\,\text{Csc}[a+b\,x]^2\right]\,\text{Sec}[a+b\,x]\right)\Big/\left(12\,b\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{c\,\text{Sec}[a+b\,x]}\right)$$

- **Problem 263: Result unnecessarily involves higher level functions.**

$$\int \frac{(d\,\text{Csc}[a+b\,x])^{9/2}}{(c\,\text{Sec}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 4, 135 leaves, 5 steps) :

$$\frac{2\,d^3\,(d\,\text{Csc}[a+b\,x])^{3/2}}{21\,b\,c\,\sqrt{c\,\text{Sec}[a+b\,x]}}-\frac{2\,d\,(d\,\text{Csc}[a+b\,x])^{7/2}}{7\,b\,c\,\sqrt{c\,\text{Sec}[a+b\,x]}}-\frac{2\,d^4\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\text{EllipticF}\left[a-\frac{\pi}{4}+b\,x,\,2\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}\,\sqrt{\text{Sin}[2\,a+2\,b\,x]}}{21\,b\,c^2}$$

Result (type 5, 119 leaves) :

$$-\left(d^3\,\text{Cos}[2\,(a+b\,x)]\,(d\,\text{Csc}[a+b\,x])^{3/2}\left((5+\text{Cos}[2\,(a+b\,x)])\,\text{Csc}[a+b\,x]^4-2\,\left(-\text{Cot}[a+b\,x]^2\right)^{3/4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{3}{2},\,\text{Csc}[a+b\,x]^2\right]\,\text{Sec}[a+b\,x]^2\right)\right)\Big/\left(21\,b\,c\,\left(-2+\text{Csc}[a+b\,x]^2\right)\,\sqrt{c\,\text{Sec}[a+b\,x]}\right)$$

- **Problem 265: Result unnecessarily involves higher level functions.**

$$\int \frac{(d\,\text{Csc}[a+b\,x])^{5/2}}{(c\,\text{Sec}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 4, 98 leaves, 4 steps) :

$$-\frac{2\,d\,(d\,\text{Csc}[a+b\,x])^{3/2}}{3\,b\,c\,\sqrt{c\,\text{Sec}[a+b\,x]}}-\frac{d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\text{EllipticF}\left[a-\frac{\pi}{4}+b\,x,\,2\right]\,\sqrt{c\,\text{Sec}[a+b\,x]}\,\sqrt{\text{Sin}[2\,a+2\,b\,x]}}{3\,b\,c^2}$$

Result (type 5, 105 leaves) :

$$-\left(d\,\text{Cos}[2\,(a+b\,x)]\,(d\,\text{Csc}[a+b\,x])^{3/2}\left(2\,\text{Cot}[a+b\,x]^2-\left(-\text{Cot}[a+b\,x]^2\right)^{3/4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{3}{2},\,\text{Csc}[a+b\,x]^2\right]\right)\,\text{Sec}[a+b\,x]^3\right)\Big/\left(3\,b\,\left(-2+\text{Csc}[a+b\,x]^2\right)\,(c\,\text{Sec}[a+b\,x])^{3/2}\right)$$

- **Problem 266: Result unnecessarily involves higher level functions.**

$$\int \frac{(d\,\text{Csc}[a+b\,x])^{3/2}}{(c\,\text{Sec}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 3, 327 leaves, 13 steps):

$$-\frac{2\,d\,\sqrt{d\,\text{Csc}[a+b\,x]}}{b\,c\,\sqrt{c\,\text{Sec}[a+b\,x]}}+\frac{d^2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}-\frac{d^2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}-\frac{d^2\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{2\,\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}+\frac{d^2\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{2\,\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}$$

Result (type 5, 95 leaves):

$$-\left(2\,(d\,\text{Csc}[a+b\,x])^{3/2}\left(3\,\left(\text{Cos}[a+b\,x]^2\right)^{1/4}\text{Csc}[a+b\,x]^2+\text{Hypergeometric2F1}\left[\frac{3}{4},\frac{3}{4},\frac{7}{4},\text{Sin}[a+b\,x]^2\right]\right)\text{Sin}[a+b\,x]^3\right)\Big/\left(3\,b\,c\,\left(\text{Cos}[a+b\,x]^2\right)^{1/4}\sqrt{c\,\text{Sec}[a+b\,x]}\right)$$

Problem 267: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{d\,\text{Csc}[a+b\,x]}}{(c\,\text{Sec}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 4, 92 leaves, 4 steps):

$$\frac{d}{b\,c\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{c\,\text{Sec}[a+b\,x]}}+\frac{\sqrt{d\,\text{Csc}[a+b\,x]}\,\text{EllipticF}\left[a-\frac{\pi}{4}+b\,x,2\right]\sqrt{c\,\text{Sec}[a+b\,x]}\,\sqrt{\text{Sin}[2\,a+2\,b\,x]}}{2\,b\,c^2}$$

Result (type 5, 84 leaves):

$$\frac{d\left(1+\text{Cos}[2\,(a+b\,x)]-\left(-\text{Cot}[a+b\,x]^2\right)^{3/4}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{3}{2},\text{Csc}[a+b\,x]^2\right]\right)\text{Sec}[a+b\,x]^3}{2\,b\,\sqrt{d\,\text{Csc}[a+b\,x]}\,(c\,\text{Sec}[a+b\,x])^{3/2}}$$

Problem 268: Result unnecessarily involves higher level functions.

$$\int\frac{1}{\sqrt{d\,\text{Csc}[a+b\,x]}\,(c\,\text{Sec}[a+b\,x])^{3/2}}\,dx$$

Optimal (type 3, 322 leaves, 13 steps):

$$\frac{d}{2\,b\,c\,(d\,\text{Csc}[a+b\,x])^{3/2}\sqrt{c\,\text{Sec}[a+b\,x]}}-\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{4\,\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}+\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{4\,\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{8\,\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\sqrt{c\,\text{Sec}[a+b\,x]}}{8\,\sqrt{2}\,b\,c^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}$$

Result (type 5, 80 leaves):

$$\frac{d\left(3\left(\text{Cos}[a+b x]^2\right)^{1/4}+\text{Hypergeometric2F1}\left[\frac{3}{4},\frac{3}{4},\frac{7}{4},\text{Sin}[a+b x]^2\right]\right)}{6 b c\left(\text{Cos}[a+b x]^2\right)^{1/4}(d\,\text{Csc}[a+b x])^{3/2}\sqrt{c\,\text{Sec}[a+b x]}}$$

Problem 269: Result unnecessarily involves higher level functions.

$$\int\frac{1}{(d\,\text{Csc}[a+b x])^{3/2}(c\,\text{Sec}[a+b x])^{3/2}}\,dx$$

Optimal (type 4, 135 leaves, 5 steps):

$$-\frac{c}{3 b d\sqrt{d\,\text{Csc}[a+b x]}\,(c\,\text{Sec}[a+b x])^{5/2}}+\frac{1}{6 b c d\sqrt{d\,\text{Csc}[a+b x]}\sqrt{c\,\text{Sec}[a+b x]}}+\frac{\sqrt{d\,\text{Csc}[a+b x]}\,\text{EllipticF}\left[a-\frac{\pi}{4}+b x,2\right]\sqrt{c\,\text{Sec}[a+b x]}\sqrt{\text{Sin}[2 a+2 b x]}}{12 b c^2 d^2}$$

Result (type 5, 89 leaves):

$$\frac{-2\,\text{Cos}[2(a+b x)]+\frac{\text{Csc}[a+b x]^2\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{3}{2},\text{Csc}[a+b x]^2\right]}{\left(-\text{Cot}[a+b x]^2\right)^{1/4}}}{12 b c d\sqrt{d\,\text{Csc}[a+b x]}\sqrt{c\,\text{Sec}[a+b x]}}$$

Problem 270: Result unnecessarily involves higher level functions.

$$\int\frac{1}{(d\,\text{Csc}[a+b x])^{5/2}(c\,\text{Sec}[a+b x])^{3/2}}\,dx$$

Optimal (type 3, 371 leaves, 14 steps):

$$-\frac{c}{4 b d(d\,\text{Csc}[a+b x])^{3/2}(c\,\text{Sec}[a+b x])^{5/2}}+\frac{3}{16 b c d(d\,\text{Csc}[a+b x])^{3/2}\sqrt{c\,\text{Sec}[a+b x]}}-\frac{3\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[a+b x]}\right]\sqrt{c\,\text{Sec}[a+b x]}}{32\sqrt{2}\,b c^2 d^2\sqrt{d\,\text{Csc}[a+b x]}\sqrt{\text{Tan}[a+b x]}}+\frac{3\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[a+b x]}\right]\sqrt{c\,\text{Sec}[a+b x]}}{32\sqrt{2}\,b c^2 d^2\sqrt{d\,\text{Csc}[a+b x]}\sqrt{\text{Tan}[a+b x]}}+\frac{3\,\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[a+b x]}+\text{Tan}[a+b x]\right]\sqrt{c\,\text{Sec}[a+b x]}}{64\sqrt{2}\,b c^2 d^2\sqrt{d\,\text{Csc}[a+b x]}\sqrt{\text{Tan}[a+b x]}}-\frac{3\,\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[a+b x]}+\text{Tan}[a+b x]\right]\sqrt{c\,\text{Sec}[a+b x]}}{64\sqrt{2}\,b c^2 d^2\sqrt{d\,\text{Csc}[a+b x]}\sqrt{\text{Tan}[a+b x]}}$$

Result (type 5, 93 leaves):

$$\frac{\left(\text{Cos}[a+b x]^2\right)^{1/4}(1-2\,\text{Cos}[2(a+b x)])+\text{Hypergeometric2F1}\left[\frac{3}{4},\frac{3}{4},\frac{7}{4},\text{Sin}[a+b x]^2\right]}{16 b c d\left(\text{Cos}[a+b x]^2\right)^{1/4}(d\,\text{Csc}[a+b x])^{3/2}\sqrt{c\,\text{Sec}[a+b x]}}$$

Problem 272: Result unnecessarily involves higher level functions.

$$\int\frac{(d\,\text{Csc}[a+b x])^{7/2}}{(c\,\text{Sec}[a+b x])^{5/2}}\,dx$$

Optimal (type 4, 135 leaves, 5 steps):

$$\frac{6 d^3 \sqrt{d \operatorname{Csc}[a+b x]}}{5 b c (c \operatorname{Sec}[a+b x])^{3/2}}-\frac{2 d (d \operatorname{Csc}[a+b x])^{5/2}}{5 b c (c \operatorname{Sec}[a+b x])^{3/2}}+\frac{6 d^4 \operatorname{EllipticE}\left[a-\frac{\pi}{4}+b x, 2\right]}{5 b c^2 \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}$$

Result (type 5, 82 leaves):

$$-\frac{1}{5 b c^3} d^3 \sqrt{d \operatorname{Csc}[a+b x]} \left(2 \operatorname{Cot}[a+b x]^2-3 \left(-\operatorname{Cot}[a+b x]^2\right)^{1/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) \sqrt{c \operatorname{Sec}[a+b x]}$$

- **Problem 273: Result unnecessarily involves higher level functions.**

$$\int \frac{(d \operatorname{Csc}[a+b x])^{5/2}}{(c \operatorname{Sec}[a+b x])^{5/2}} \, dx$$

Optimal (type 3, 329 leaves, 13 steps):

$$-\frac{2 d (d \operatorname{Csc}[a+b x])^{3/2}}{3 b c (c \operatorname{Sec}[a+b x])^{3/2}}+\frac{d^2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{\sqrt{2} b c^2 \sqrt{c \operatorname{Sec}[a+b x]}}-\frac{d^2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{\sqrt{2} b c^2 \sqrt{c \operatorname{Sec}[a+b x]}}+\frac{d^2 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{2 \sqrt{2} b c^2 \sqrt{c \operatorname{Sec}[a+b x]}}-\frac{d^2 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{2 \sqrt{2} b c^2 \sqrt{c \operatorname{Sec}[a+b x]}}$$

Result (type 5, 88 leaves):

$$-\frac{2 d (d \operatorname{Csc}[a+b x])^{3/2} \left(\left(\operatorname{Cos}[a+b x]^2\right)^{3/4}+3 \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{4}, \frac{5}{4}, \operatorname{Sin}[a+b x]^2\right] \operatorname{Sin}[a+b x]^2\right)}{3 b c \left(\operatorname{Cos}[a+b x]^2\right)^{3/4} (c \operatorname{Sec}[a+b x])^{3/2}}$$

- **Problem 274: Result unnecessarily involves higher level functions.**

$$\int \frac{(d \operatorname{Csc}[a+b x])^{3/2}}{(c \operatorname{Sec}[a+b x])^{5/2}} \, dx$$

Optimal (type 4, 94 leaves, 4 steps):

$$-\frac{2 d \sqrt{d \operatorname{Csc}[a+b x]}}{b c (c \operatorname{Sec}[a+b x])^{3/2}}-\frac{3 d^2 \operatorname{EllipticE}\left[a-\frac{\pi}{4}+b x, 2\right]}{b c^2 \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}$$

Result (type 5, 79 leaves):

$$\frac{1}{2 b c^3} d \sqrt{d \operatorname{Csc}[a+b x]} \left(1+\operatorname{Cos}[2 (a+b x)]-3 \left(-\operatorname{Cot}[a+b x]^2\right)^{1/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) \sqrt{c \operatorname{Sec}[a+b x]}$$

- **Problem 275: Result unnecessarily involves higher level functions.**

$$\int \frac{\sqrt{d \operatorname{Csc}[a+b x]}}{(c \operatorname{Sec}[a+b x])^{5/2}} \, dx$$

Optimal (type 3, 322 leaves, 13 steps):

$$\frac{d}{2 b c \sqrt{d \operatorname{Csc}[a+b x]} \, (c \operatorname{Sec}[a+b x])^{3/2}} - \frac{3 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{4 \sqrt{2} \, b c^2 \sqrt{c \operatorname{Sec}[a+b x]}} + \frac{3 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{4 \sqrt{2} \, b c^2 \sqrt{c \operatorname{Sec}[a+b x]}} - \frac{3 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{8 \sqrt{2} \, b c^2 \sqrt{c \operatorname{Sec}[a+b x]}} + \frac{3 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{8 \sqrt{2} \, b c^2 \sqrt{c \operatorname{Sec}[a+b x]}}$$

Result (type 5, 87 leaves):

$$\frac{\sqrt{d \operatorname{Csc}[a+b x]} \left(\left(\operatorname{Cos}[a+b x]^2\right)^{3/4} + 3 \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{4}, \frac{5}{4}, \operatorname{Sin}[a+b x]^2\right]\right) \operatorname{Sin}[2 (a+b x)]}{4 b c^2 \left(\operatorname{Cos}[a+b x]^2\right)^{3/4} \sqrt{c \operatorname{Sec}[a+b x]}}$$

- **Problem 276: Result unnecessarily involves higher level functions.**

$$\int \frac{1}{\sqrt{d \operatorname{Csc}[a+b x]} \, (c \operatorname{Sec}[a+b x])^{5/2}} \, dx$$

Optimal (type 4, 95 leaves, 4 steps):

$$\frac{d}{3 b c \, (d \operatorname{Csc}[a+b x])^{3/2} \, (c \operatorname{Sec}[a+b x])^{3/2}} + \frac{\operatorname{EllipticE}\left[a-\frac{\pi}{4}+b x, 2\right]}{2 b c^2 \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}}$$

Result (type 5, 91 leaves):

$$-\frac{1}{24 b c^3 d} \sqrt{d \operatorname{Csc}[a+b x]} \left(5+6 \operatorname{Cos}[2 (a+b x)] + \operatorname{Cos}[4 (a+b x)] - 6 \left(-\operatorname{Cot}[a+b x]^2\right)^{1/4} \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{3}{2}, \operatorname{Csc}[a+b x]^2\right]\right) \sqrt{c \operatorname{Sec}[a+b x]}$$

- **Problem 277: Result unnecessarily involves higher level functions.**

$$\int \frac{1}{(d \operatorname{Csc}[a+b x])^{3/2} \, (c \operatorname{Sec}[a+b x])^{5/2}} \, dx$$

Optimal (type 3, 371 leaves, 14 steps):

$$-\frac{c}{4\,b\,d\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\left(c\,\text{Sec}[a+b\,x]\right)^{7/2}}+\frac{1}{16\,b\,c\,d\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\left(c\,\text{Sec}[a+b\,x]\right)^{3/2}}-\frac{3\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}{32\,\sqrt{2}\,b\,c^2\,d^2\,\sqrt{c\,\text{Sec}[a+b\,x]}}+\frac{3\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}\right]\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{\text{Tan}[a+b\,x]}}{32\,\sqrt{2}\,b\,c^2\,d^2\,\sqrt{c\,\text{Sec}[a+b\,x]}}-\frac{3\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\,\sqrt{\text{Tan}[a+b\,x]}}{64\,\sqrt{2}\,b\,c^2\,d^2\,\sqrt{c\,\text{Sec}[a+b\,x]}}+\frac{3\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[a+b\,x]}+\text{Tan}[a+b\,x]\right]\,\sqrt{\text{Tan}[a+b\,x]}}{64\,\sqrt{2}\,b\,c^2\,d^2\,\sqrt{c\,\text{Sec}[a+b\,x]}}$$

Result (type 5, 98 leaves) :

$$-\frac{\text{Cot}[a+b\,x]\,\left(\left(\text{Cos}[a+b\,x]^2\right)^{3/4}\,\left(1+2\,\text{Cos}[2\,(a+b\,x)]\right)-3\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{4},\frac{5}{4},\text{Sin}[a+b\,x]^2\right]\right)}{16\,b\,c^2\,\left(\text{Cos}[a+b\,x]^2\right)^{3/4}\,\left(d\,\text{Csc}[a+b\,x]\right)^{3/2}\,\sqrt{c\,\text{Sec}[a+b\,x]}}$$

- **Problem 278: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{\left(d\,\text{Csc}[a+b\,x]\right)^{5/2}\,\left(c\,\text{Sec}[a+b\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 135 leaves, 5 steps) :

$$-\frac{c}{5\,b\,d\,\left(d\,\text{Csc}[a+b\,x]\right)^{3/2}\,\left(c\,\text{Sec}[a+b\,x]\right)^{7/2}}+\frac{1}{10\,b\,c\,d\,\left(d\,\text{Csc}[a+b\,x]\right)^{3/2}\,\left(c\,\text{Sec}[a+b\,x]\right)^{3/2}}+\frac{3\,\text{EllipticE}\left[a-\frac{\pi}{4}+b\,x,2\right]}{20\,b\,c^2\,d^2\,\sqrt{d\,\text{Csc}[a+b\,x]}\,\sqrt{c\,\text{Sec}[a+b\,x]}\,\sqrt{\text{Sin}[2\,a+2\,b\,x]}}$$

Result (type 5, 91 leaves) :

$$\frac{1}{160\,b\,c^3\,d^3}\sqrt{d\,\text{Csc}[a+b\,x]}\,\left(-12-13\,\text{Cos}[2\,(a+b\,x)]+\text{Cos}[6\,(a+b\,x)]+12\,\left(-\text{Cot}[a+b\,x]^2\right)^{1/4}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{3}{2},\text{Csc}[a+b\,x]^2\right]\right)\,\sqrt{c\,\text{Sec}[a+b\,x]}$$

- **Problem 279: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{\left(d\,\text{Csc}[a+b\,x]\right)^{7/2}\,\left(c\,\text{Sec}[a+b\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 406 leaves, 15 steps) :

$$-\frac{c}{6 b d (d \operatorname{Csc}[a+b x])^{5/2} (c \operatorname{Sec}[a+b x])^{7/2}}-\frac{5 c}{48 b d^3 \sqrt{d \operatorname{Csc}[a+b x]} (c \operatorname{Sec}[a+b x])^{7/2}}+\frac{5}{192 b c d^3 \sqrt{d \operatorname{Csc}[a+b x]} (c \operatorname{Sec}[a+b x])^{3/2}}-\frac{5 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{128 \sqrt{2} b c^2 d^4 \sqrt{c \operatorname{Sec}[a+b x]}}+\frac{5 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}\right] \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{\operatorname{Tan}[a+b x]}}{128 \sqrt{2} b c^2 d^4 \sqrt{c \operatorname{Sec}[a+b x]}}-\frac{5 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{256 \sqrt{2} b c^2 d^4 \sqrt{c \operatorname{Sec}[a+b x]}}+\frac{5 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[a+b x]}+\operatorname{Tan}[a+b x]\right] \sqrt{\operatorname{Tan}[a+b x]}}{256 \sqrt{2} b c^2 d^4 \sqrt{c \operatorname{Sec}[a+b x]}}$$

Result (type 5, 106 leaves):

$$\left(-2 \left(\operatorname{Cos}[a+b x]^2\right)^{3/4} (9+10 \operatorname{Cos}[2 (a+b x)]-4 \operatorname{Cos}[4 (a+b x)])+30 \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{4}, \frac{5}{4}, \operatorname{Sin}[a+b x]^2\right]\right) \Big/ \left(384 b c d^3 \left(\operatorname{Cos}[a+b x]^2\right)^{3/4} \sqrt{d \operatorname{Csc}[a+b x]} (c \operatorname{Sec}[a+b x])^{3/2}\right)$$

- **Problem 280: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \operatorname{Csc}[e+f x]^n \operatorname{Sec}[e+f x]^m \, dx$$

Optimal (type 5, 81 leaves, 2 steps):

$$\frac{\left(\operatorname{Cos}[e+f x]^2\right)^{\frac{1+m}{2}} \operatorname{Csc}[e+f x]^{-1+n} \operatorname{Hypergeometric2F1}\left[\frac{1+m}{2}, \frac{1-n}{2}, \frac{3-n}{2}, \operatorname{Sin}[e+f x]^2\right] \operatorname{Sec}[e+f x]^{1+m}}{f (1-n)}$$

Result (type 6, 2840 leaves):

$$-\left(\left((-3+n) \operatorname{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \operatorname{Csc}[e+f x]^{-1+2 n} \left(\operatorname{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^m \operatorname{Sec}[e+f x]^m \left(\operatorname{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Sec}[e+f x]\right)^m\right) \Big/ \left(f (-1+n) \left((-3+n) \operatorname{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - 2 \left((-1+m+n) \operatorname{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + m \operatorname{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, 1+m, 1-m-n, \frac{5}{2}-\frac{n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)\right.$$

$$\left(\left((-3+n) \operatorname{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \operatorname{Cos}[e+f x] \operatorname{Csc}[e+f x]^n \left(\operatorname{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^m\right.\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^m\Big) \Big/ \Big((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] -$$

$$2\Big((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, 1+m, 1-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) -$$

$$\Big(m\,(-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Csc}[e+f x]^{-1+n}$$

$$\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m \left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^m \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) \Big/$$

$$\Big((-1+n)\,\Big((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] -$$

$$2\Big((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + m$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, 1+m, 1-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big) -$$

$$\Big((-3+n)\,\text{Csc}[e+f x]^{-1+n} \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m \left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^m \Big(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\left(\frac{1}{2}-\frac{n}{2}\right)$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{\frac{3}{2}-\frac{n}{2}}$$

$$m\left(\frac{1}{2}-\frac{n}{2}\right) \text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, 1+m, 1-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big) \Big/$$

$$\Big((-1+n)\,\Big((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] -$$

$$2\Big((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + m$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, 1+m, 1-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big) +$$

$$\Big((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Csc}[e+f x]^{-1+n} \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^m \Big(-2\Big((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + m$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$(-3+n)\left(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}-\frac{n}{2}}m\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)-2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\left((-1+m+n)\left(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(2-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},m,3-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}-\frac{n}{2}}m\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},1+m,2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+m\left(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(1-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},1+m,\right.\right.$$

$$2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}-\frac{n}{2}}(1+m)\left(\frac{3}{2}-\frac{n}{2}\right)$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},2+m,1-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$

$$\left((-1+n)\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.\right.$$

$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.\left.m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)-$$

$$\left(m(-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Csc}[e+fx]^{-1+n}\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^m\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+m}\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left((-1+n)\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.\right.$$

$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\right.$$
$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\right)\right)$$

- **Problem 281: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Csc}[e+fx]^n\,(a\,\text{Sec}[e+fx])^m\,dx$$

Optimal (type 5, 86 leaves, 2 steps):

$$\frac{\left(\text{Cos}[e+fx]^2\right)^{\frac{1+m}{2}}\text{Csc}[e+fx]^{-1+n}\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Sin}[e+fx]^2\right](a\,\text{Sec}[e+fx])^{1+m}}{a\,f\,(1-n)}$$

Result (type 6, 2842 leaves):

$$-\left(\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Csc}[e+fx]^{-1+2n}\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^m(a\,\text{Sec}[e+fx])^m\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m\right)\Big/\left(f\,(-1+n)\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.\right.$$
$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$
$$\left(\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\,\text{Csc}[e+fx]^n\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^m\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m\right)\Big/\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.$$
$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$
$$\left(m\,(-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Csc}[e+fx]^{-1+n}\right.$$
$$\left.\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^m\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/$$

$$\Big((-1+n)\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},\,m,\,1-m-n,\,\frac{3}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,m,\,2-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,1+m,\,1-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)-$$

$$\Big((-3+n)\,\text{Csc}[e+f x]^{-1+n}\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^m\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^m\Big(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\Big(\frac{1}{2}-\frac{n}{2}\Big)$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,m,\,2-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{\frac{3}{2}-\frac{n}{2}}$$

$$m\Big(\frac{1}{2}-\frac{n}{2}\Big)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,1+m,\,1-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big/$$

$$\Big((-1+n)\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},\,m,\,1-m-n,\,\frac{3}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,m,\,2-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,1+m,\,1-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)+$$

$$\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},\,m,\,1-m-n,\,\frac{3}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Csc}[e+f x]^{-1+n}\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^m$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^m\Big(-2\Big((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,m,\,2-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,1+m,\,1-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$(-3+n)\Big(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\Big(\frac{1}{2}-\frac{n}{2}\Big)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,m,\,2-m-n,\,\frac{5}{2}-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{\frac{3}{2}-\frac{n}{2}}m\Big(\frac{1}{2}-\frac{n}{2}\Big)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\,1+m,\,1-m-n,\,\frac{5}{2}-\frac{n}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)-2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big((-1+m+n)\Big(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(2-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\Big[\frac{5}{2}-\frac{n}{2},m,3-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+\frac{1}{\frac{5}{2}-\frac{n}{2}}m\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\Big[\frac{5}{2}-\frac{n}{2},1+m,2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)+m\Big(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(1-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\Big[\frac{5}{2}-\frac{n}{2},1+m,$$

$$2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+\frac{1}{\frac{5}{2}-\frac{n}{2}}(1+m)\left(\frac{3}{2}-\frac{n}{2}\right)$$

$$\text{AppellF1}\Big[\frac{5}{2}-\frac{n}{2},2+m,1-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big((-1+n)\Big((-3+n)\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^2\Big)-$$

$$\Big(m(-3+n)\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Csc}[e+fx]^{-1+n}\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^m$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Sec}[e+fx]\Big)^{-1+m}\Big(-\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]\text{Sec}[e+fx]\text{Sin}\Big[\frac{1}{2}(e+fx)\Big]+\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Sec}[e+fx]\text{Tan}[e+fx]\Big)\Big)\Big/$$

$$\Big((-1+n)\Big((-3+n)\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+m$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)\Big)\Big)$$

- **Problem 282: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(b\,\text{Csc}[e+fx])^n\,\text{Sec}[e+fx]^m\,dx$$

Optimal (type 5, 84 leaves, 2 steps):

$$\frac{b\left(\text{Cos}[e+f x]^2\right)^{\frac{1+m}{2}}(b\,\text{Csc}[e+f x])^{-1+n}\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Sin}[e+f x]^2\right]\text{Sec}[e+f x]^{1+m}}{f\,(1-n)}$$

Result (type 6, 2848 leaves) :

$$-\left(\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.$$
$$\text{Csc}[e+f x]^{-1+n}(b\,\text{Csc}[e+f x])^n\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m\text{Sec}[e+f x]^m\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\Bigg)\Bigg/$$
$$\left(f(-1+n)\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-\right.\right.$$
$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$
$$\left(\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\,\text{Csc}[e+f x]^n\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m\right.\right.$$
$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\Bigg)\Bigg/\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-\right.$$
$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$
$$\left(m(-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Csc}[e+f x]^{-1+n}\right.$$
$$\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg/$$
$$\left((-1+n)\left((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-\right.\right.$$
$$2\left((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+m\right.$$
$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)-$$
$$\left((-3+n)\,\text{Csc}[e+f x]^{-1+n}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\left(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\left(\frac{1}{2}-\frac{n}{2}\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}-\frac{n}{2}}$$

$$m\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg/$$

$$\Bigg((-1+n)\Bigg((-3+n)\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-$$

$$2\Bigg((-1+m+n)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)+$$

$$\Bigg((-3+n)\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Csc}[e+fx]^{-1+n}\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^m$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m\Bigg(-2\Bigg((-1+m+n)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$(-3+n)\Bigg(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}-\frac{n}{2}}m\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)-2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\Bigg((-1+m+n)\Bigg(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(2-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},m,3-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}-\frac{n}{2}}m\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},1+m,2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+m\Bigg(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(1-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},1+m,\right.$$

$$\left.2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}-\frac{n}{2}}(1+m)\left(\frac{3}{2}-\frac{n}{2}\right)$$

$$\text{AppellF1}\left[\frac{5}{2}-\frac{n}{2},\ 2+m,\ 1-m-n,\ \frac{7}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg((-1+n)\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},\ m,\ 1-m-n,\ \frac{3}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$

$$2\Bigg((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},\ m,\ 2-m-n,\ \frac{5}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$m\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},\ 1+m,\ 1-m-n,\ \frac{5}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2\Bigg)-$$

$$\Bigg(m(-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},\ m,\ 1-m-n,\ \frac{3}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Csc}[e+f x]^{-1+n}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m}\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg((-1+n)\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},\ m,\ 1-m-n,\ \frac{3}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$

$$2\Bigg((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},\ m,\ 2-m-n,\ \frac{5}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+m$$

$$\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},\ 1+m,\ 1-m-n,\ \frac{5}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 283: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (b\,\text{Csc}[e+f x])^n\,(a\,\text{Sec}[e+f x])^m\,dx$$

Optimal (type 5, 89 leaves, 2 steps):

$$\frac{1}{a f(1-n)}b\left(\text{Cos}[e+f x]^2\right)^{\frac{1+m}{2}}(b\,\text{Csc}[e+f x])^{-1+n}\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},\ \frac{1-n}{2},\ \frac{3-n}{2},\ \text{Sin}[e+f x]^2\right](a\,\text{Sec}[e+f x])^{1+m}$$

Result (type 6, 2850 leaves):

$$-\Bigg(\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},\ m,\ 1-m-n,\ \frac{3}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Csc}[e+f x]^{-1+n}(b\,\text{Csc}[e+f x])^n\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m(a\,\text{Sec}[e+f x])^m\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\Bigg)\Bigg/$$

$$\Bigg(f(-1+n)\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1}{2}-\frac{n}{2},\ m,\ 1-m-n,\ \frac{3}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$

$$2\Bigg((-1+m+n)\,\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2},\ m,\ 2-m-n,\ \frac{5}{2}-\frac{n}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)$$

$$\Bigg(\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Cos}[e+f x]\,\text{Csc}[e+f x]^n\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^m$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^m\Big)\Big/\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)-$$

$$\Big(m\,(-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Csc}[e+f x]^{-1+n}$$

$$\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^m\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^m\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big/$$

$$\Big((-1+n)\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)-$$

$$\Big((-3+n)\,\text{Csc}[e+f x]^{-1+n}\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^m\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^m\Big(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\Big(\frac{1}{2}-\frac{n}{2}\Big)$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{\frac{3}{2}-\frac{n}{2}}$$

$$m\Big(\frac{1}{2}-\frac{n}{2}\Big)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big/$$

$$\Big((-1+n)\Big((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-$$

$$2\Big((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m$$

$$\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)+$$

$$\Big((-3+n)\,\text{AppellF1}\Big[\tfrac{1}{2}-\tfrac{n}{2},m,1-m-n,\tfrac{3}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\,\text{Csc}[e+fx]^{-1+n}\Big(\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\Big)^m$$

$$\Big(\text{Cos}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Sec}[e+fx]\Big)^m\Big(-2\Big((-1+m+n)\,\text{AppellF1}\Big[\tfrac{3}{2}-\tfrac{n}{2},m,2-m-n,\tfrac{5}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]+m$$

$$\text{AppellF1}\Big[\tfrac{3}{2}-\tfrac{n}{2},1+m,1-m-n,\tfrac{5}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\Big)\,\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]+$$

$$(-3+n)\Big(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\Big(\tfrac{1}{2}-\tfrac{n}{2}\Big)\,\text{AppellF1}\Big[\tfrac{3}{2}-\tfrac{n}{2},m,2-m-n,\tfrac{5}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]$$

$$\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]+\frac{1}{\frac{3}{2}-\frac{n}{2}}m\Big(\tfrac{1}{2}-\tfrac{n}{2}\Big)\,\text{AppellF1}\Big[\tfrac{3}{2}-\tfrac{n}{2},1+m,1-m-n,\tfrac{5}{2}-\tfrac{n}{2},$$

$$\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\,\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]\Big)-2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2$$

$$\Big((-1+m+n)\Big(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(2-m-n)\Big(\tfrac{3}{2}-\tfrac{n}{2}\Big)\,\text{AppellF1}\Big[\tfrac{5}{2}-\tfrac{n}{2},m,3-m-n,\tfrac{7}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]$$

$$\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]+\frac{1}{\frac{5}{2}-\frac{n}{2}}m\Big(\tfrac{3}{2}-\tfrac{n}{2}\Big)\,\text{AppellF1}\Big[\tfrac{5}{2}-\tfrac{n}{2},1+m,2-m-n,\tfrac{7}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,$$

$$-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\,\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]\Big)+m\Big(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(1-m-n)\Big(\tfrac{3}{2}-\tfrac{n}{2}\Big)\,\text{AppellF1}\Big[\tfrac{5}{2}-\tfrac{n}{2},1+m,$$

$$2-m-n,\tfrac{7}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\,\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]+\frac{1}{\frac{5}{2}-\frac{n}{2}}(1+m)\Big(\tfrac{3}{2}-\tfrac{n}{2}\Big)$$

$$\text{AppellF1}\Big[\tfrac{5}{2}-\tfrac{n}{2},2+m,1-m-n,\tfrac{7}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\,\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big((-1+n)\Big((-3+n)\,\text{AppellF1}\Big[\tfrac{1}{2}-\tfrac{n}{2},m,1-m-n,\tfrac{3}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]-$$

$$2\Big((-1+m+n)\,\text{AppellF1}\Big[\tfrac{3}{2}-\tfrac{n}{2},m,2-m-n,\tfrac{5}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\tfrac{3}{2}-\tfrac{n}{2},1+m,1-m-n,\tfrac{5}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\Big)\,\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big)^2\Big)-$$

$$\Big(m(-3+n)\,\text{AppellF1}\Big[\tfrac{1}{2}-\tfrac{n}{2},m,1-m-n,\tfrac{3}{2}-\tfrac{n}{2},\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2,-\text{Tan}\big[\tfrac{1}{2}(e+fx)\big]^2\Big]\,\text{Csc}[e+fx]^{-1+n}\Big(\text{Sec}\big[\tfrac{1}{2}(e+fx)\big]^2\Big)^m$$

$$\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^{-1+m} \left(-\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right] \mathrm{Sec}[e+f x] \mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]+\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \mathrm{Sec}[e+f x] \mathrm{Tan}[e+f x]\right)\Bigg/ \left((-1+n)\left((-3+n) \mathrm{AppellF1}\left[\frac{1}{2}-\frac{n}{2}, m, 1-m-n, \frac{3}{2}-\frac{n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] - 2\left((-1+m+n) \mathrm{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+m\, \mathrm{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, 1+m, 1-m-n, \frac{5}{2}-\frac{n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)$$

- **Problem 284: Result more than twice size of optimal antiderivative.**

$$\int (b\, \mathrm{Csc}[e+f x])^n \mathrm{Sec}[e+f x]^5\, dx$$

Optimal (type 5, 48 leaves, 2 steps):

$$\frac{(b\, \mathrm{Csc}[e+f x])^{5+n} \mathrm{Hypergeometric2F1}\left[3, \frac{5+n}{2}, \frac{7+n}{2}, \mathrm{Csc}[e+f x]^2\right]}{b^5 f (5+n)}$$

Result (type 5, 139 leaves):

$$-\frac{1}{f(-3+n)(-1+n)} b (b\, \mathrm{Csc}[e+f x])^{-1+n} \left(\mathrm{Sec}[e+f x]^2\right)^{\frac{1-n}{2}} \left((-3+n) \mathrm{Hypergeometric2F1}\left[\frac{1}{2}(-1-n), \frac{1-n}{2}, \frac{3-n}{2}, -\mathrm{Tan}[e+f x]^2\right]+(-1+n) \mathrm{Hypergeometric2F1}\left[\frac{1}{2}(-1-n), \frac{3-n}{2}, \frac{5-n}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^2\right)$$

- **Problem 290: Result more than twice size of optimal antiderivative.**

$$\int (b\, \mathrm{Csc}[e+f x])^n \mathrm{Sec}[e+f x]^6\, dx$$

Optimal (type 5, 72 leaves, 2 steps):

$$\frac{b \sqrt{\mathrm{Cos}[e+f x]^2}\, (b\, \mathrm{Csc}[e+f x])^{-1+n} \mathrm{Hypergeometric2F1}\left[\frac{7}{2}, \frac{1-n}{2}, \frac{3-n}{2}, \mathrm{Sin}[e+f x]^2\right] \mathrm{Sec}[e+f x]}{f(1-n)}$$

Result (type 5, 192 leaves):

$$-\frac{1}{f(-5+n)(-3+n)(-1+n)}(b\,\text{Csc}[e+f\,x])^n\left(\text{Sec}[e+f\,x]^2\right)^{-n/2}\text{Tan}[e+f\,x]\left(\left(15-8\,n+n^2\right)\text{Hypergeometric2F1}\left[\frac{1}{2}-\frac{n}{2},-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}[e+f\,x]^2\right]+(-1+n)\,\text{Tan}[e+f\,x]^2\left(2\,(-5+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}-\frac{n}{2},-\frac{n}{2},\frac{5}{2}-\frac{n}{2},-\text{Tan}[e+f\,x]^2\right]+(-3+n)\,\text{Hypergeometric2F1}\left[\frac{5}{2}-\frac{n}{2},-\frac{n}{2},\frac{7}{2}-\frac{n}{2},-\text{Tan}[e+f\,x]^2\right]\text{Tan}[e+f\,x]^2\right)\right)$$

Problem 294: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f\,x]^2\,(b\,\text{Csc}[e+f\,x])^n\,dx$$

Optimal (type 5, 72 leaves, 2 steps):

$$\frac{b\,\text{Cos}[e+f\,x]\,(b\,\text{Csc}[e+f\,x])^{-1+n}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Sin}[e+f\,x]^2\right]}{f\,(1-n)\sqrt{\text{Cos}[e+f\,x]^2}}$$

Result (type 5, 165 leaves):

$$-\frac{1}{f(-1+n)}2\,(b\,\text{Csc}[e+f\,x])^n\left(\text{Hypergeometric2F1}\left[1-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-4\,\text{Hypergeometric2F1}\left[2-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+4\,\text{Hypergeometric2F1}\left[3-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{-n}\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]$$

Problem 295: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f\,x]^4\,(b\,\text{Csc}[e+f\,x])^n\,dx$$

Optimal (type 5, 72 leaves, 2 steps):

$$\frac{b\,\text{Cos}[e+f\,x]\,(b\,\text{Csc}[e+f\,x])^{-1+n}\,\text{Hypergeometric2F1}\left[-\frac{3}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Sin}[e+f\,x]^2\right]}{f\,(1-n)\sqrt{\text{Cos}[e+f\,x]^2}}$$

Result (type 5, 246 leaves):

$$-\frac{1}{f\,(-1+n)}\,2\,(b\,\text{Csc}[e+f\,x])^n \left(\text{Hypergeometric2F1}\left[1-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-8\left(\text{Hypergeometric2F1}\left[2-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-3\,\text{Hypergeometric2F1}\left[3-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+4\,\text{Hypergeometric2F1}\left[4-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\,\text{Hypergeometric2F1}\left[5-n,\frac{1}{2}-\frac{n}{2},\frac{3}{2}-\frac{n}{2},-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\right)\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{-n}\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]$$

Test results for the 46 problems in "4.5.10 (c+d x)^m (a+b sec)^n.m"

- **Problem 6: Result more than twice size of optimal antiderivative.**

$$\int (c+d\,x)^3\,(a+a\,\text{Sec}[e+f\,x])^2\,dx$$

Optimal (type 4, 371 leaves, 17 steps):

$$-\frac{i\,a^2\,(c+d\,x)^3}{f}+\frac{a^2\,(c+d\,x)^4}{4\,d}-\frac{4\,i\,a^2\,(c+d\,x)^3\,\text{ArcTan}\left[e^{i\,(e+f\,x)}\right]}{f}+\frac{3\,a^2\,d\,(c+d\,x)^2\,\text{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]}{f^2}+\frac{6\,i\,a^2\,d\,(c+d\,x)^2\,\text{PolyLog}\left[2,-i\,e^{i\,(e+f\,x)}\right]}{f^2}-\frac{6\,i\,a^2\,d\,(c+d\,x)^2\,\text{PolyLog}\left[2,i\,e^{i\,(e+f\,x)}\right]}{f^2}-\frac{3\,i\,a^2\,d^2\,(c+d\,x)\,\text{PolyLog}\left[2,-e^{2\,i\,(e+f\,x)}\right]}{f^3}-\frac{12\,a^2\,d^2\,(c+d\,x)\,\text{PolyLog}\left[3,-i\,e^{i\,(e+f\,x)}\right]}{f^3}+\frac{12\,a^2\,d^2\,(c+d\,x)\,\text{PolyLog}\left[3,i\,e^{i\,(e+f\,x)}\right]}{f^3}+\frac{3\,a^2\,d^3\,\text{PolyLog}\left[3,-e^{2\,i\,(e+f\,x)}\right]}{2\,f^4}-\frac{12\,i\,a^2\,d^3\,\text{PolyLog}\left[4,-i\,e^{i\,(e+f\,x)}\right]}{f^4}+\frac{12\,i\,a^2\,d^3\,\text{PolyLog}\left[4,i\,e^{i\,(e+f\,x)}\right]}{f^4}+\frac{a^2\,(c+d\,x)^3\,\text{Tan}[e+f\,x]}{f}$$

Result (type 4, 1027 leaves):

$$\frac{1}{16} x \left(4 c^3 + 6 c^2 d x + 4 c d^2 x^2 + d^3 x^3\right) \text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 +$$
$$\left(\text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 \left(c^3 \text{Sin}\left[\frac{f x}{2}\right] + 3 c^2 d x \text{Sin}\left[\frac{f x}{2}\right] + 3 c d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right] + d^3 x^3 \text{Sin}\left[\frac{f x}{2}\right]\right)\right) \Big/$$
$$\left(4 f \left(\text{Cos}\left[\frac{e}{2}\right] - \text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] - \text{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)\right) +$$
$$\left(\text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 \left(c^3 \text{Sin}\left[\frac{f x}{2}\right] + 3 c^2 d x \text{Sin}\left[\frac{f x}{2}\right] + 3 c d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right] + d^3 x^3 \text{Sin}\left[\frac{f x}{2}\right]\right)\right) \Big/$$
$$\left(4 f \left(\text{Cos}\left[\frac{e}{2}\right] + \text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] + \text{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)\right) -$$
$$\frac{1}{8 f^4} i \text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 \left(6 c^2 d f^3 x + 6 c d^2 f^3 x^2 + 2 d^3 f^3 x^3 + 8 c^3 f^3 \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] +\right.$$
$$24 c^2 d f^3 x \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] + 24 c d^2 f^3 x^2 \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] +$$
$$8 d^3 f^3 x^3 \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] + 6 i c^2 d f^2 \text{Log}[1 + \text{Cos}[2 (e + f x)] + i \text{Sin}[2 (e + f x)]] +$$
$$12 i c d^2 f^2 x \text{Log}[1 + \text{Cos}[2 (e + f x)] + i \text{Sin}[2 (e + f x)]] + 6 i d^3 f^2 x^2 \text{Log}[1 + \text{Cos}[2 (e + f x)] + i \text{Sin}[2 (e + f x)]] +$$
$$12 d f^2 (c + d x)^2 \text{PolyLog}[2, i \text{Cos}[e + f x] - \text{Sin}[e + f x]] - 12 d f^2 (c + d x)^2 \text{PolyLog}[2, -i \text{Cos}[e + f x] + \text{Sin}[e + f x]] +$$
$$6 c d^2 f \text{PolyLog}[2, -\text{Cos}[2 (e + f x)] - i \text{Sin}[2 (e + f x)]] + 6 d^3 f x \text{PolyLog}[2, -\text{Cos}[2 (e + f x)] - i \text{Sin}[2 (e + f x)]] +$$
$$24 i c d^2 f \text{PolyLog}[3, i \text{Cos}[e + f x] - \text{Sin}[e + f x]] + 24 i d^3 f x \text{PolyLog}[3, i \text{Cos}[e + f x] - \text{Sin}[e + f x]] -$$
$$24 i c d^2 f \text{PolyLog}[3, -i \text{Cos}[e + f x] + \text{Sin}[e + f x]] - 24 i d^3 f x \text{PolyLog}[3, -i \text{Cos}[e + f x] + \text{Sin}[e + f x]] +$$
$$3 i d^3 \text{PolyLog}[3, -\text{Cos}[2 (e + f x)] - i \text{Sin}[2 (e + f x)]] - 24 d^3 \text{PolyLog}[4, i \text{Cos}[e + f x] - \text{Sin}[e + f x]] +$$
$$\left.24 d^3 \text{PolyLog}[4, -i \text{Cos}[e + f x] + \text{Sin}[e + f x]] + 6 i c^2 d f^3 x \text{Tan}[e] + 6 i c d^2 f^3 x^2 \text{Tan}[e] + 2 i d^3 f^3 x^3 \text{Tan}[e]\right)$$

- **Problem 7: Result more than twice size of optimal antiderivative.**

$$\int (c + d x)^2 (a + a \text{Sec}[e + f x])^2 \, dx$$

Optimal (type 4, 262 leaves, 14 steps):

$$-\frac{i a^2 (c + d x)^2}{f} + \frac{a^2 (c + d x)^3}{3 d} - \frac{4 i a^2 (c + d x)^2 \text{ArcTan}\left[e^{i (e+f x)}\right]}{f} + \frac{2 a^2 d (c + d x) \text{Log}\left[1 + e^{2 i (e+f x)}\right]}{f^2} +$$
$$\frac{4 i a^2 d (c + d x) \text{PolyLog}\left[2, -i e^{i (e+f x)}\right]}{f^2} - \frac{4 i a^2 d (c + d x) \text{PolyLog}\left[2, i e^{i (e+f x)}\right]}{f^2} - \frac{i a^2 d^2 \text{PolyLog}\left[2, -e^{2 i (e+f x)}\right]}{f^3} -$$
$$\frac{4 a^2 d^2 \text{PolyLog}\left[3, -i e^{i (e+f x)}\right]}{f^3} + \frac{4 a^2 d^2 \text{PolyLog}\left[3, i e^{i (e+f x)}\right]}{f^3} + \frac{a^2 (c + d x)^2 \text{Tan}[e + f x]}{f}$$

Result (type 4, 685 leaves):

$$\frac{1}{12} x \left(3 c^2 + 3 c d x + d^2 x^2\right) \text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 +$$

$$\frac{\text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 \left(c^2 \text{Sin}\left[\frac{f x}{2}\right] + 2 c d x \text{Sin}\left[\frac{f x}{2}\right] + d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right]\right)}{4 f \left(\text{Cos}\left[\frac{e}{2}\right] - \text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] - \text{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)} +$$

$$\frac{\text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \text{Sec}[e + f x])^2 \left(c^2 \text{Sin}\left[\frac{f x}{2}\right] + 2 c d x \text{Sin}\left[\frac{f x}{2}\right] + d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right]\right)}{4 f \left(\text{Cos}\left[\frac{e}{2}\right] + \text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] + \text{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)} - \frac{1}{4 f^3} i \text{Cos}[e + f x]^2 \text{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4$$

$$(a + a \text{Sec}[e + f x])^2 \left(2 c d f^2 x + d^2 f^2 x^2 + 4 c^2 f^2 \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] + 8 c d f^2 x \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] +\right.$$
$$4 d^2 f^2 x^2 \text{ArcTan}[\text{Cos}[e + f x] + i \text{Sin}[e + f x]] + 2 i c d f \text{Log}[1 + \text{Cos}[2 (e + f x)] + i \text{Sin}[2 (e + f x)]] +$$
$$2 i d^2 f x \text{Log}[1 + \text{Cos}[2 (e + f x)] + i \text{Sin}[2 (e + f x)]] + 4 d f (c + d x) \text{PolyLog}[2, i \text{Cos}[e + f x] - \text{Sin}[e + f x]] -$$
$$4 d f (c + d x) \text{PolyLog}[2, -i \text{Cos}[e + f x] + \text{Sin}[e + f x]] + d^2 \text{PolyLog}[2, -\text{Cos}[2 (e + f x)] - i \text{Sin}[2 (e + f x)]] +$$
$$\left.4 i d^2 \text{PolyLog}[3, i \text{Cos}[e + f x] - \text{Sin}[e + f x]] - 4 i d^2 \text{PolyLog}[3, -i \text{Cos}[e + f x] + \text{Sin}[e + f x]] + 2 i c d f^2 x \text{Tan}[e] + i d^2 f^2 x^2 \text{Tan}[e]\right)$$

- **Problem 8: Result more than twice size of optimal antiderivative.**

$$\int (c + d x) (a + a \text{Sec}[e + f x])^2 \, dx$$

Optimal (type 4, 134 leaves, 9 steps):

$$\frac{a^2 (c + d x)^2}{2 d} - \frac{4 i a^2 (c + d x) \text{ArcTan}\left[e^{i (e+f x)}\right]}{f} + \frac{a^2 d \text{Log}[\text{Cos}[e + f x]]}{f^2} +$$
$$\frac{2 i a^2 d \text{PolyLog}\left[2, -i e^{i (e+f x)}\right]}{f^2} - \frac{2 i a^2 d \text{PolyLog}\left[2, i e^{i (e+f x)}\right]}{f^2} + \frac{a^2 (c + d x) \text{Tan}[e + f x]}{f}$$

Result (type 4, 728 leaves):

$$\frac{x\,\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,(2\,c\,f\,\mathrm{Cos}[e]+d\,f\,x\,\mathrm{Cos}[e]+2\,d\,\mathrm{Sin}[e])}{8\,f\,\left(\mathrm{Cos}\left[\frac{e}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{e}{2}\right]+\mathrm{Sin}\left[\frac{e}{2}\right]\right)}+\frac{1}{4\,f^2\,\left(\mathrm{Cos}[e]^2+\mathrm{Sin}[e]^2\right)}$$

$$d\,\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}[e]\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,(\mathrm{Cos}[e]\,\mathrm{Log}[\mathrm{Cos}[e]\,\mathrm{Cos}[f\,x]-\mathrm{Sin}[e]\,\mathrm{Sin}[f\,x]]+f\,x\,\mathrm{Sin}[e])+$$

$$\frac{i\,c\,\mathrm{ArcTan}\left[\frac{-i\,\mathrm{Sin}[e]-i\,\mathrm{Cos}[e]\,\mathrm{Tan}\left[\frac{f\,x}{2}\right]}{\sqrt{\mathrm{Cos}[e]^2+\mathrm{Sin}[e]^2}}\right]\,\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2}{f\,\sqrt{\mathrm{Cos}[e]^2+\mathrm{Sin}[e]^2}}+\frac{1}{2\,f^2}d\,\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2$$

$$\Bigg(-1\Big/\left(\sqrt{1+\mathrm{Cot}[e]^2}\right)\mathrm{Csc}[e]\,\Big((f\,x-\mathrm{ArcTan}[\mathrm{Cot}[e]])\,\left(\mathrm{Log}\left[1-e^{i\,(f\,x-\mathrm{ArcTan}[\mathrm{Cot}[e]])}\right]-\mathrm{Log}\left[1+e^{i\,(f\,x-\mathrm{ArcTan}[\mathrm{Cot}[e]])}\right]\right)+$$

$$i\,\left(\mathrm{PolyLog}\left[2,-e^{i\,(f\,x-\mathrm{ArcTan}[\mathrm{Cot}[e]])}\right]-\mathrm{PolyLog}\left[2,e^{i\,(f\,x-\mathrm{ArcTan}[\mathrm{Cot}[e]])}\right]\right)\Big)+\frac{2\,\mathrm{ArcTan}[\mathrm{Cot}[e]]\,\mathrm{ArcTanh}\left[\frac{\mathrm{Sin}[e]+\mathrm{Cos}[e]\,\mathrm{Tan}\left[\frac{f\,x}{2}\right]}{\sqrt{\mathrm{Cos}[e]^2+\mathrm{Sin}[e]^2}}\right]}{\sqrt{\mathrm{Cos}[e]^2+\mathrm{Sin}[e]^2}}\Bigg)+$$

$$\frac{\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,\left(c\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]+d\,x\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]\right)}{4\,f\,\left(\mathrm{Cos}\left[\frac{e}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\right)}+$$

$$\frac{\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,\left(c\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]+d\,x\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]\right)}{4\,f\,\left(\mathrm{Cos}\left[\frac{e}{2}\right]+\mathrm{Sin}\left[\frac{e}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]+\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\right)}-$$

$$\frac{d\,x\,\mathrm{Cos}[e+f\,x]^2\,\mathrm{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,\mathrm{Tan}[e]}{4\,f}$$

- **Problem 12: Result more than twice size of optimal antiderivative.**

$$\int\frac{(c+d\,x)^2}{a+a\,\mathrm{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 119 leaves, 8 steps):

$$\frac{i\,(c+d\,x)^2}{a\,f}+\frac{(c+d\,x)^3}{3\,a\,d}-\frac{4\,d\,(c+d\,x)\,\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]}{a\,f^2}+\frac{4\,i\,d^2\,\mathrm{PolyLog}\left[2,-e^{i\,(e+f\,x)}\right]}{a\,f^3}-\frac{(c+d\,x)^2\,\mathrm{Tan}\left[\frac{e}{2}+\frac{f\,x}{2}\right]}{a\,f}$$

Result (type 4, 528 leaves):

$$\frac{2 x \left(3 c^2+3 c d x+d^2 x^2\right) \cos\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \sec[e+f x]}{3 (a+a \sec[e+f x])}-$$

$$\frac{8 c d \cos\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \sec\left[\frac{e}{2}\right] \sec[e+f x] \left(\cos\left[\frac{e}{2}\right] \log\left[\cos\left[\frac{e}{2}\right] \cos\left[\frac{f x}{2}\right]-\sin\left[\frac{e}{2}\right] \sin\left[\frac{f x}{2}\right]\right]+\frac{1}{2} f x \sin\left[\frac{e}{2}\right]\right)}{f^2 (a+a \sec[e+f x]) \left(\cos\left[\frac{e}{2}\right]^2+\sin\left[\frac{e}{2}\right]^2\right)}-$$

$$\left(8 d^2 \cos\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \csc\left[\frac{e}{2}\right] \left(\frac{1}{4} e^{-i \operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right]} f^2 x^2-1\Big/\left(\sqrt{1+\cot\left[\frac{e}{2}\right]^2}\right) \cot\left[\frac{e}{2}\right]\right.\right.$$
$$\left(\frac{1}{2} i f x \left(-\pi-2 \operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right]\right)-\pi \log\left[1+e^{-i f x}\right]-2 \left(\frac{f x}{2}-\operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right]\right) \log\left[1-e^{2 i \left(\frac{f x}{2}-\operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right]\right)}\right]+\pi \log\left[\cos\left[\frac{f x}{2}\right]\right]-\right.$$
$$\left.\left.\left.2 \operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right] \log\left[\sin\left[\frac{f x}{2}-\operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right]\right]\right]+i \operatorname{PolyLog}\left[2, e^{2 i \left(\frac{f x}{2}-\operatorname{ArcTan}\left[\cot\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right) \sec\left[\frac{e}{2}\right] \sec[e+f x]\right)\Big/$$
$$\left(f^3 (a+a \sec[e+f x]) \sqrt{\csc\left[\frac{e}{2}\right]^2 \left(\cos\left[\frac{e}{2}\right]^2+\sin\left[\frac{e}{2}\right]^2\right)}\right)-\frac{2 \cos\left[\frac{e}{2}+\frac{f x}{2}\right] \sec\left[\frac{e}{2}\right] \sec[e+f x] \left(c^2 \sin\left[\frac{f x}{2}\right]+2 c d x \sin\left[\frac{f x}{2}\right]+d^2 x^2 \sin\left[\frac{f x}{2}\right]\right)}{f (a+a \sec[e+f x])}$$

Problem 16: Result more than twice size of optimal antiderivative.

$$\int \frac{(c+d x)^3}{(a+a \sec[e+f x])^2} \, dx$$

Optimal (type 4, 288 leaves, 19 steps):

$$\frac{5 i (c+d x)^3}{3 a^2 f}+\frac{(c+d x)^4}{4 a^2 d}-\frac{10 d (c+d x)^2 \log\left[1+e^{i (e+f x)}\right]}{a^2 f^2}+\frac{4 d^3 \log\left[\cos\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{a^2 f^4}+$$
$$\frac{20 i d^2 (c+d x) \operatorname{PolyLog}\left[2,-e^{i (e+f x)}\right]}{a^2 f^3}-\frac{20 d^3 \operatorname{PolyLog}\left[3,-e^{i (e+f x)}\right]}{a^2 f^4}-\frac{d (c+d x)^2 \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^2}{2 a^2 f^2}+$$
$$\frac{2 d^2 (c+d x) \tan\left[\frac{e}{2}+\frac{f x}{2}\right]}{a^2 f^3}-\frac{5 (c+d x)^3 \tan\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 a^2 f}+\frac{(c+d x)^3 \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \tan\left[\frac{e}{2}+\frac{f x}{2}\right]}{6 a^2 f}$$

Result (type 4, 1455 leaves):

$$\frac{1}{3 f^4 (a + a \operatorname{Sec}[e + f x])^2} 20 d^3 e^{-\frac{i e}{2}} \operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right]^4$$

$$\left(i f^2 x^2 \left(e^{i e} f x + 3 i \left(1 + e^{i e}\right) \operatorname{Log}\left[1 + e^{i (e+f x)}\right]\right) + 6 i \left(1 + e^{i e}\right) f x \operatorname{PolyLog}\left[2, -e^{i (e+f x)}\right] - 6 \left(1 + e^{i e}\right) \operatorname{PolyLog}\left[3, -e^{i (e+f x)}\right]\right) \operatorname{Sec}\left[\frac{e}{2}\right]$$

$$\operatorname{Sec}[e + f x]^2 + \left(16 d^3 \operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e + f x]^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Cos}\left[\frac{f x}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]\right] + \frac{1}{2} f x \operatorname{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/$$

$$\left(f^4 (a + a \operatorname{Sec}[e + f x])^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]^2 + \operatorname{Sin}\left[\frac{e}{2}\right]^2\right)\right) -$$

$$\left(40 c^2 d \operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e + f x]^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Cos}\left[\frac{f x}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]\right] + \frac{1}{2} f x \operatorname{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/$$

$$\left(f^2 (a + a \operatorname{Sec}[e + f x])^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]^2 + \operatorname{Sin}\left[\frac{e}{2}\right]^2\right)\right) - \left(80 c d^2 \operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}\right] \left(\frac{1}{4} e^{-i \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]} f^2 x^2 - 1 \Big/ \left(\sqrt{1 + \operatorname{Cot}\left[\frac{e}{2}\right]^2}\right) \operatorname{Cot}\left[\frac{e}{2}\right]\right.\right.$$

$$\left(\frac{1}{2} i f x \left(-\pi - 2 \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right) - \pi \operatorname{Log}\left[1 + e^{-i f x}\right] - 2 \left(\frac{f x}{2} - \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right) \operatorname{Log}\left[1 - e^{2 i \left(\frac{f x}{2} - \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right)}\right] + \pi \operatorname{Log}\left[\operatorname{Cos}\left[\frac{f x}{2}\right]\right] -$$

$$\left.\left.2 \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right] \operatorname{Log}\left[\operatorname{Sin}\left[\frac{f x}{2} - \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right]\right] + i \operatorname{PolyLog}\left[2, e^{2 i \left(\frac{f x}{2} - \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right) \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e + f x]^2\right) \Big/$$

$$\left(f^3 (a + a \operatorname{Sec}[e + f x])^2 \sqrt{\operatorname{Csc}\left[\frac{e}{2}\right]^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]^2 + \operatorname{Sin}\left[\frac{e}{2}\right]^2\right)}\right) + \frac{1}{24 f^3 (a + a \operatorname{Sec}[e + f x])^2} \operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e + f x]^2$$

$$\left(-24 c^2 d f \operatorname{Cos}\left[\frac{f x}{2}\right] - 48 c d^2 f x \operatorname{Cos}\left[\frac{f x}{2}\right] + 36 c^3 f^3 x \operatorname{Cos}\left[\frac{f x}{2}\right] - 24 d^3 f x^2 \operatorname{Cos}\left[\frac{f x}{2}\right] + 54 c^2 d f^3 x^2 \operatorname{Cos}\left[\frac{f x}{2}\right] + 36 c d^2 f^3 x^3 \operatorname{Cos}\left[\frac{f x}{2}\right] +\right.$$

$$9 d^3 f^3 x^4 \operatorname{Cos}\left[\frac{f x}{2}\right] - 24 c^2 d f \operatorname{Cos}\left[e + \frac{f x}{2}\right] - 48 c d^2 f x \operatorname{Cos}\left[e + \frac{f x}{2}\right] + 36 c^3 f^3 x \operatorname{Cos}\left[e + \frac{f x}{2}\right] - 24 d^3 f x^2 \operatorname{Cos}\left[e + \frac{f x}{2}\right] +$$

$$54 c^2 d f^3 x^2 \operatorname{Cos}\left[e + \frac{f x}{2}\right] + 36 c d^2 f^3 x^3 \operatorname{Cos}\left[e + \frac{f x}{2}\right] + 9 d^3 f^3 x^4 \operatorname{Cos}\left[e + \frac{f x}{2}\right] + 12 c^3 f^3 x \operatorname{Cos}\left[e + \frac{3 f x}{2}\right] + 18 c^2 d f^3 x^2 \operatorname{Cos}\left[e + \frac{3 f x}{2}\right] +$$

$$12 c d^2 f^3 x^3 \operatorname{Cos}\left[e + \frac{3 f x}{2}\right] + 3 d^3 f^3 x^4 \operatorname{Cos}\left[e + \frac{3 f x}{2}\right] + 12 c^3 f^3 x \operatorname{Cos}\left[2 e + \frac{3 f x}{2}\right] + 18 c^2 d f^3 x^2 \operatorname{Cos}\left[2 e + \frac{3 f x}{2}\right] +$$

$$12 c d^2 f^3 x^3 \operatorname{Cos}\left[2 e + \frac{3 f x}{2}\right] + 3 d^3 f^3 x^4 \operatorname{Cos}\left[2 e + \frac{3 f x}{2}\right] + 96 c d^2 \operatorname{Sin}\left[\frac{f x}{2}\right] - 72 c^3 f^2 \operatorname{Sin}\left[\frac{f x}{2}\right] + 96 d^3 x \operatorname{Sin}\left[\frac{f x}{2}\right] -$$

$$216 c^2 d f^2 x \operatorname{Sin}\left[\frac{f x}{2}\right] - 216 c d^2 f^2 x^2 \operatorname{Sin}\left[\frac{f x}{2}\right] - 72 d^3 f^2 x^3 \operatorname{Sin}\left[\frac{f x}{2}\right] - 48 c d^2 \operatorname{Sin}\left[e + \frac{f x}{2}\right] + 48 c^3 f^2 \operatorname{Sin}\left[e + \frac{f x}{2}\right] -$$

$$48 d^3 x \operatorname{Sin}\left[e + \frac{f x}{2}\right] + 144 c^2 d f^2 x \operatorname{Sin}\left[e + \frac{f x}{2}\right] + 144 c d^2 f^2 x^2 \operatorname{Sin}\left[e + \frac{f x}{2}\right] + 48 d^3 f^2 x^3 \operatorname{Sin}\left[e + \frac{f x}{2}\right] + 48 c d^2 \operatorname{Sin}\left[e + \frac{3 f x}{2}\right] -$$

$$\left.40 c^3 f^2 \operatorname{Sin}\left[e + \frac{3 f x}{2}\right] + 48 d^3 x \operatorname{Sin}\left[e + \frac{3 f x}{2}\right] - 120 c^2 d f^2 x \operatorname{Sin}\left[e + \frac{3 f x}{2}\right] - 120 c d^2 f^2 x^2 \operatorname{Sin}\left[e + \frac{3 f x}{2}\right] - 40 d^3 f^2 x^3 \operatorname{Sin}\left[e + \frac{3 f x}{2}\right]\right)$$

Problem 17: Result more than twice size of optimal antiderivative.

$$\int \frac{(c+d x)^2}{(a+a \operatorname{Sec}[e+f x])^2} \, dx$$

Optimal (type 4, 229 leaves, 17 steps):

$$\frac{5 i (c+d x)^2}{3 a^2 f}+\frac{(c+d x)^3}{3 a^2 d}-\frac{20 d (c+d x) \operatorname{Log}\left[1+e^{i (e+f x)}\right]}{3 a^2 f^2}+\frac{20 i d^2 \operatorname{PolyLog}\left[2,-e^{i (e+f x)}\right]}{3 a^2 f^3}-\frac{d (c+d x) \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^2}{3 a^2 f^2}+\frac{2 d^2 \operatorname{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 a^2 f^3}-\frac{5 (c+d x)^2 \operatorname{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 a^2 f}+\frac{(c+d x)^2 \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \operatorname{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]}{6 a^2 f}$$

Result (type 4, 925 leaves):

$$-\left(80 c d \operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e+f x]^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Cos}\left[\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]\right]+\frac{1}{2} f x \operatorname{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/ \left(3 f^2 (a+a \operatorname{Sec}[e+f x])^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]^2+\operatorname{Sin}\left[\frac{e}{2}\right]^2\right)\right)-\left(80 d^2 \operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}\right] \left(\frac{1}{4} e^{-i \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]} f^2 x^2-1 \Big/ \left(\sqrt{1+\operatorname{Cot}\left[\frac{e}{2}\right]^2}\right) \operatorname{Cot}\left[\frac{e}{2}\right] \left(\frac{1}{2} i f x \left(-\pi-2 \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right)-\pi \operatorname{Log}\left[1+e^{-i f x}\right]-2 \left(\frac{f x}{2}-\operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right) \operatorname{Log}\left[1-e^{2 i \left(\frac{f x}{2}-\operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]+\pi \operatorname{Log}\left[\operatorname{Cos}\left[\frac{f x}{2}\right]\right]-2 \operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right] \operatorname{Log}\left[\operatorname{Sin}\left[\frac{f x}{2}-\operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right]\right]+i \operatorname{PolyLog}\left[2, e^{2 i \left(\frac{f x}{2}-\operatorname{ArcTan}\left[\operatorname{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right) \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e+f x]^2\right) \Big/ \left(3 f^3 (a+a \operatorname{Sec}[e+f x])^2 \sqrt{\operatorname{Csc}\left[\frac{e}{2}\right]^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]^2+\operatorname{Sin}\left[\frac{e}{2}\right]^2\right)}\right)+\frac{1}{6 f^3 (a+a \operatorname{Sec}[e+f x])^2} \operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right] \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e+f x]^2 \left(-4 c d f \operatorname{Cos}\left[\frac{f x}{2}\right]-4 d^2 f x \operatorname{Cos}\left[\frac{f x}{2}\right]+9 c^2 f^3 x \operatorname{Cos}\left[\frac{f x}{2}\right]+9 c d f^3 x^2 \operatorname{Cos}\left[\frac{f x}{2}\right]+3 d^2 f^3 x^3 \operatorname{Cos}\left[\frac{f x}{2}\right]-4 c d f \operatorname{Cos}\left[e+\frac{f x}{2}\right]-4 d^2 f x \operatorname{Cos}\left[e+\frac{f x}{2}\right]+9 c^2 f^3 x \operatorname{Cos}\left[e+\frac{f x}{2}\right]+9 c d f^3 x^2 \operatorname{Cos}\left[e+\frac{f x}{2}\right]+3 d^2 f^3 x^3 \operatorname{Cos}\left[e+\frac{f x}{2}\right]+3 c^2 f^3 x \operatorname{Cos}\left[e+\frac{3 f x}{2}\right]+3 c d f^3 x^2 \operatorname{Cos}\left[e+\frac{3 f x}{2}\right]+d^2 f^3 x^3 \operatorname{Cos}\left[e+\frac{3 f x}{2}\right]+3 c^2 f^3 x \operatorname{Cos}\left[2 e+\frac{3 f x}{2}\right]+3 c d f^3 x^2 \operatorname{Cos}\left[2 e+\frac{3 f x}{2}\right]+d^2 f^3 x^3 \operatorname{Cos}\left[2 e+\frac{3 f x}{2}\right]+8 d^2 \operatorname{Sin}\left[\frac{f x}{2}\right]-18 c^2 f^2 \operatorname{Sin}\left[\frac{f x}{2}\right]-36 c d f^2 x \operatorname{Sin}\left[\frac{f x}{2}\right]-18 d^2 f^2 x^2 \operatorname{Sin}\left[\frac{f x}{2}\right]-4 d^2 \operatorname{Sin}\left[e+\frac{f x}{2}\right]+12 c^2 f^2 \operatorname{Sin}\left[e+\frac{f x}{2}\right]+24 c d f^2 x \operatorname{Sin}\left[e+\frac{f x}{2}\right]+12 d^2 f^2 x^2 \operatorname{Sin}\left[e+\frac{f x}{2}\right]+4 d^2 \operatorname{Sin}\left[e+\frac{3 f x}{2}\right]-10 c^2 f^2 \operatorname{Sin}\left[e+\frac{3 f x}{2}\right]-20 c d f^2 x \operatorname{Sin}\left[e+\frac{3 f x}{2}\right]-10 d^2 f^2 x^2 \operatorname{Sin}\left[e+\frac{3 f x}{2}\right]\right)$$

- **Problem 24: Result more than twice size of optimal antiderivative.**

$$\int (c+d x)^3 (a+b \operatorname{Sec}[e+f x]) \, dx$$

Optimal (type 4, 227 leaves, 11 steps):

$$\frac{a (c+d x)^4}{4 d}-\frac{2 i b (c+d x)^3 \operatorname{ArcTan}\left[e^{i (e+f x)}\right]}{f}+\frac{3 i b d (c+d x)^2 \operatorname{PolyLog}\left[2,-i e^{i (e+f x)}\right]}{f^2}-\frac{3 i b d (c+d x)^2 \operatorname{PolyLog}\left[2, i e^{i (e+f x)}\right]}{f^2}-\frac{6 b d^2 (c+d x) \operatorname{PolyLog}\left[3,-i e^{i (e+f x)}\right]}{f^3}+\frac{6 b d^2 (c+d x) \operatorname{PolyLog}\left[3, i e^{i (e+f x)}\right]}{f^3}-\frac{6 i b d^3 \operatorname{PolyLog}\left[4,-i e^{i (e+f x)}\right]}{f^4}+\frac{6 i b d^3 \operatorname{PolyLog}\left[4, i e^{i (e+f x)}\right]}{f^4}$$

Result (type 4, 474 leaves):

$$\frac{1}{4 f^4}\Big(4 a c^3 f^4 x+6 a c^2 d f^4 x^2+4 a c d^2 f^4 x^3+a d^3 f^4 x^4-8 i b c^3 f^3 \operatorname{ArcTan}\left[e^{i (e+f x)}\right]+12 b c^2 d f^3 x \operatorname{Log}\left[1-i e^{i (e+f x)}\right]+12 b c d^2 f^3 x^2 \operatorname{Log}\left[1-i e^{i (e+f x)}\right]+4 b d^3 f^3 x^3 \operatorname{Log}\left[1-i e^{i (e+f x)}\right]-12 b c^2 d f^3 x \operatorname{Log}\left[1+i e^{i (e+f x)}\right]-12 b c d^2 f^3 x^2 \operatorname{Log}\left[1+i e^{i (e+f x)}\right]-4 b d^3 f^3 x^3 \operatorname{Log}\left[1+i e^{i (e+f x)}\right]+12 i b d f^2 (c+d x)^2 \operatorname{PolyLog}\left[2,-i e^{i (e+f x)}\right]-12 i b d f^2 (c+d x)^2 \operatorname{PolyLog}\left[2, i e^{i (e+f x)}\right]-24 b c d^2 f \operatorname{PolyLog}\left[3,-i e^{i (e+f x)}\right]-24 b d^3 f x \operatorname{PolyLog}\left[3,-i e^{i (e+f x)}\right]+24 b c d^2 f \operatorname{PolyLog}\left[3, i e^{i (e+f x)}\right]+24 b d^3 f x \operatorname{PolyLog}\left[3, i e^{i (e+f x)}\right]-24 i b d^3 \operatorname{PolyLog}\left[4,-i e^{i (e+f x)}\right]+24 i b d^3 \operatorname{PolyLog}\left[4, i e^{i (e+f x)}\right]\Big)$$

- **Problem 26: Result more than twice size of optimal antiderivative.**

$$\int (c+d x) (a+b \operatorname{Sec}[e+f x]) \, dx$$

Optimal (type 4, 93 leaves, 7 steps):

$$\frac{a (c+d x)^2}{2 d}-\frac{2 i b (c+d x) \operatorname{ArcTan}\left[e^{i (e+f x)}\right]}{f}+\frac{i b d \operatorname{PolyLog}\left[2,-i e^{i (e+f x)}\right]}{f^2}-\frac{i b d \operatorname{PolyLog}\left[2, i e^{i (e+f x)}\right]}{f^2}$$

Result (type 4, 236 leaves):

$$a c x+\frac{1}{2} a d x^2-\frac{b c \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+\frac{b c \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+\frac{1}{f^2} b d \left(\left(-e+\frac{\pi}{2}-f x\right)\left(\operatorname{Log}\left[1-e^{i\left(-e+\frac{\pi}{2}-f x\right)}\right]-\operatorname{Log}\left[1+e^{i\left(-e+\frac{\pi}{2}-f x\right)}\right]\right)-\left(-e+\frac{\pi}{2}\right) \operatorname{Log}\left[\operatorname{Tan}\left[\frac{1}{2}\left(-e+\frac{\pi}{2}-f x\right)\right]\right]+i\left(\operatorname{PolyLog}\left[2,-e^{i\left(-e+\frac{\pi}{2}-f x\right)}\right]-\operatorname{PolyLog}\left[2, e^{i\left(-e+\frac{\pi}{2}-f x\right)}\right]\right)\right)$$

- **Problem 29: Result more than twice size of optimal antiderivative.**

$$\int (c+d x)^3 (a+b \operatorname{Sec}[e+f x])^2 \, dx$$

Optimal (type 4, 364 leaves, 17 steps):

$$-\frac{i b^2 (c+d x)^3}{f}+\frac{a^2 (c+d x)^4}{4 d}-\frac{4 i a b (c+d x)^3 \text{ArcTan}\left[e^{i (e+f x)}\right]}{f}+\frac{3 b^2 d (c+d x)^2 \text{Log}\left[1+e^{2 i (e+f x)}\right]}{f^2}+\frac{6 i a b d (c+d x)^2 \text{PolyLog}\left[2,-i e^{i (e+f x)}\right]}{f^2}-\frac{6 i a b d (c+d x)^2 \text{PolyLog}\left[2,i e^{i (e+f x)}\right]}{f^2}-\frac{3 i b^2 d^2 (c+d x) \text{PolyLog}\left[2,-e^{2 i (e+f x)}\right]}{f^3}-\frac{12 a b d^2 (c+d x) \text{PolyLog}\left[3,-i e^{i (e+f x)}\right]}{f^3}+\frac{12 a b d^2 (c+d x) \text{PolyLog}\left[3,i e^{i (e+f x)}\right]}{f^3}+\frac{3 b^2 d^3 \text{PolyLog}\left[3,-e^{2 i (e+f x)}\right]}{2 f^4}-\frac{12 i a b d^3 \text{PolyLog}\left[4,-i e^{i (e+f x)}\right]}{f^4}+\frac{12 i a b d^3 \text{PolyLog}\left[4,i e^{i (e+f x)}\right]}{f^4}+\frac{b^2 (c+d x)^3 \text{Tan}[e+f x]}{f}$$

Result (type 4, 1700 leaves) :

$$\frac{a^2 x \left(4 c^3+6 c^2 d x+4 c d^2 x^2+d^3 x^3\right) \text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2}{4 (b+a \text{Cos}[e+f x])^2}+\frac{1}{2 \left(1+e^{2 i e}\right) f^4 (b+a \text{Cos}[e+f x])^2} b \text{Cos}[e+f x]^2 \left(-12 i b c^2 d e^{2 i e} f^3 x-12 i b c d^2 e^{2 i e} f^3 x^2-4 i b d^3 e^{2 i e} f^3 x^3-8 i a c^3 f^3 \text{ArcTan}\left[e^{i (e+f x)}\right]-8 i a c^3 e^{2 i e} f^3 \text{ArcTan}\left[e^{i (e+f x)}\right]+12 a c^2 d f^3 x \text{Log}\left[1-i e^{i (e+f x)}\right]+12 a c^2 d e^{2 i e} f^3 x \text{Log}\left[1-i e^{i (e+f x)}\right]+12 a c d^2 f^3 x^2 \text{Log}\left[1-i e^{i (e+f x)}\right]+12 a c d^2 e^{2 i e} f^3 x^2 \text{Log}\left[1-i e^{i (e+f x)}\right]+4 a d^3 f^3 x^3 \text{Log}\left[1-i e^{i (e+f x)}\right]+4 a d^3 e^{2 i e} f^3 x^3 \text{Log}\left[1-i e^{i (e+f x)}\right]-12 a c^2 d f^3 x \text{Log}\left[1+i e^{i (e+f x)}\right]-12 a c^2 d e^{2 i e} f^3 x \text{Log}\left[1+i e^{i (e+f x)}\right]-12 a c d^2 f^3 x^2 \text{Log}\left[1+i e^{i (e+f x)}\right]-12 a c d^2 e^{2 i e} f^3 x^2 \text{Log}\left[1+i e^{i (e+f x)}\right]-4 a d^3 f^3 x^3 \text{Log}\left[1+i e^{i (e+f x)}\right]-4 a d^3 e^{2 i e} f^3 x^3 \text{Log}\left[1+i e^{i (e+f x)}\right]+6 b c^2 d f^2 \text{Log}\left[1+e^{2 i (e+f x)}\right]+6 b c^2 d e^{2 i e} f^2 \text{Log}\left[1+e^{2 i (e+f x)}\right]+12 b c d^2 f^2 x \text{Log}\left[1+e^{2 i (e+f x)}\right]+12 b c d^2 e^{2 i e} f^2 x \text{Log}\left[1+e^{2 i (e+f x)}\right]+6 b d^3 f^2 x^2 \text{Log}\left[1+e^{2 i (e+f x)}\right]+6 b d^3 e^{2 i e} f^2 x^2 \text{Log}\left[1+e^{2 i (e+f x)}\right]+12 i a d \left(1+e^{2 i e}\right) f^2 (c+d x)^2 \text{PolyLog}\left[2,-i e^{i (e+f x)}\right]-12 i a d \left(1+e^{2 i e}\right) f^2 (c+d x)^2 \text{PolyLog}\left[2,i e^{i (e+f x)}\right]-6 i b c d^2 f \text{PolyLog}\left[2,-e^{2 i (e+f x)}\right]-6 i b c d^2 e^{2 i e} f \text{PolyLog}\left[2,-e^{2 i (e+f x)}\right]-6 i b d^3 f x \text{PolyLog}\left[2,-e^{2 i (e+f x)}\right]-6 i b d^3 e^{2 i e} f x \text{PolyLog}\left[2,-e^{2 i (e+f x)}\right]-24 a c d^2 f \text{PolyLog}\left[3,-i e^{i (e+f x)}\right]-24 a c d^2 e^{2 i e} f \text{PolyLog}\left[3,-i e^{i (e+f x)}\right]-24 a d^3 f x \text{PolyLog}\left[3,-i e^{i (e+f x)}\right]-24 a d^3 e^{2 i e} f x \text{PolyLog}\left[3,-i e^{i (e+f x)}\right]+24 a c d^2 f \text{PolyLog}\left[3,i e^{i (e+f x)}\right]+24 a c d^2 e^{2 i e} f \text{PolyLog}\left[3,i e^{i (e+f x)}\right]+24 a d^3 f x \text{PolyLog}\left[3,i e^{i (e+f x)}\right]+24 a d^3 e^{2 i e} f x \text{PolyLog}\left[3,i e^{i (e+f x)}\right]+3 b d^3 \text{PolyLog}\left[3,-e^{2 i (e+f x)}\right]+3 b d^3 e^{2 i e} \text{PolyLog}\left[3,-e^{2 i (e+f x)}\right]-24 i a d^3 \text{PolyLog}\left[4,-i e^{i (e+f x)}\right]-24 i a d^3 e^{2 i e} \text{PolyLog}\left[4,-i e^{i (e+f x)}\right]+24 i a d^3 \text{PolyLog}\left[4,i e^{i (e+f x)}\right]+24 i a d^3 e^{2 i e} \text{PolyLog}\left[4,i e^{i (e+f x)}\right]\right) (a+b \text{Sec}[e+f x])^2+\left(\text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2 \left(b^2 c^3 \text{Sin}\left[\frac{f x}{2}\right]+3 b^2 c^2 d x \text{Sin}\left[\frac{f x}{2}\right]+3 b^2 c d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right]+b^2 d^3 x^3 \text{Sin}\left[\frac{f x}{2}\right]\right)\right)\Big/\left(f (b+a \text{Cos}[e+f x])^2 \left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)\right)+\left(\text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2 \left(b^2 c^3 \text{Sin}\left[\frac{f x}{2}\right]+3 b^2 c^2 d x \text{Sin}\left[\frac{f x}{2}\right]+3 b^2 c d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right]+b^2 d^3 x^3 \text{Sin}\left[\frac{f x}{2}\right]\right)\right)\Big/\left(f (b+a \text{Cos}[e+f x])^2 \left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)\right)$$

Problem 30: Result more than twice size of optimal antiderivative.

$$\int (c+d x)^2 (a+b \text{Sec}[e+f x])^2 \, dx$$

Optimal (type 4, 257 leaves, 14 steps):

$$-\frac{i b^2 (c+d x)^2}{f}+\frac{a^2 (c+d x)^3}{3 d}-\frac{4 i a b (c+d x)^2 \text{ArcTan}\left[e^{i (e+f x)}\right]}{f}+\frac{2 b^2 d (c+d x) \text{Log}\left[1+e^{2 i (e+f x)}\right]}{f^2}+\frac{4 i a b d (c+d x) \text{PolyLog}\left[2,-i e^{i (e+f x)}\right]}{f^2}-\frac{4 i a b d (c+d x) \text{PolyLog}\left[2,i e^{i (e+f x)}\right]}{f^2}-\frac{i b^2 d^2 \text{PolyLog}\left[2,-e^{2 i (e+f x)}\right]}{f^3}-\frac{4 a b d^2 \text{PolyLog}\left[3,-i e^{i (e+f x)}\right]}{f^3}+\frac{4 a b d^2 \text{PolyLog}\left[3,i e^{i (e+f x)}\right]}{f^3}+\frac{b^2 (c+d x)^2 \text{Tan}[e+f x]}{f}$$

Result (type 4, 703 leaves):

$$\frac{a^2 x \left(3 c^2+3 c d x+d^2 x^2\right) \text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2}{3 (b+a \text{Cos}[e+f x])^2}+\frac{\text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2 \left(b^2 c^2 \text{Sin}\left[\frac{f x}{2}\right]+2 b^2 c d x \text{Sin}\left[\frac{f x}{2}\right]+b^2 d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right]\right)}{f (b+a \text{Cos}[e+f x])^2 \left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+\frac{\text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2 \left(b^2 c^2 \text{Sin}\left[\frac{f x}{2}\right]+2 b^2 c d x \text{Sin}\left[\frac{f x}{2}\right]+b^2 d^2 x^2 \text{Sin}\left[\frac{f x}{2}\right]\right)}{f (b+a \text{Cos}[e+f x])^2 \left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+\frac{1}{f^3 (b+a \text{Cos}[e+f x])^2} b \text{Cos}[e+f x]^2 (a+b \text{Sec}[e+f x])^2 \left(-2 i b c d f^2 x-i b d^2 f^2 x^2-4 i a c^2 f^2 \text{ArcTan}[\text{Cos}[e+f x]+i \text{Sin}[e+f x]]-8 i a c d f^2 x \text{ArcTan}[\text{Cos}[e+f x]+i \text{Sin}[e+f x]]-4 i a d^2 f^2 x^2 \text{ArcTan}[\text{Cos}[e+f x]+i \text{Sin}[e+f x]]+2 b c d f \text{Log}[1+\text{Cos}[2 (e+f x)]+i \text{Sin}[2 (e+f x)]]+2 b d^2 f x \text{Log}[1+\text{Cos}[2 (e+f x)]+i \text{Sin}[2 (e+f x)]]-4 i a d f (c+d x) \text{PolyLog}[2,i \text{Cos}[e+f x]-\text{Sin}[e+f x]]+4 i a d f (c+d x) \text{PolyLog}[2,-i \text{Cos}[e+f x]+\text{Sin}[e+f x]]-i b d^2 \text{PolyLog}[2,-\text{Cos}[2 (e+f x)]-i \text{Sin}[2 (e+f x)]]+4 a d^2 \text{PolyLog}[3,i \text{Cos}[e+f x]-\text{Sin}[e+f x]]-4 a d^2 \text{PolyLog}[3,-i \text{Cos}[e+f x]+\text{Sin}[e+f x]]+2 b c d f^2 x \text{Tan}[e]+b d^2 f^2 x^2 \text{Tan}[e]\right)$$

- **Problem 31: Result more than twice size of optimal antiderivative.**

$$\int (c+d x) (a+b \text{Sec}[e+f x])^2 \, dx$$

Optimal (type 4, 131 leaves, 9 steps):

$$\frac{a^2 (c+d x)^2}{2 d}-\frac{4 i a b (c+d x) \text{ArcTan}\left[e^{i (e+f x)}\right]}{f}+\frac{b^2 d \text{Log}[\text{Cos}[e+f x]]}{f^2}+\frac{2 i a b d \text{PolyLog}\left[2,-i e^{i (e+f x)}\right]}{f^2}-\frac{2 i a b d \text{PolyLog}\left[2,i e^{i (e+f x)}\right]}{f^2}+\frac{b^2 (c+d x) \text{Tan}[e+f x]}{f}$$

Result (type 4, 554 leaves):

$$\frac{1}{2 f^2}\left(-a^2 (e+f x) (-2 c f+d (e-f x))+\right.$$
$$2 b \left(-2 a d (e+f x) \left(\text{Log}\left[1-\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]\right)+a (d e-c f) \left(e+f x+\text{Log}\left[-1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]-\right.\right.$$
$$\left.\text{Log}\left[1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]\right)-a (d e-c f) \left(e+f x-\text{Log}\left[1-\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]+\text{Log}\left[1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]\right)+$$
$$b d \left(-\text{Log}\left[\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right]+\text{Log}\left[-1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]+\text{Log}\left[4 \left(1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]\right)-$$
$$2 i a d \left(\text{Log}\left[1-\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right] \text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) \left(-i+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]-\text{Log}\left[1-\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right] \text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right) \left(i+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]-\right.$$
$$\text{Log}\left[\frac{1}{2} \left((1+i)-(1-i) \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right] \text{Log}\left[1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]+\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) \left(i+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right] \text{Log}\left[1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]+$$
$$\text{PolyLog}\left[2,\left(-\frac{1}{2}-\frac{i}{2}\right) \left(-1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]-\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right) \left(-1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]-$$
$$\left.\left.\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right) \left(1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]+\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right) \left(1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right]\right)\right)+$$
$$\left.\frac{2 b^2 f (c+d x) \text{Sin}\left[\frac{1}{2} (e+f x)\right]}{\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]}+\frac{2 b^2 f (c+d x) \text{Sin}\left[\frac{1}{2} (e+f x)\right]}{\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]}\right)$$

Problem 34: Result more than twice size of optimal antiderivative.

$$\int \frac{(c+d x)^3}{a+b \text{Sec}[e+f x]} \, dx$$

Optimal (type 4, 526 leaves, 14 steps):

$$\frac{(c+d x)^4}{4 a d}+\frac{i b (c+d x)^3 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f}-\frac{i b (c+d x)^3 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f}+$$
$$\frac{3 b d (c+d x)^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f^2}-\frac{3 b d (c+d x)^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f^2}+\frac{6 i b d^2 (c+d x) \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f^3}-$$
$$\frac{6 i b d^2 (c+d x) \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f^3}-\frac{6 b d^3 \text{PolyLog}\left[4,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f^4}+\frac{6 b d^3 \text{PolyLog}\left[4,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} f^4}$$

Result (type 4, 1356 leaves):

$$\frac{x\left(4 c^3+6 c^2 d x+4 c d^2 x^2+d^3 x^3\right)(b+a \operatorname{Cos}[e+f x]) \operatorname{Sec}[e+f x]}{4 a(a+b \operatorname{Sec}[e+f x])}+$$

$$\frac{1}{a \sqrt{a^2-b^2} \sqrt{\left(-a^2+b^2\right) e^{2 i e}} f^4(a+b \operatorname{Sec}[e+f x])} b(b+a \operatorname{Cos}[e+f x]) \left(2 i c^3 \sqrt{\left(-a^2+b^2\right) e^{2 i e}} f^3 \operatorname{ArcTan}\left[\frac{b+a e^{i(e+f x)}}{\sqrt{a^2-b^2}}\right]+\right.$$

$$3 i \sqrt{a^2-b^2} c^2 d e^{i e} f^3 x \operatorname{Log}\left[1+\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]+3 i \sqrt{a^2-b^2} c d^2 e^{i e} f^3 x^2 \operatorname{Log}\left[1+\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]+$$

$$i \sqrt{a^2-b^2} d^3 e^{i e} f^3 x^3 \operatorname{Log}\left[1+\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-3 i \sqrt{a^2-b^2} c^2 d e^{i e} f^3 x \operatorname{Log}\left[1+\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-$$

$$3 i \sqrt{a^2-b^2} c d^2 e^{i e} f^3 x^2 \operatorname{Log}\left[1+\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-i \sqrt{a^2-b^2} d^3 e^{i e} f^3 x^3 \operatorname{Log}\left[1+\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]+$$

$$3 \sqrt{a^2-b^2} d e^{i e} f^2(c+d x)^2 \operatorname{PolyLog}\left[2,-\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-3 \sqrt{a^2-b^2} d e^{i e} f^2(c+d x)^2 \operatorname{PolyLog}\left[2,-\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]+$$

$$6 i \sqrt{a^2-b^2} c d^2 e^{i e} f \operatorname{PolyLog}\left[3,-\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]+6 i \sqrt{a^2-b^2} d^3 e^{i e} f x \operatorname{PolyLog}\left[3,-\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-$$

$$6 i \sqrt{a^2-b^2} c d^2 e^{i e} f \operatorname{PolyLog}\left[3,-\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-6 i \sqrt{a^2-b^2} d^3 e^{i e} f x \operatorname{PolyLog}\left[3,-\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]-$$

$$\left.6 \sqrt{a^2-b^2} d^3 e^{i e} \operatorname{PolyLog}\left[4,-\frac{a e^{i(2 e+f x)}}{b e^{i e}-\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]+6 \sqrt{a^2-b^2} d^3 e^{i e} \operatorname{PolyLog}\left[4,-\frac{a e^{i(2 e+f x)}}{b e^{i e}+\sqrt{\left(-a^2+b^2\right) e^{2 i e}}}\right]\right) \operatorname{Sec}[e+f x]$$

Problem 39: Result more than twice size of optimal antiderivative.

$$\int \frac{(c+d x)^3}{(a+b \operatorname{Sec}[e+f x])^2} dx$$

Optimal (type 4, 1523 leaves, 36 steps) :

$$-\frac{i b^2 (c+d x)^3}{a^2 (a^2-b^2) f}+\frac{(c+d x)^4}{4 a^2 d}+\frac{3 b^2 d (c+d x)^2 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^2}+\frac{3 b^2 d (c+d x)^2 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^2}-$$

$$\frac{i b^3 (c+d x)^3 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f}+\frac{2 i b (c+d x)^3 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f}+\frac{i b^3 (c+d x)^3 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f}-$$

$$\frac{2 i b (c+d x)^3 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f}-\frac{6 i b^2 d^2 (c+d x) \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^3}-\frac{6 i b^2 d^2 (c+d x) \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^3}-$$

$$\frac{3 b^3 d (c+d x)^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^2}+\frac{6 b d (c+d x)^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f^2}+\frac{3 b^3 d (c+d x)^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^2}-$$

$$\frac{6 b d (c+d x)^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f^2}+\frac{6 b^2 d^3 \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b-i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^4}+\frac{6 b^2 d^3 \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b+i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^4}-$$

$$\frac{6 i b^3 d^2 (c+d x) \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^3}+\frac{12 i b d^2 (c+d x) \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f^3}+\frac{6 i b^3 d^2 (c+d x) \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^3}-$$

$$\frac{12 i b d^2 (c+d x) \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f^3}+\frac{6 b^3 d^3 \text{PolyLog}\left[4,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^4}-\frac{12 b d^3 \text{PolyLog}\left[4,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f^4}-$$

$$\frac{6 b^3 d^3 \text{PolyLog}\left[4,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^4}+\frac{12 b d^3 \text{PolyLog}\left[4,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2}\, f^4}+\frac{b^2 (c+d x)^3 \text{Sin}[e+f x]}{a (a^2-b^2) f (b+a \text{Cos}[e+f x])}$$

Result (type 4, 9003 leaves) : Display of huge result suppressed!

- **Problem 40: Result more than twice size of optimal antiderivative.**

$$\int \frac{(c+d x)^2}{(a+b \text{Sec}[e+f x])^2}\, dx$$

Optimal (type 4, 1117 leaves, 30 steps) :

$$-\frac{i b^2 (c+d x)^2}{a^2 (a^2-b^2) f}+\frac{(c+d x)^3}{3 a^2 d}+\frac{2 b^2 d (c+d x) \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^2}+\frac{2 b^2 d (c+d x) \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^2}-\frac{i b^3 (c+d x)^2 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f}+$$

$$\frac{2 i b (c+d x)^2 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2} f}+\frac{i b^3 (c+d x)^2 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f}-\frac{2 i b (c+d x)^2 \text{Log}\left[1+\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2} f}-\frac{2 i b^2 d^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^3}-$$

$$\frac{2 i b^2 d^2 \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+i \sqrt{a^2-b^2}}\right]}{a^2 (a^2-b^2) f^3}-\frac{2 b^3 d (c+d x) \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^2}+\frac{4 b d (c+d x) \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2} f^2}+$$

$$\frac{2 b^3 d (c+d x) \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^2}-\frac{4 b d (c+d x) \text{PolyLog}\left[2,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2} f^2}-\frac{2 i b^3 d^2 \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^3}+$$

$$\frac{4 i b d^2 \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2} f^3}+\frac{2 i b^3 d^2 \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 (-a^2+b^2)^{3/2} f^3}-\frac{4 i b d^2 \text{PolyLog}\left[3,-\frac{a e^{i (e+f x)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2 \sqrt{-a^2+b^2} f^3}+\frac{b^2 (c+d x)^2 \text{Sin}[e+f x]}{a (a^2-b^2) f (b+a \text{Cos}[e+f x])}$$

Result (type 4, 5576 leaves):

$$\frac{x (3 c^2+3 c d x+d^2 x^2) (b+a \text{Cos}[e+f x])^2 \text{Sec}[e+f x]^2}{3 a^2 (a+b \text{Sec}[e+f x])^2}-\frac{1}{(a^2-b^2)^{3/2} f^2 (a+b \text{Sec}[e+f x])^2}$$

$$4 b c d (b+a \text{Cos}[e+f x])^2 \left(2 (e+f x) \text{ArcTanh}\left[\frac{(a+b) \text{Cot}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]-2 \left(e+\text{ArcCos}\left[-\frac{b}{a}\right]\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2 i \left(\text{ArcTanh}\left[\frac{(a+b) \text{Cot}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right) \text{Log}\left[\frac{\sqrt{a^2-b^2}\, e^{-\frac{1}{2} i (e+f x)}}{\sqrt{2} \sqrt{a} \sqrt{b+a \text{Cos}[e+f x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2 i \left(\text{ArcTanh}\left[\frac{(a+b) \text{Cot}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right) \text{Log}\left[\frac{\sqrt{a^2-b^2}\, e^{\frac{1}{2} i (e+f x)}}{\sqrt{2} \sqrt{a} \sqrt{b+a \text{Cos}[e+f x]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2 i \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a^2-b^2}}\right]\right) \text{Log}\left[1-\frac{\left(b-i \sqrt{a^2-b^2}\right) \left(a+b-\sqrt{a^2-b^2} \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)}{a \left(a+b+\sqrt{a^2-b^2} \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)}\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]-\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]\right)\Bigg)$$

$$\text{Sec}[e+f\,x]^2+\frac{1}{a^2\left(a^2-b^2\right)^{3/2}f^2\,(a+b\,\text{Sec}[e+f\,x])^2}\,2\,b^3\,c\,d\,(b+a\,\text{Cos}[e+f\,x])^2$$

$$\Bigg(2\,(e+f\,x)\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-2\left(e+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{-\frac{1}{2}i\,(e+f\,x)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{\frac{1}{2}i\,(e+f\,x)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]-\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]\right)\Bigg)$$

$$\text{Sec}[e+f\,x]^2-\Bigg(2\,b\,d^2\,e^{i\,e}\,(b+a\,\text{Cos}[e+f\,x])^2\left(-2\,f\,x\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(2\,e+f\,x)}}{b\,e^{i\,e}-\sqrt{\left(-a^2+b^2\right)e^{2\,i\,e}}}\right]-\right.$$

$$\mathbb{i}\left(f^2 x^2 \text{Log}\left[1+\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}-\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]-f^2 x^2 \text{Log}\left[1+\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}+\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]+2\,\mathbb{i}\, f x \,\text{PolyLog}\left[2,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}+\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]+\right.$$

$$\left.\left.\left. 2\,\text{PolyLog}\left[3,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}-\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]-2\,\text{PolyLog}\left[3,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}+\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]\right)\right)\text{Sec}[e+f x]^2\right)\Big/$$

$$\left(\left(a^2-b^2\right)\sqrt{(-a^2+b^2)\, e^{2 i e}}\; f^3\,(a+b\,\text{Sec}[e+f x])^2\right)+\left(b^3 d^2 e^{i e}\,(b+a\,\text{Cos}[e+f x])^2\left(-2 f x\,\text{PolyLog}\left[2,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}-\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]-\right.\right.$$

$$\mathbb{i}\left(f^2 x^2 \text{Log}\left[1+\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}-\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]-f^2 x^2 \text{Log}\left[1+\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}+\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]+2\,\mathbb{i}\, f x \,\text{PolyLog}\left[2,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}+\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]+\right.$$

$$\left.\left.\left. 2\,\text{PolyLog}\left[3,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}-\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]-2\,\text{PolyLog}\left[3,-\frac{a\, e^{i\,(2e+f x)}}{b\, e^{i e}+\sqrt{(-a^2+b^2)\, e^{2 i e}}}\right]\right)\right)\text{Sec}[e+f x]^2\right)\Big/$$

$$\left(a^2\left(a^2-b^2\right)\sqrt{(-a^2+b^2)\, e^{2 i e}}\; f^3\,(a+b\,\text{Sec}[e+f x])^2\right)-\frac{4\,\mathbb{i}\, b\, c^2\,\text{ArcTan}\left[\frac{-\mathbb{i}\, a\,\text{Sin}[e]-\mathbb{i}\,(-b+a\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]}{\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}\right](b+a\,\text{Cos}[e+f x])^2\,\text{Sec}[e+f x]^2}{\left(a^2-b^2\right) f\,(a+b\,\text{Sec}[e+f x])^2\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}+$$

$$\frac{2\,\mathbb{i}\, b^3 c^2\,\text{ArcTan}\left[\frac{-\mathbb{i}\, a\,\text{Sin}[e]-\mathbb{i}\,(-b+a\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]}{\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}\right](b+a\,\text{Cos}[e+f x])^2\,\text{Sec}[e+f x]^2}{a^2\left(a^2-b^2\right) f\,(a+b\,\text{Sec}[e+f x])^2\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}+$$

$$\left(2 b^2 c\, d\,(b+a\,\text{Cos}[e+f x])^2\,\text{Sec}[e]\,\text{Sec}[e+f x]^2\right.$$

$$\left.\left.\left(a\,\text{Cos}[e]\,\text{Log}[b+a\,\text{Cos}[e]\,\text{Cos}[f x]-a\,\text{Sin}[e]\,\text{Sin}[f x]]+a f x\,\text{Sin}[e]-\frac{2\,\mathbb{i}\, a\, b\,\text{ArcTan}\left[\frac{-\mathbb{i}\, a\,\text{Sin}[e]-\mathbb{i}\,(-b+a\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]}{\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}\right]\text{Sin}[e]}{\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}\right)\right)\right)\Big/$$

$$\left(a\left(a^2-b^2\right) f^2\,(a+b\,\text{Sec}[e+f x])^2\left(a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2\right)\right)-\frac{1}{a\left(a^2-b^2\right) f\,(a+b\,\text{Sec}[e+f x])^2}$$

$$2 b^2 d^2\,(b+a\,\text{Cos}[e+f x])^2\,\text{Sec}[e]\,\text{Sec}[e+f x]^2$$

$$\left(\frac{x^2\,\text{Sin}[e]}{2\,a}-\frac{1}{a\,f}x\left(\text{Cos}[e]\,\text{Log}[b+a\,\text{Cos}[e+f\,x]]+f\,x\,\text{Sin}[e]+\frac{b\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\left(a\,\text{Sin}[e]+(-b+a\,\text{Cos}[e])\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\left(2\,\text{Sin}[e]^2+i\,\text{Sin}[2\,e]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right)+\right.$$

$$\frac{1}{a\,f}\left(\frac{(e+f\,x)\,\text{Cos}[e]\,\text{Log}[b+a\,\text{Cos}[e+f\,x]]}{f}+\frac{1}{f}\right.$$

$$a\,\text{Cos}[e]\left(-\frac{(e+f\,x)\,\text{Log}[b+a\,\text{Cos}[e+f\,x]]}{a}+1/a\left(\frac{1}{2}\,i\,(e+f\,x)^2-4\,i\,\text{ArcSin}\left[\frac{\sqrt{\frac{a+b}{a}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{-a^2+b^2}}\right]-\right.\right.$$

$$\left(e+f\,x+2\,\text{ArcSin}\left[\frac{\sqrt{\frac{a+b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(b-\sqrt{-a^2+b^2}\right)e^{i\,(e+f\,x)}}{a}\right]-\left(e+f\,x-2\,\text{ArcSin}\left[\frac{\sqrt{\frac{a+b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(b+\sqrt{-a^2+b^2}\right)e^{i\,(e+f\,x)}}{a}\right]+$$

$$\left.\left.\left.(e+f\,x)\,\text{Log}[b+a\,\text{Cos}[e+f\,x]]+i\left(\text{PolyLog}\left[2,-\frac{\left(b-\sqrt{-a^2+b^2}\right)e^{i\,(e+f\,x)}}{a}\right]+\text{PolyLog}\left[2,-\frac{\left(b+\sqrt{-a^2+b^2}\right)e^{i\,(e+f\,x)}}{a}\right]\right)\right)\right)\right)+$$

$$\frac{b\,x\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\left(a\,\text{Sin}[e]+(-b+a\,\text{Cos}[e])\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\left(2\,\text{Sin}[e]^2+i\,\text{Sin}[2\,e]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}-\frac{1}{2\,\sqrt{a^2-b^2}\,f\,(\text{Cos}[e]-i\,\text{Sin}[e])^2}$$

$$b\left(2\,(e+f\,x)\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-2\left(e+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{-\frac{1}{2}\,i\,(e+f\,x)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\;e^{\frac{1}{2}i(e+f\,x)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{(a+b)\left(a-b-i\sqrt{a^2-b^2}\right)\left(1+i\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{(a+b)\left(-i\,a+i\,b+\sqrt{a^2-b^2}\right)\left(i+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]-\text{PolyLog}\left[2,\right.\right.$$

$$\left.\left.\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)}\right]\right)\right)\left(i\,\text{Cos}[e]+\text{Sin}[e]\right)\left(2\,\text{Sin}[e]^2+i\,\text{Sin}[2\,e]\right)\Bigg)\Bigg)+$$

$$\left((b+a\,\text{Cos}[e+f\,x])\,\text{Sec}[e+f\,x]^2\left(b^3c^2\,\text{Sin}[e]+2\,b^3c\,d\,x\,\text{Sin}[e]+b^3d^2x^2\,\text{Sin}[e]-a\,b^2c^2\,\text{Sin}[f\,x]-2\,a\,b^2c\,d\,x\,\text{Sin}[f\,x]-a\,b^2d^2x^2\,\text{Sin}[f\,x]\right)\right)\Big/$$

$$\left(a^2(-a+b)(a+b)\,f\,(a+b\,\text{Sec}[e+f\,x])^2\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\right)+$$

$$\frac{1}{a^2\left(a^2-b^2\right)^{3/2}f^3\,(a+b\,\text{Sec}[e+f\,x])^2}\,2\,b^3d^2\,(b+a\,\text{Cos}[e+f\,x])^2$$

$$\left(2\,(e+f\,x)\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-2\left(e+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\;e^{-\frac{1}{2}i(e+f\,x)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{\frac{1}{2}i(e+f x)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[e+f x]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}\right]-\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)}\right]\right)\Bigg)\Bigg)$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e]+\frac{4\,i\,b^3\,c\,d\,\text{ArcTan}\left[\frac{-i\,a\,\text{Sin}[e]-i\,(-b+a\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]}{\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}\right](b+a\,\text{Cos}[e+f x])^2\,\text{Sec}[e+f x]^2\,\text{Tan}[e]}{a^2\left(a^2-b^2\right)f^2\,(a+b\,\text{Sec}[e+f x])^2\sqrt{-b^2+a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}$$

Test results for the 83 problems in "4.5.11 (e x)^m (a+b sec(c+d x^n))^p.m"

- **Problem 5: Result more than twice size of optimal antiderivative.**

$$\int x\left(a+b\,\text{Sec}\left[c+d\,x^2\right]\right)dx$$

Optimal (type 3, 26 leaves, 4 steps):

$$\frac{a\,x^2}{2}+\frac{b\,\text{ArcTanh}\left[\text{Sin}\left[c+d\,x^2\right]\right]}{2\,d}$$

Result (type 3, 91 leaves):

$$\frac{a\,x^2}{2}-\frac{b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x^2}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x^2}{2}\right]\right]}{2\,d}+\frac{b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x^2}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x^2}{2}\right]\right]}{2\,d}$$

- **Problem 10: Result more than twice size of optimal antiderivative.**

$$\int x^3\left(a+b\,\text{Sec}\left[c+d\,x^2\right]\right)^2dx$$

Optimal (type 4, 133 leaves, 10 steps):

$$\frac{a^2 x^4}{4}-\frac{2 i a b x^2 \text{ArcTan}\left[e^{i (c+d x^2)}\right]}{d}+\frac{b^2 \text{Log}\left[\text{Cos}\left[c+d x^2\right]\right]}{2 d^2}+\frac{i a b \text{PolyLog}\left[2,-i e^{i (c+d x^2)}\right]}{d^2}-\frac{i a b \text{PolyLog}\left[2,i e^{i (c+d x^2)}\right]}{d^2}+\frac{b^2 x^2 \text{Tan}\left[c+d x^2\right]}{2 d}$$

Result (type 4, 677 leaves):

$$\frac{x^2 \text{Cos}\left[c+d x^2\right]^2 \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2 \left(a^2 d x^2 \text{Cos}[c]+2 b^2 \text{Sin}[c]\right)}{4 d \left(b+a \text{Cos}\left[c+d x^2\right]\right)^2 \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)}+$$

$$\left(b^2 \text{Cos}\left[c+d x^2\right]^2 \text{Sec}[c] \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2 \left(\text{Cos}[c] \text{Log}\left[\text{Cos}[c] \text{Cos}\left[d x^2\right]-\text{Sin}[c] \text{Sin}\left[d x^2\right]\right]+d x^2 \text{Sin}[c]\right)\right)\Big/$$

$$\left(2 d^2 \left(b+a \text{Cos}\left[c+d x^2\right]\right)^2 \left(\text{Cos}[c]^2+\text{Sin}[c]^2\right)\right)+\frac{1}{d^2 \left(b+a \text{Cos}\left[c+d x^2\right]\right)^2} a b \text{Cos}\left[c+d x^2\right]^2 \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2$$

$$\left(-1\Big/\left(\sqrt{1+\text{Cot}[c]^2}\right) \text{Csc}[c] \left(\left(d x^2-\text{ArcTan}[\text{Cot}[c]]\right) \left(\text{Log}\left[1-e^{i \left(d x^2-\text{ArcTan}[\text{Cot}[c]]\right)}\right]-\text{Log}\left[1+e^{i \left(d x^2-\text{ArcTan}[\text{Cot}[c]]\right)}\right]\right)+\right.\right.$$

$$\left.\left.i \left(\text{PolyLog}\left[2,-e^{i \left(d x^2-\text{ArcTan}[\text{Cot}[c]]\right)}\right]-\text{PolyLog}\left[2,e^{i \left(d x^2-\text{ArcTan}[\text{Cot}[c]]\right)}\right]\right)\right)+\frac{2 \text{ArcTan}[\text{Cot}[c]] \text{ArcTanh}\left[\frac{\text{Sin}[c]+\text{Cos}[c] \text{Tan}\left[\frac{d x^2}{2}\right]}{\sqrt{\text{Cos}[c]^2+\text{Sin}[c]^2}}\right]}{\sqrt{\text{Cos}[c]^2+\text{Sin}[c]^2}}\right)+$$

$$\frac{b^2 x^2 \text{Cos}\left[c+d x^2\right]^2 \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2 \text{Sin}\left[\frac{d x^2}{2}\right]}{2 d \left(b+a \text{Cos}\left[c+d x^2\right]\right)^2 \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x^2}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x^2}{2}\right]\right)}+$$

$$\frac{b^2 x^2 \text{Cos}\left[c+d x^2\right]^2 \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2 \text{Sin}\left[\frac{d x^2}{2}\right]}{2 d \left(b+a \text{Cos}\left[c+d x^2\right]\right)^2 \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x^2}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x^2}{2}\right]\right)}-$$

$$\frac{b^2 x^2 \text{Cos}\left[c+d x^2\right]^2 \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2 \text{Tan}[c]}{2 d \left(b+a \text{Cos}\left[c+d x^2\right]\right)^2}$$

- **Problem 12: Result more than twice size of optimal antiderivative.**

$$\int x \left(a+b \text{Sec}\left[c+d x^2\right]\right)^2 dx$$

Optimal (type 3, 44 leaves, 5 steps):

$$\frac{a^2 x^2}{2}+\frac{a b \text{ArcTanh}\left[\text{Sin}\left[c+d x^2\right]\right]}{d}+\frac{b^2 \text{Tan}\left[c+d x^2\right]}{2 d}$$

Result (type 3, 92 leaves) :

$$\frac{1}{2\,d}\left(a\left(a\,c+a\,d\,x^2-2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right]+2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right]\right)+b^2\,\text{Tan}\left[c+d\,x^2\right]\right)$$

- **Problem 18: Result more than twice size of optimal antiderivative.**

$$\int\frac{x^3}{a+b\,\text{Sec}\left[c+d\,x^2\right]}\,dx$$

Optimal (type 4, 261 leaves, 11 steps) :

$$\frac{x^4}{4\,a}+\frac{i\,b\,x^2\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^2)}}{b-\sqrt{-a^2+b^2}}\right]}{2\,a\,\sqrt{-a^2+b^2}\,d}-\frac{i\,b\,x^2\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^2)}}{b+\sqrt{-a^2+b^2}}\right]}{2\,a\,\sqrt{-a^2+b^2}\,d}+\frac{b\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^2)}}{b-\sqrt{-a^2+b^2}}\right]}{2\,a\,\sqrt{-a^2+b^2}\,d^2}-\frac{b\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^2)}}{b+\sqrt{-a^2+b^2}}\right]}{2\,a\,\sqrt{-a^2+b^2}\,d^2}$$

Result (type 4, 845 leaves) :

$$\frac{1}{4\,a\,\left(a+b\,\text{Sec}\left[c+d\,x^2\right]\right)}\left(b+a\,\text{Cos}\left[c+d\,x^2\right]\right)\left(x^4-\frac{1}{\sqrt{a^2-b^2}\,d^2}2\,b\left(2\left(c+d\,x^2\right)\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]-2\left(c+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]+\right.\right.$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{-\frac{1}{2}i\left(c+d\,x^2\right)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}\left[c+d\,x^2\right]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{\frac{1}{2}i\left(c+d\,x^2\right)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}\left[c+d\,x^2\right]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{(a+b)\left(a-b-i\sqrt{a^2-b^2}\right)\left(1+i\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{(a+b)\left(-i\,a+i\,b+\sqrt{a^2-b^2}\right)\left(i+\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x^2\right)\right]\right)}\right]\right)\right)\right)\text{Sec}\left[c+d\,x^2\right]$$

- **Problem 53: Result more than twice size of optimal antiderivative.**

$$\int\frac{a+b\,\text{Sec}\left[c+d\sqrt{x}\right]}{\sqrt{x}}\,dx$$

Optimal (type 3, 26 leaves, 4 steps):

$$2\,a\sqrt{x}+\frac{2\,b\,\text{ArcTanh}\left[\text{Sin}\left[c+d\sqrt{x}\right]\right]}{d}$$

Result (type 3, 84 leaves):

$$\frac{1}{d}2\left(a\left(c+d\sqrt{x}\right)-b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]\right]+b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]\right]\right)$$

- **Problem 58: Result more than twice size of optimal antiderivative.**

$$\int\frac{\left(a+b\,\mathrm{Sec}\left[c+d\sqrt{x}\right]\right)^2}{\sqrt{x}}\,dx$$

Optimal (type 3, 47 leaves, 5 steps):

$$2a^2\sqrt{x}+\frac{4ab\,\mathrm{ArcTanh}\left[\mathrm{Sin}\left[c+d\sqrt{x}\right]\right]}{d}+\frac{2b^2\,\mathrm{Tan}\left[c+d\sqrt{x}\right]}{d}$$

Result (type 3, 102 leaves):

$$\frac{1}{d}2\left(a\left(ac+ad\sqrt{x}-2b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]\right]+2b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\sqrt{x}\right)\right]\right]\right)+b^2\,\mathrm{Tan}\left[c+d\sqrt{x}\right]\right)$$

- **Problem 72: Result more than twice size of optimal antiderivative.**

$$\int(e\,x)^{-1+n}\,(a+b\,\mathrm{Sec}[c+d\,x^n])\,dx$$

Optimal (type 3, 44 leaves, 5 steps):

$$\frac{a\,(e\,x)^n}{e\,n}+\frac{b\,x^{-n}\,(e\,x)^n\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x^n]]}{d\,e\,n}$$

Result (type 3, 89 leaves):

$$\frac{1}{d\,e\,n}x^{-n}\,(e\,x)^n\left(a\,(c+d\,x^n)-b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x^n)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x^n)\right]\right]+b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x^n)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x^n)\right]\right]\right)$$

- **Problem 74: Unable to integrate problem.**

$$\int(e\,x)^{-1+3n}\,(a+b\,\mathrm{Sec}[c+d\,x^n])\,dx$$

Optimal (type 4, 235 leaves, 11 steps):

$$\frac{a\,(e\,x)^{3n}}{3\,e\,n}-\frac{2\,i\,b\,x^{-n}\,(e\,x)^{3n}\,\mathrm{ArcTan}\left[e^{i\,(c+d\,x^n)}\right]}{d\,e\,n}+\frac{2\,i\,b\,x^{-2n}\,(e\,x)^{3n}\,\mathrm{PolyLog}\left[2,-i\,e^{i\,(c+d\,x^n)}\right]}{d^2\,e\,n}-\frac{2\,i\,b\,x^{-2n}\,(e\,x)^{3n}\,\mathrm{PolyLog}\left[2,i\,e^{i\,(c+d\,x^n)}\right]}{d^2\,e\,n}-\frac{2\,b\,x^{-3n}\,(e\,x)^{3n}\,\mathrm{PolyLog}\left[3,-i\,e^{i\,(c+d\,x^n)}\right]}{d^3\,e\,n}+\frac{2\,b\,x^{-3n}\,(e\,x)^{3n}\,\mathrm{PolyLog}\left[3,i\,e^{i\,(c+d\,x^n)}\right]}{d^3\,e\,n}$$

Result (type 8, 24 leaves):

$$\int(e\,x)^{-1+3n}\,(a+b\,\mathrm{Sec}[c+d\,x^n])\,dx$$

Problem 76: Result more than twice size of optimal antiderivative.

$$\int (e x)^{-1+2 n} (a + b \operatorname{Sec}[c + d x^n])^2 \, dx$$

Optimal (type 4, 221 leaves, 11 steps):

$$\frac{a^2 (e x)^{2 n}}{2 e n} - \frac{4 i a b x^{-n} (e x)^{2 n} \operatorname{ArcTan}\left[e^{i (c+d x^n)}\right]}{d e n} + \frac{b^2 x^{-2 n} (e x)^{2 n} \operatorname{Log}[\operatorname{Cos}[c + d x^n]]}{d^2 e n} + \frac{2 i a b x^{-2 n} (e x)^{2 n} \operatorname{PolyLog}\left[2, -i e^{i (c+d x^n)}\right]}{d^2 e n} - \frac{2 i a b x^{-2 n} (e x)^{2 n} \operatorname{PolyLog}\left[2, i e^{i (c+d x^n)}\right]}{d^2 e n} + \frac{b^2 x^{-n} (e x)^{2 n} \operatorname{Tan}[c + d x^n]}{d e n}$$

Result (type 4, 769 leaves):

$$\frac{x^{1-n} (e x)^{-1+2 n} \operatorname{Cos}[c + d x^n]^2 (a + b \operatorname{Sec}[c + d x^n])^2 \left(a^2 d x^n \operatorname{Cos}[c] + 2 b^2 \operatorname{Sin}[c]\right)}{2 d n (b + a \operatorname{Cos}[c + d x^n])^2 \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right)} +$$

$$\left(b^2 x^{1-2 n} (e x)^{-1+2 n} \operatorname{Cos}[c + d x^n]^2 \operatorname{Sec}[c] (a + b \operatorname{Sec}[c + d x^n])^2 (\operatorname{Cos}[c] \operatorname{Log}[\operatorname{Cos}[c] \operatorname{Cos}[d x^n] - \operatorname{Sin}[c] \operatorname{Sin}[d x^n]] + d x^n \operatorname{Sin}[c])\right) \Big/ \left(d^2 n (b + a \operatorname{Cos}[c + d x^n])^2 \left(\operatorname{Cos}[c]^2 + \operatorname{Sin}[c]^2\right)\right) + \frac{1}{d^2 n (b + a \operatorname{Cos}[c + d x^n])^2} 2 a b x^{1-2 n} (e x)^{-1+2 n} \operatorname{Cos}[c + d x^n]^2 (a + b \operatorname{Sec}[c + d x^n])^2$$

$$\left(-1 \Big/ \left(\sqrt{1 + \operatorname{Cot}[c]^2}\right) \operatorname{Csc}[c] \left((d x^n - \operatorname{ArcTan}[\operatorname{Cot}[c]]) \left(\operatorname{Log}\left[1 - e^{i (d x^n - \operatorname{ArcTan}[\operatorname{Cot}[c]])}\right] - \operatorname{Log}\left[1 + e^{i (d x^n - \operatorname{ArcTan}[\operatorname{Cot}[c]])}\right]\right) + \right.\right.$$

$$\left.\left. i \left(\operatorname{PolyLog}\left[2, -e^{i (d x^n - \operatorname{ArcTan}[\operatorname{Cot}[c]])}\right] - \operatorname{PolyLog}\left[2, e^{i (d x^n - \operatorname{ArcTan}[\operatorname{Cot}[c]])}\right]\right)\right) + \frac{2 \operatorname{ArcTan}[\operatorname{Cot}[c]] \operatorname{ArcTanh}\left[\frac{\operatorname{Sin}[c] + \operatorname{Cos}[c] \operatorname{Tan}\left[\frac{d x^n}{2}\right]}{\sqrt{\operatorname{Cos}[c]^2 + \operatorname{Sin}[c]^2}}\right]}{\sqrt{\operatorname{Cos}[c]^2 + \operatorname{Sin}[c]^2}}\right) +$$

$$\frac{b^2 x^{1-n} (e x)^{-1+2 n} \operatorname{Cos}[c + d x^n]^2 (a + b \operatorname{Sec}[c + d x^n])^2 \operatorname{Sin}\left[\frac{d x^n}{2}\right]}{d n (b + a \operatorname{Cos}[c + d x^n])^2 \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x^n}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x^n}{2}\right]\right)} +$$

$$\frac{b^2 x^{1-n} (e x)^{-1+2 n} \operatorname{Cos}[c + d x^n]^2 (a + b \operatorname{Sec}[c + d x^n])^2 \operatorname{Sin}\left[\frac{d x^n}{2}\right]}{d n (b + a \operatorname{Cos}[c + d x^n])^2 \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x^n}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x^n}{2}\right]\right)} -$$

$$\frac{b^2 x^{1-n} (e x)^{-1+2 n} \operatorname{Cos}[c + d x^n]^2 (a + b \operatorname{Sec}[c + d x^n])^2 \operatorname{Tan}[c]}{d n (b + a \operatorname{Cos}[c + d x^n])^2}$$

Problem 77: Unable to integrate problem.

$$\int (e x)^{-1+3 n} (a + b \operatorname{Sec}[c + d x^n])^2 \, dx$$

Optimal (type 4, 390 leaves, 16 steps) :

$$\frac{a^2 (e x)^{3n}}{3 e n}-\frac{i b^2 x^{-n} (e x)^{3n}}{d e n}-\frac{4 i a b x^{-n} (e x)^{3n} \text{ArcTan}\left[e^{i (c+d x^n)}\right]}{d e n}+\frac{2 b^2 x^{-2n} (e x)^{3n} \text{Log}\left[1+e^{2 i (c+d x^n)}\right]}{d^2 e n}+\frac{4 i a b x^{-2n} (e x)^{3n} \text{PolyLog}\left[2,-i e^{i (c+d x^n)}\right]}{d^2 e n}-\frac{4 i a b x^{-2n} (e x)^{3n} \text{PolyLog}\left[2, i e^{i (c+d x^n)}\right]}{d^2 e n}-\frac{i b^2 x^{-3n} (e x)^{3n} \text{PolyLog}\left[2,-e^{2 i (c+d x^n)}\right]}{d^3 e n}-\frac{4 a b x^{-3n} (e x)^{3n} \text{PolyLog}\left[3,-i e^{i (c+d x^n)}\right]}{d^3 e n}+\frac{4 a b x^{-3n} (e x)^{3n} \text{PolyLog}\left[3, i e^{i (c+d x^n)}\right]}{d^3 e n}+\frac{b^2 x^{-n} (e x)^{3n} \text{Tan}[c+d x^n]}{d e n}$$

Result (type 8, 26 leaves) :

$$\int (e x)^{-1+3n} (a+b \text{Sec}[c+d x^n])^2 \, dx$$

Problem 79: Result more than twice size of optimal antiderivative.

$$\int \frac{(e x)^{-1+2n}}{a+b \text{Sec}[c+d x^n]} \, dx$$

Optimal (type 4, 328 leaves, 12 steps) :

$$\frac{(e x)^{2n}}{2 a e n}+\frac{i b x^{-n} (e x)^{2n} \text{Log}\left[1+\frac{a e^{i (c+d x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} \, d e n}-\frac{i b x^{-n} (e x)^{2n} \text{Log}\left[1+\frac{a e^{i (c+d x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} \, d e n}+\frac{b x^{-2n} (e x)^{2n} \text{PolyLog}\left[2,-\frac{a e^{i (c+d x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} \, d^2 e n}-\frac{b x^{-2n} (e x)^{2n} \text{PolyLog}\left[2,-\frac{a e^{i (c+d x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a \sqrt{-a^2+b^2} \, d^2 e n}$$

Result (type 4, 861 leaves) :

$$\frac{1}{2\,a\,e\,n\,(a+b\,\text{Sec}[c+d\,x^n])}(e\,x)^{2n}\,(b+a\,\text{Cos}[c+d\,x^n])$$

$$\left(1-\frac{1}{\sqrt{a^2-b^2}\,d^2}2\,b\,x^{-2n}\left(2\,(c+d\,x^n)\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-2\left(c+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]+\right.\right.$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{-\frac{1}{2}\,i\,(c+d\,x^n)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[c+d\,x^n]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\,e^{\frac{1}{2}\,i\,(c+d\,x^n)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[c+d\,x^n]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{(a+b)\left(a-b-i\sqrt{a^2-b^2}\right)\left(1+i\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[\frac{(a+b)\left(-i\,a+i\,b+\sqrt{a^2-b^2}\right)\left(i+\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]\right)\right)\right)\text{Sec}[c+d\,x^n]$$

▪ Problem 80: Unable to integrate problem.

$$\int\frac{(e\,x)^{-1+3n}}{a+b\,\text{Sec}[c+d\,x^n]}\,dx$$

Optimal (type 4, 485 leaves, 14 steps) :

$$\frac{(e\,x)^{3n}}{3\,a\,e\,n}+\frac{i\,b\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a\,\sqrt{-a^2+b^2}\,d\,e\,n}-\frac{i\,b\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a\,\sqrt{-a^2+b^2}\,d\,e\,n}+\frac{2\,b\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a\,\sqrt{-a^2+b^2}\,d^2\,e\,n}-$$
$$\frac{2\,b\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a\,\sqrt{-a^2+b^2}\,d^2\,e\,n}+\frac{2\,i\,b\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a\,\sqrt{-a^2+b^2}\,d^3\,e\,n}-\frac{2\,i\,b\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a\,\sqrt{-a^2+b^2}\,d^3\,e\,n}$$

Result (type 8, 26 leaves) :

$$\int\frac{(e\,x)^{-1+3n}}{a+b\,\text{Sec}[c+d\,x^n]}\,dx$$

Problem 82: Result more than twice size of optimal antiderivative.

$$\int\frac{(e\,x)^{-1+2n}}{(a+b\,\text{Sec}[c+d\,x^n])^2}\,dx$$

Optimal (type 4, 757 leaves, 23 steps) :

$$\frac{(e\,x)^{2n}}{2\,a^2\,e\,n}-\frac{i\,b^3\,x^{-n}\,(e\,x)^{2n}\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\,(-a^2+b^2)^{3/2}\,d\,e\,n}+\frac{2\,i\,b\,x^{-n}\,(e\,x)^{2n}\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\,\sqrt{-a^2+b^2}\,d\,e\,n}+$$
$$\frac{i\,b^3\,x^{-n}\,(e\,x)^{2n}\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\,(-a^2+b^2)^{3/2}\,d\,e\,n}-\frac{2\,i\,b\,x^{-n}\,(e\,x)^{2n}\,\text{Log}\left[1+\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\,\sqrt{-a^2+b^2}\,d\,e\,n}+\frac{b^2\,x^{-2n}\,(e\,x)^{2n}\,\text{Log}[b+a\,\text{Cos}[c+d\,x^n]]}{a^2\,(a^2-b^2)\,d^2\,e\,n}-$$
$$\frac{b^3\,x^{-2n}\,(e\,x)^{2n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\,(-a^2+b^2)^{3/2}\,d^2\,e\,n}+\frac{2\,b\,x^{-2n}\,(e\,x)^{2n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^n)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\,\sqrt{-a^2+b^2}\,d^2\,e\,n}+$$
$$\frac{b^3\,x^{-2n}\,(e\,x)^{2n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\,(-a^2+b^2)^{3/2}\,d^2\,e\,n}-\frac{2\,b\,x^{-2n}\,(e\,x)^{2n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\,(c+d\,x^n)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\,\sqrt{-a^2+b^2}\,d^2\,e\,n}+\frac{b^2\,x^{-n}\,(e\,x)^{2n}\,\text{Sin}[c+d\,x^n]}{a\,(a^2-b^2)\,d\,e\,n\,(b+a\,\text{Cos}[c+d\,x^n])}$$

Result (type 4, 2450 leaves) :

$$-\frac{1}{(a^2-b^2)^{3/2}\,d^2\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2}\,2\,b\,x^{1-2n}\,(e\,x)^{-1+2n}\,(b+a\,\text{Cos}[c+d\,x^n])^2$$
$$\left(2\,(c+d\,x^n)\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-2\left(c+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\;e^{-\frac{1}{2}\,i\,(c+d\,x^n)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[c+d\,x^n]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\;e^{\frac{1}{2}\,i\,(c+d\,x^n)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[c+d\,x^n]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b-i\,\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b+i\,\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-i\,\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]-\text{PolyLog}\left[2,\frac{\left(b+i\,\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]\right)\Bigg)\Bigg)$$

$$\text{Sec}[c+d\,x^n]^2+\frac{1}{a^2\left(a^2-b^2\right)^{3/2}d^2\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2}\,b^3\,x^{1-2\,n}\,(e\,x)^{-1+2\,n}\,(b+a\,\text{Cos}[c+d\,x^n])^2$$

$$\Bigg(2\,(c+d\,x^n)\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-2\left(c+\text{ArcCos}\left[-\frac{b}{a}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]-2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\;e^{-\frac{1}{2}\,i\,(c+d\,x^n)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[c+d\,x^n]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\left(\text{ArcTanh}\left[\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{a^2-b^2}\;e^{\frac{1}{2}\,i\,(c+d\,x^n)}}{\sqrt{2}\,\sqrt{a}\,\sqrt{b+a\,\text{Cos}[c+d\,x^n]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{\left(b-i\,\sqrt{a^2-b^2}\right)\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]}{\sqrt{a^2-b^2}}\right]\right)\,\text{Log}\left[1-\frac{\left(b+i\,\sqrt{a^2-b^2}\right)\,\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\,\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]+$$

$$i\,\left(\text{PolyLog}\left[2,\,\frac{\left(b-i\,\sqrt{a^2-b^2}\right)\,\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\,\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]-\text{PolyLog}\left[2,\,\frac{\left(b+i\,\sqrt{a^2-b^2}\right)\,\left(a+b-\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}{a\,\left(a+b+\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x^n)\right]\right)}\right]\right)\Bigg)\Bigg)$$

$$\text{Sec}[c+d\,x^n]^2+\frac{x^{1-n}\,(e\,x)^{-1+2\,n}\,(b+a\,\text{Cos}[c+d\,x^n])^2\,\text{Sec}[c+d\,x^n]^2\,\left(a^2\,d\,x^n\,\text{Cos}[c]-b^2\,d\,x^n\,\text{Cos}[c]+2\,b^2\,\text{Sin}[c]\right)}{2\,a^2\,(a-b)\,(a+b)\,d\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)}+$$

$$\Bigg(b^2\,x^{1-2\,n}\,(e\,x)^{-1+2\,n}\,(b+a\,\text{Cos}[c+d\,x^n])^2\,\text{Sec}[c]\,\text{Sec}[c+d\,x^n]^2$$

$$\left(a\,\text{Cos}[c]\,\text{Log}[b+a\,\text{Cos}[c]\,\text{Cos}[d\,x^n]-a\,\text{Sin}[c]\,\text{Sin}[d\,x^n]]+a\,d\,x^n\,\text{Sin}[c]-\frac{2\,i\,a\,b\,\text{ArcTan}\left[\frac{-i\,a\,\text{Sin}[c]-i\,(-b+a\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x^n}{2}\right]}{\sqrt{-b^2+a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}\right]\,\text{Sin}[c]}{\sqrt{-b^2+a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}\right)\Bigg)\Bigg/$$

$$\left(a\,\left(a^2-b^2\right)\,d^2\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2\,\left(a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2\right)\right)+$$

$$\frac{b^2\,x^{1-n}\,(e\,x)^{-1+2\,n}\,(b+a\,\text{Cos}[c+d\,x^n])\,\text{Sec}[c+d\,x^n]^2\,(b\,\text{Sin}[c]-a\,\text{Sin}[d\,x^n])}{a^2\,(-a+b)\,(a+b)\,d\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)}+$$

$$\frac{b^2\,x^{1-n}\,(e\,x)^{-1+2\,n}\,(b+a\,\text{Cos}[c+d\,x^n])^2\,\text{Sec}[c+d\,x^n]^2\,\text{Tan}[c]}{a^2\,\left(-a^2+b^2\right)\,d\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2}-$$

$$\frac{2\,i\,b^3\,x^{1-2\,n}\,(e\,x)^{-1+2\,n}\,\text{ArcTan}\left[\frac{b+a\,\text{Cos}[c+d\,x^n]+i\,a\,\text{Sin}[c+d\,x^n]}{\sqrt{a^2-b^2}}\right]\,(b+a\,\text{Cos}[c+d\,x^n])^2\,\text{Sec}[c+d\,x^n]^2\,\text{Tan}[c]}{a^2\,\left(a^2-b^2\right)^{3/2}\,d^2\,n\,(a+b\,\text{Sec}[c+d\,x^n])^2}$$

- **Problem 83: Unable to integrate problem.**

$$\int\frac{(e\,x)^{-1+3\,n}}{(a+b\,\text{Sec}[c+d\,x^n])^2}\,dx$$

Optimal (type 4, 1384 leaves, 32 steps) :

$$\frac{(e\,x)^{3n}}{3\,a^2\,e\,n}-\frac{i\,b^2\,x^{-n}\,(e\,x)^{3n}}{a^2\left(a^2-b^2\right)d\,e\,n}+\frac{2\,b^2\,x^{-2n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-i\sqrt{a^2-b^2}}\right]}{a^2\left(a^2-b^2\right)d^2\,e\,n}+\frac{2\,b^2\,x^{-2n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+i\sqrt{a^2-b^2}}\right]}{a^2\left(a^2-b^2\right)d^2\,e\,n}-$$

$$\frac{i\,b^3\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\left(-a^2+b^2\right)^{3/2}d\,e\,n}+\frac{2\,i\,b\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\sqrt{-a^2+b^2}\,d\,e\,n}+\frac{i\,b^3\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\left(-a^2+b^2\right)^{3/2}d\,e\,n}-$$

$$\frac{2\,i\,b\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\sqrt{-a^2+b^2}\,d\,e\,n}-\frac{2\,i\,b^2\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-i\sqrt{a^2-b^2}}\right]}{a^2\left(a^2-b^2\right)d^3\,e\,n}-\frac{2\,i\,b^2\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+i\sqrt{a^2-b^2}}\right]}{a^2\left(a^2-b^2\right)d^3\,e\,n}-$$

$$\frac{2\,b^3\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\left(-a^2+b^2\right)^{3/2}d^2\,e\,n}+\frac{4\,b\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\sqrt{-a^2+b^2}\,d^2\,e\,n}+\frac{2\,b^3\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\left(-a^2+b^2\right)^{3/2}d^2\,e\,n}-$$

$$\frac{4\,b\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\sqrt{-a^2+b^2}\,d^2\,e\,n}-\frac{2\,i\,b^3\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\left(-a^2+b^2\right)^{3/2}d^3\,e\,n}+\frac{4\,i\,b\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b-\sqrt{-a^2+b^2}}\right]}{a^2\sqrt{-a^2+b^2}\,d^3\,e\,n}+$$

$$\frac{2\,i\,b^3\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\left(-a^2+b^2\right)^{3/2}d^3\,e\,n}-\frac{4\,i\,b\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{i\left(c+d\,x^n\right)}}{b+\sqrt{-a^2+b^2}}\right]}{a^2\sqrt{-a^2+b^2}\,d^3\,e\,n}+\frac{b^2\,x^{-n}\,(e\,x)^{3n}\,\text{Sin}\left[c+d\,x^n\right]}{a\left(a^2-b^2\right)d\,e\,n\left(b+a\,\text{Cos}\left[c+d\,x^n\right]\right)}$$

Result (type 8, 26 leaves) :

$$\int\frac{(e\,x)^{-1+3n}}{\left(a+b\,\text{Sec}\left[c+d\,x^n\right]\right)^2}\,dx$$

Test results for the 879 problems in "4.5.1.2 (d sec)^n (a+b sec)^m.m"

- **Problem 1: Result more than twice size of optimal antiderivative.**

$$\int\text{Sec}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 85 leaves, 6 steps) :

$$\frac{3\,a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a\,\text{Tan}[c+d\,x]}{d}+\frac{3\,a\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a\,\text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 227 leaves) :

$$-\frac{3\,a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{3\,a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{a}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{3\,a}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-\frac{3\,a}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,a\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

- **Problem 2: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 63 leaves, 5 steps):

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a\,\text{Tan}[c+d\,x]}{d}+\frac{a\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}+\frac{a\,\text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 163 leaves):

$$-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,a\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

- **Problem 3: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 47 leaves, 5 steps):

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a\,\text{Tan}[c+d\,x]}{d}+\frac{a\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 138 leaves):

$$-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{a\,\text{Tan}[c+d\,x]}{d}$$

- **Problem 4: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 24 leaves, 4 steps):

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 81 leaves) :

$$-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,\text{Tan}[c+d\,x]}{d}$$

- **Problem 5: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 16 leaves, 2 steps) :

$$a\,x+\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}$$

Result (type 3, 73 leaves) :

$$a\,x-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}$$

- **Problem 10: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 122 leaves, 7 steps) :

$$\frac{3\,a^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{4\,d}+\frac{9\,a^2\,\text{Tan}[c+d\,x]}{5\,d}+\frac{3\,a^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{2\,d}+\frac{a^2\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}+\frac{3\,a^2\,\text{Tan}[c+d\,x]^3}{5\,d}$$

Result (type 3, 487 leaves) :

$$-\frac{1}{640\,d}\,a^2\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5$$
$$\Big(75\,\text{Cos}[2\,c+3\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]+75\,\text{Cos}[4\,c+3\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]+$$
$$15\,\text{Cos}[4\,c+5\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]+15\,\text{Cos}[6\,c+5\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]+$$
$$150\,\text{Cos}[d\,x]\,\Big(\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]\Big)+$$
$$150\,\text{Cos}[2\,c+d\,x]\,\Big(\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]\Big)-$$
$$75\,\text{Cos}[2\,c+3\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]-75\,\text{Cos}[4\,c+3\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]-$$
$$15\,\text{Cos}[4\,c+5\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]-15\,\text{Cos}[6\,c+5\,d\,x]\,\text{Log}\Big[\text{Cos}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\tfrac{1}{2}\,(c+d\,x)\Big]\Big]-400\,\text{Sin}[d\,x]+$$
$$80\,\text{Sin}[2\,c+d\,x]-140\,\text{Sin}[c+2\,d\,x]-140\,\text{Sin}[3\,c+2\,d\,x]-240\,\text{Sin}[2\,c+3\,d\,x]-30\,\text{Sin}[3\,c+4\,d\,x]-30\,\text{Sin}[5\,c+4\,d\,x]-48\,\text{Sin}[4\,c+5\,d\,x]\Big)$$

Problem 11: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 96 leaves, 6 steps):

$$\frac{7\,a^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{2\,a^2\,\text{Tan}[c+d\,x]}{d}+\frac{7\,a^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{2\,a^2\,\text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 877 leaves):

$$-\frac{7\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2}{32\,d}+$$
$$\frac{7\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2}{32\,d}+$$
$$\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2}{64\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(29\,\text{Cos}\left[\frac{c}{2}\right]-13\,\text{Sin}\left[\frac{c}{2}\right]\right)}{192\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}-$$
$$\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2}{64\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(-29\,\text{Cos}\left[\frac{c}{2}\right]-13\,\text{Sin}\left[\frac{c}{2}\right]\right)}{192\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 12: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 74 leaves, 6 steps):

$$\frac{a^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{5\,a^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{d}+\frac{a^2\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 318 leaves):

$$-\frac{1}{24\,d}$$
$$a^2\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\left(3\,\text{Cos}[2\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+3\,\text{Cos}[4\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.$$
$$9\,\text{Cos}[d\,x]\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+$$
$$9\,\text{Cos}[2\,c+d\,x]\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-$$
$$3\,\text{Cos}[2\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-3\,\text{Cos}[4\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\left.24\,\text{Sin}[d\,x]+6\,\text{Sin}[2\,c+d\,x]-6\,\text{Sin}[c+2\,d\,x]-6\,\text{Sin}[3\,c+2\,d\,x]-10\,\text{Sin}[2\,c+3\,d\,x]\right)$$

Problem 13: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]\,(a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 54 leaves, 5 steps):

$$\frac{3 a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{2 a^2 \text{Tan}[c+d x]}{d}+\frac{a^2 \text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 d}$$

Result (type 3, 219 leaves):

$$\frac{1}{16 d} a^2 (1+\text{Cos}[c+d x])^2 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \left(-6 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$6 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\left.(8 \text{Sin}[d x]) \Big/ \left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)$$

Problem 14: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 34 leaves, 4 steps):

$$a^2 x+\frac{2 a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{a^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 171 leaves):

$$\frac{1}{4 d} a^2 (1+\text{Cos}[c+d x])^2 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \left(d x-2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$\left.\text{Sin}[d x] \Big/ \left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)$$

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]\,(a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 34 leaves, 4 steps):

$$2 a^2 x+\frac{a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{a^2 \text{Sin}[c+d x]}{d}$$

Result (type 3, 106 leaves):

$$2\,a^2\,x-\frac{a^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a^2\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{a^2\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}$$

Problem 20: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 114 leaves, 11 steps):

$$\frac{13\,a^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{4\,a^3\,\text{Tan}[c+d\,x]}{d}+\frac{13\,a^3\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{3\,a^3\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{5\,a^3\,\text{Tan}[c+d\,x]^3}{3\,d}+\frac{a^3\,\text{Tan}[c+d\,x]^5}{5\,d}$$

Result (type 3, 487 leaves):

$$-\frac{1}{3840\,d}\,a^3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\Bigg(975\,\text{Cos}[2\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+975\,\text{Cos}[4\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$195\,\text{Cos}[4\,c+5\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+195\,\text{Cos}[6\,c+5\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$1950\,\text{Cos}[d\,x]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$
$$1950\,\text{Cos}[2\,c+d\,x]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$
$$975\,\text{Cos}[2\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-975\,\text{Cos}[4\,c+3\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$195\,\text{Cos}[4\,c+5\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-195\,\text{Cos}[6\,c+5\,d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$4640\,\text{Sin}[d\,x]+1440\,\text{Sin}[2\,c+d\,x]-1500\,\text{Sin}[c+2\,d\,x]-1500\,\text{Sin}[3\,c+2\,d\,x]-$$
$$3040\,\text{Sin}[2\,c+3\,d\,x]-390\,\text{Sin}[3\,c+4\,d\,x]-390\,\text{Sin}[5\,c+4\,d\,x]-608\,\text{Sin}[4\,c+5\,d\,x]\Bigg)$$

Problem 21: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 93 leaves, 11 steps):

$$\frac{15\,a^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{4\,a^3\,\text{Tan}[c+d\,x]}{d}+\frac{15\,a^3\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a^3\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a^3\,\text{Tan}[c+d\,x]^3}{d}$$

Result (type 3, 877 leaves):

$$-\frac{15\,\text{Cos}[c+d x]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3}{64\,d}+$$

$$\frac{15\,\text{Cos}[c+d x]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3}{64\,d}+$$

$$\frac{\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3}{128\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+\frac{\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,\text{Sin}\left[\frac{d x}{2}\right]}{16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,\left(19\,\text{Cos}\left[\frac{c}{2}\right]-11\,\text{Sin}\left[\frac{c}{2}\right]\right)}{128\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\frac{3\,\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,\text{Sin}\left[\frac{d x}{2}\right]}{8\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-$$

$$\frac{\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3}{128\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+\frac{\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,\text{Sin}\left[\frac{d x}{2}\right]}{16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,\left(-19\,\text{Cos}\left[\frac{c}{2}\right]-11\,\text{Sin}\left[\frac{c}{2}\right]\right)}{128\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\frac{3\,\text{Cos}[c+d x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,\text{Sin}\left[\frac{d x}{2}\right]}{8\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

- **Problem 22: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]\,(a+a\,\text{Sec}[c+d x])^3\,dx$$

Optimal (type 3, 72 leaves, 9 steps) :

$$\frac{5\,a^3\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2\,d}+\frac{4\,a^3\,\text{Tan}[c+d x]}{d}+\frac{3\,a^3\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2\,d}+\frac{a^3\,\text{Tan}[c+d x]^3}{3\,d}$$

Result (type 3, 733 leaves) :

$$-\frac{5\,\text{Cos}[c+d\,x]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3}{16\,d}+$$
$$\frac{5\,\text{Cos}[c+d\,x]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3}{16\,d}+$$
$$\frac{\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{48\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+\frac{\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(5\,\text{Cos}\left[\frac{c}{2}\right]-4\,\text{Sin}\left[\frac{c}{2}\right]\right)}{48\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$
$$\frac{11\,\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+\frac{\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{48\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(-5\,\text{Cos}\left[\frac{c}{2}\right]-4\,\text{Sin}\left[\frac{c}{2}\right]\right)}{48\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{11\,\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 23: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 66 leaves, 5 steps):

$$a^3\,x+\frac{7\,a^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{5\,a^3\,\text{Tan}[c+d\,x]}{2\,d}+\frac{\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 235 leaves):

$$\frac{1}{32}\,a^3\,(1+\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^6\,\left(4\,x-\frac{14\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\right.$$
$$\frac{14\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{1}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{1}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\left.(12\,\text{Sin}[d\,x])\Big/\left(d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)$$

- **Problem 24: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 48 leaves, 6 steps):

$$3\,a^3\,x+\frac{3\,a^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a^3\,\text{Sin}[c+d\,x]}{d}+\frac{a^3\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 211 leaves) :

$$\frac{1}{8} a^3 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 \left(3 x-\frac{3 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{3 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{\text{Cos}[d x] \text{Sin}[c]}{d}+\frac{\text{Cos}[c] \text{Sin}[d x]}{d}+\frac{\text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+\frac{\text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)$$

Problem 31: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^2 (a+a \text{Sec}[c+d x])^4 \, dx$$

Optimal (type 3, 111 leaves, 13 steps) :

$$\frac{7 a^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{8 a^4 \text{Tan}[c+d x]}{d}+\frac{7 a^4 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}+\frac{a^4 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{d}+\frac{8 a^4 \text{Tan}[c+d x]^3}{3 d}+\frac{a^4 \text{Tan}[c+d x]^5}{5 d}$$

Result (type 3, 498 leaves) :

$$-\frac{1}{960 d} a^4 \text{Sec}[c] \text{Sec}[c+d x]^5 \left(525 \text{Cos}[2 c+3 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+525 \text{Cos}[4 c+3 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$105 \text{Cos}[4 c+5 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+105 \text{Cos}[6 c+5 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$1050 \text{Cos}[d x] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+$$
$$1050 \text{Cos}[2 c+d x] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)-$$
$$525 \text{Cos}[2 c+3 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-525 \text{Cos}[4 c+3 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-$$
$$105 \text{Cos}[4 c+5 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-105 \text{Cos}[6 c+5 d x] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-$$
$$2360 \text{Sin}[d x]+960 \text{Sin}[2 c+d x]-660 \text{Sin}[c+2 d x]-660 \text{Sin}[3 c+2 d x]-1600 \text{Sin}[2 c+3 d x]+$$
$$\left.60 \text{Sin}[4 c+3 d x]-210 \text{Sin}[3 c+4 d x]-210 \text{Sin}[5 c+4 d x]-332 \text{Sin}[4 c+5 d x]\right)$$

Problem 32: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (a+a \text{Sec}[c+d x])^4 \, dx$$

Optimal (type 3, 96 leaves, 12 steps):

$$\frac{35\,a^4\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{8\,a^4\,\text{Tan}[c+d\,x]}{d}+\frac{27\,a^4\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a^4\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{4\,a^4\,\text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 877 leaves):

$$-\frac{35\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4}{128\,d}+$$
$$\frac{35\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4}{128\,d}+$$
$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4}{256\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(97\,\text{Cos}\left[\frac{c}{2}\right]-65\,\text{Sin}\left[\frac{c}{2}\right]\right)}{768\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{5\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}-$$
$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4}{256\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(-97\,\text{Cos}\left[\frac{c}{2}\right]-65\,\text{Sin}\left[\frac{c}{2}\right]\right)}{768\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{5\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 33: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^4\,dx$$

Optimal (type 3, 91 leaves, 6 steps):

$$a^4\,x+\frac{6\,a^4\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{5\,a^4\,\text{Tan}[c+d\,x]}{d}+\frac{\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{4\,\left(a^4+a^4\,\text{Sec}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 773 leaves):

$$\frac{1}{16}\,x\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4-\frac{3\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4}{8\,d}+$$

$$\frac{3\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4}{8\,d}+$$

$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{96\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(13\,\text{Cos}\left[\frac{c}{2}\right]-11\,\text{Sin}\left[\frac{c}{2}\right]\right)}{192\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

$$\frac{5\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{96\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(-13\,\text{Cos}\left[\frac{c}{2}\right]-11\,\text{Sin}\left[\frac{c}{2}\right]\right)}{192\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{5\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 34: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^4\,dx$$

Optimal (type 3, 73 leaves, 8 steps) :

$$4\,a^4\,x+\frac{13\,a^4\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a^4\,\text{Sin}[c+d\,x]}{d}+\frac{4\,a^4\,\text{Tan}[c+d\,x]}{d}+\frac{a^4\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 272 leaves) :

$$\frac{1}{64}\,a^4\,(1+\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^8$$

$$\left(16\,x-\frac{26\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{26\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{4\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\right.$$

$$\frac{4\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{1}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{16\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-$$

$$\left.\frac{1}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{16\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

- **Problem 35: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^4\,dx$$

Optimal (type 3, 73 leaves, 8 steps) :

$$\frac{13 a^4 x}{2}+\frac{4 a^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{4 a^4 \text{Sin}[c+d x]}{d}+\frac{a^4 \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 d}+\frac{a^4 \text{Tan}[c+d x]}{d}$$

Result (type 3, 241 leaves):

$$\frac{1}{64} a^4 (1+\text{Cos}[c+d x])^4 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^8$$
$$\left(26 x-\frac{16 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{16 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{16 \text{Cos}[d x] \text{Sin}[c]}{d}+\right.$$
$$\frac{\text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{16 \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{\text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{4 \text{Sin}\left[\frac{d x}{2}\right]}{d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\left.\frac{4 \text{Sin}\left[\frac{d x}{2}\right]}{d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)$$

- **Problem 42: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^5}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 103 leaves, 6 steps):

$$-\frac{3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a d}+\frac{4 \text{Tan}[c+d x]}{a d}-\frac{3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a d}-\frac{\text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{d (a+a \text{Sec}[c+d x])}+\frac{4 \text{Tan}[c+d x]^3}{3 a d}$$

Result (type 3, 760 leaves):

$$\frac{3\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}-\frac{3\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}+$$

$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,(a+a\,\text{Sec}[c+d\,x])}+\frac{\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]\,\left(-\text{Cos}\left[\frac{c}{2}\right]+2\,\text{Sin}\left[\frac{c}{2}\right]\right)}{3\,d\,(a+a\,\text{Sec}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

$$\frac{10\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]\,\left(\text{Cos}\left[\frac{c}{2}\right]+2\,\text{Sin}\left[\frac{c}{2}\right]\right)}{3\,d\,(a+a\,\text{Sec}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{10\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 43: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^4}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 85 leaves, 6 steps):

$$\frac{3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a\,d}-\frac{2\,\text{Tan}[c+d\,x]}{a\,d}+\frac{3\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d}-\frac{\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 250 leaves):

$$\frac{1}{2\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}[c+d\,x]$$

$$\left(-4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-6\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+6\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.\right.$$

$$\frac{1}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{1}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-$$

$$\left.\left.(4\,\text{Sin}[d\,x])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)\right)$$

Problem 44: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^3}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 51 leaves, 4 steps):

$$-\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{a d}+\frac{\text{Tan}[c+d x]}{a d}+\frac{\text{Tan}[c+d x]}{d\,(a+a\,\text{Sec}[c+d x])}$$

Result (type 3, 194 leaves):

$$\frac{1}{a d\,(1+\text{Sec}[c+d x])}2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]$$
$$\left(\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.\right.$$
$$\left.\left.\text{Sin}[d x]\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)$$

Problem 45: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^2}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 38 leaves, 3 steps):

$$\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{a d}-\frac{\text{Tan}[c+d x]}{d\,(a+a\,\text{Sec}[c+d x])}$$

Result (type 3, 109 leaves):

$$-\frac{1}{a d\,(1+\text{Sec}[c+d x])}2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]$$
$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]\right)$$

Problem 48: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 44 leaves, 4 steps):

$$-\frac{x}{a}+\frac{2\,\text{Sin}[c+d x]}{a d}-\frac{\text{Sin}[c+d x]}{d\,(a+a\,\text{Sec}[c+d x])}$$

Result (type 3, 89 leaves):

$$\frac{1}{4 a d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\left(-2 d x\,\text{Cos}\left[\frac{d x}{2}\right]-2 d x\,\text{Cos}\left[c+\frac{d x}{2}\right]+5\,\text{Sin}\left[\frac{d x}{2}\right]+\text{Sin}\left[c+\frac{d x}{2}\right]+\text{Sin}\left[c+\frac{3 d x}{2}\right]+\text{Sin}\left[2 c+\frac{3 d x}{2}\right]\right)$$

Problem 52: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^5}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 123 leaves, 7 steps):

$$\frac{7\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^2 d}-\frac{16\,\text{Tan}[c+d x]}{3 a^2 d}+\frac{7\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 a^2 d}-\frac{8\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 a^2 d\,(1+\text{Sec}[c+d x])}-\frac{\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 3, 300 leaves):

$$\frac{1}{3 a^2 d\,(1+\text{Sec}[c+d x])^2}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]^2\left(-2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]-40\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+\right.$$
$$3\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(-14\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+14\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-(8\,\text{Sin}[d x])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\right.$$
$$\left.\left.\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)-2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 53: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^4}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 89 leaves, 6 steps):

$$-\frac{2\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{4\,\text{Tan}[c+d x]}{3 a^2 d}+\frac{2\,\text{Tan}[c+d x]}{a^2 d\,(1+\text{Sec}[c+d x])}-\frac{\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 3, 247 leaves):

$$\frac{1}{3 a^2 d\,(1+\text{Sec}[c+d x])^2}2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]^2\left(\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+14\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+\right.$$
$$6\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\text{Sin}[d x]\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\right.\right.$$
$$\left.\left.\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)+\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^3}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 66 leaves, 4 steps):

$$\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}-\frac{5\,\text{Tan}[c+d x]}{3 a^2 d\,(1+\text{Sec}[c+d x])}+\frac{\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 3, 160 leaves):

$$-\frac{1}{3 a^2 d\,(1+\text{Sec}[c+d x])^2}2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]^2\left(6\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+8\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 58: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 72 leaves, 5 steps):

$$-\frac{2 x}{a^2}+\frac{10\,\text{Sin}[c+d x]}{3 a^2 d}-\frac{2\,\text{Sin}[c+d x]}{a^2 d\,(1+\text{Sec}[c+d x])}-\frac{\text{Sin}[c+d x]}{3 d\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 3, 151 leaves):

$$\frac{1}{48 a^2 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\left(-36\,d x\,\text{Cos}\left[\frac{d x}{2}\right]-36\,d x\,\text{Cos}\left[c+\frac{d x}{2}\right]-12\,d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]-12\,d x\,\text{Cos}\left[2 c+\frac{3 d x}{2}\right]+66\,\text{Sin}\left[\frac{d x}{2}\right]-30\,\text{Sin}\left[c+\frac{d x}{2}\right]+41\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+9\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+3\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]+3\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]\right)$$

Problem 61: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^6}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 3, 162 leaves, 8 steps):

$$\frac{13\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^3 d}-\frac{152\,\text{Tan}[c+d x]}{15 a^3 d}+\frac{13\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 a^3 d}-\frac{\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{5 d\,(a+a\,\text{Sec}[c+d x])^3}-\frac{11\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{15 a d\,(a+a\,\text{Sec}[c+d x])^2}-\frac{76\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{15 d\,\left(a^3+a^3\,\text{Sec}[c+d x]\right)}$$

Result (type 3, 351 leaves):

$$-\frac{1}{480 a^3 d (1+\operatorname{Sec}[c+d x])^3}\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\operatorname{Sec}[c+d x]^3\left(24960\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c]\operatorname{Sec}[c+d x]^2\left(-1235\operatorname{Sin}\left[\frac{d x}{2}\right]+3805\operatorname{Sin}\left[\frac{3 d x}{2}\right]-4329\operatorname{Sin}\left[c-\frac{d x}{2}\right]+1989\operatorname{Sin}\left[c+\frac{d x}{2}\right]-3575\operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-475\operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+2005\operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-2275\operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]+2673\operatorname{Sin}\left[c+\frac{5 d x}{2}\right]+105\operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+1593\operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-975\operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]+1325\operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]+255\operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+875\operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-195\operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]+304\operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]+90\operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]+214\operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)\right)$$

- **Problem 62: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c+d x]^5}{(a+a\operatorname{Sec}[c+d x])^3}\,dx$$

Optimal (type 3, 128 leaves, 7 steps):

$$-\frac{3\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^3 d}+\frac{9\operatorname{Tan}[c+d x]}{5 a^3 d}-\frac{\operatorname{Sec}[c+d x]^3\operatorname{Tan}[c+d x]}{5 d (a+a\operatorname{Sec}[c+d x])^3}-\frac{3\operatorname{Sec}[c+d x]^2\operatorname{Tan}[c+d x]}{5 a d (a+a\operatorname{Sec}[c+d x])^2}+\frac{3\operatorname{Tan}[c+d x]}{d\left(a^3+a^3\operatorname{Sec}[c+d x]\right)}$$

Result (type 3, 294 leaves):

$$\frac{1}{5 a^3 d (1+\operatorname{Sec}[c+d x])^3} 2\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\operatorname{Sec}[c+d x]^3\left(\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sin}\left[\frac{d x}{2}\right]+8\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sin}\left[\frac{d x}{2}\right]+76\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^4\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sin}\left[\frac{d x}{2}\right]+20\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(3\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-3\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\operatorname{Sin}[d x]\Big/\left(\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)+\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\operatorname{Tan}\left[\frac{c}{2}\right]+8\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3\operatorname{Tan}\left[\frac{c}{2}\right]\right)$$

- **Problem 70: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c+d x]^7}{(a+a\operatorname{Sec}[c+d x])^4}\,dx$$

Optimal (type 3, 193 leaves, 9 steps):

$$\frac{21\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^4\,d}-\frac{576\,\text{Tan}[c+d\,x]}{35\,a^4\,d}+\frac{21\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^4\,d}-\frac{43\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{35\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}-\frac{288\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{35\,a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{\text{Sec}[c+d\,x]^5\,\text{Tan}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{2\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 403 leaves) :

$$-\frac{1}{2240\,a^4\,d\,(1+\text{Sec}[c+d\,x])^4}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]^4\left(376320\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^7\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\left(-24402\,\text{Sin}\left[\frac{d\,x}{2}\right]+55556\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-61054\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+33614\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-51842\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-12460\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+33716\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-34300\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+39788\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-2940\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+26068\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-16660\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+21351\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+1295\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+14911\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-5145\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+7329\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+1225\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+5369\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-735\,\text{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]+1152\,\text{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]+280\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+872\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)\right)$$

Problem 71: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^6}{(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 159 leaves, 8 steps) :

$$-\frac{4\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^4\,d}+\frac{244\,\text{Tan}[c+d\,x]}{105\,a^4\,d}-\frac{88\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}+\frac{4\,\text{Tan}[c+d\,x]}{a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{12\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{35\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 349 leaves) :

$$\frac{1}{1680\,a^4\,d\,(1+\text{Sec}[c+d\,x])^4}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]^4\left(107\,520\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^7\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\,\text{Sec}[c+d\,x]\left(-10\,780\,\text{Sin}\left[\frac{d\,x}{2}\right]+18\,788\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-20\,524\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+14\,644\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-16\,660\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-4690\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+14\,378\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9100\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+11\,668\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-630\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+9358\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-2940\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+4228\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+315\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3493\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-420\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+664\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+105\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+559\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)\right)$$

- **Problem 77: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 111 leaves, 5 steps):

$$\frac{x}{a^4}-\frac{11\,\text{Tan}[c+d\,x]}{21\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}-\frac{32\,\text{Tan}[c+d\,x]}{21\,a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{\text{Tan}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{2\,\text{Tan}[c+d\,x]}{7\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 224 leaves):

$$\frac{1}{2688\,a^4\,d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^7\left(735\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+735\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+441\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+441\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+147\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+147\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+21\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+21\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-1988\,\text{Sin}\left[\frac{d\,x}{2}\right]+1652\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1428\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+756\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-560\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+168\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-104\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]\right)$$

- **Problem 78: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d\,x]}{(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 126 leaves, 7 steps):

$$-\frac{4\,x}{a^4}+\frac{664\,\text{Sin}[c+d\,x]}{105\,a^4\,d}-\frac{88\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}-\frac{4\,\text{Sin}[c+d\,x]}{a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{\text{Sin}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{12\,\text{Sin}[c+d\,x]}{35\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 263 leaves):

$$-\frac{1}{26880\,a^4\,d}\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^7\left(29400\,d x\operatorname{Cos}\left[\frac{d x}{2}\right]+29400\,d x\operatorname{Cos}\left[c+\frac{d x}{2}\right]+17640\,d x\operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+17640\,d x\operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+5880\,d x\operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+5880\,d x\operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]+840\,d x\operatorname{Cos}\left[3 c+\frac{7 d x}{2}\right]+840\,d x\operatorname{Cos}\left[4 c+\frac{7 d x}{2}\right]-60830\operatorname{Sin}\left[\frac{d x}{2}\right]+46130\operatorname{Sin}\left[c+\frac{d x}{2}\right]-46116\operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+18060\operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-19292\operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+2100\operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-3791\operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]-735\operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-105\operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]-105\operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

Problem 80: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Sec}[c+d x]^7}{(a+a\operatorname{Sec}[c+d x])^5}\,dx$$

Optimal (type 3, 200 leaves, 9 steps):

$$-\frac{5\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^5 d}+\frac{181\operatorname{Tan}[c+d x]}{63 a^5 d}-\frac{\operatorname{Sec}[c+d x]^5\operatorname{Tan}[c+d x]}{9 d (a+a\operatorname{Sec}[c+d x])^5}-\frac{5\operatorname{Sec}[c+d x]^4\operatorname{Tan}[c+d x]}{21 a d (a+a\operatorname{Sec}[c+d x])^4}-\frac{29\operatorname{Sec}[c+d x]^3\operatorname{Tan}[c+d x]}{63 a^2 d (a+a\operatorname{Sec}[c+d x])^3}-\frac{67\operatorname{Sec}[c+d x]^2\operatorname{Tan}[c+d x]}{63 a^3 d (a+a\operatorname{Sec}[c+d x])^2}+\frac{5\operatorname{Tan}[c+d x]}{d\left(a^5+a^5\operatorname{Sec}[c+d x]\right)}$$

Result (type 3, 401 leaves):

$$\frac{1}{2016\,a^5\,d\,(1+\operatorname{Sec}[c+d x])^5}\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\operatorname{Sec}[c+d x]^5\left(322560\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^9\left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c]\operatorname{Sec}[c+d x]\left(-33978\operatorname{Sin}\left[\frac{d x}{2}\right]+52002\operatorname{Sin}\left[\frac{3 d x}{2}\right]-56952\operatorname{Sin}\left[c-\frac{d x}{2}\right]+43722\operatorname{Sin}\left[c+\frac{d x}{2}\right]-47208\operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-18144\operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+41796\operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-28350\operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]+34578\operatorname{Sin}\left[c+\frac{5 d x}{2}\right]-5691\operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+28719\operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-11550\operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]+15517\operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]-504\operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+13186\operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-2835\operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]+4149\operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]+252\operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]+3582\operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]-315\operatorname{Sin}\left[6 c+\frac{9 d x}{2}\right]+496\operatorname{Sin}\left[4 c+\frac{11 d x}{2}\right]+63\operatorname{Sin}\left[5 c+\frac{11 d x}{2}\right]+433\operatorname{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)\right)$$

Problem 88: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Cos}[c+d x]}{(a+a\operatorname{Sec}[c+d x])^5}\,dx$$

Optimal (type 3, 159 leaves, 8 steps) :

$$-\frac{5 x}{a^5}+\frac{496 \operatorname{Sin}[c+d x]}{63 a^5 d}-\frac{\operatorname{Sin}[c+d x]}{9 d (a+a \operatorname{Sec}[c+d x])^5}-\frac{5 \operatorname{Sin}[c+d x]}{21 a d (a+a \operatorname{Sec}[c+d x])^4}-\frac{29 \operatorname{Sin}[c+d x]}{63 a^2 d (a+a \operatorname{Sec}[c+d x])^3}-\frac{67 \operatorname{Sin}[c+d x]}{63 a^3 d (a+a \operatorname{Sec}[c+d x])^2}-\frac{5 \operatorname{Sin}[c+d x]}{d \left(a^5+a^5 \operatorname{Sec}[c+d x]\right)}$$

Result (type 3, 319 leaves) :

$$-\frac{1}{64512 a^5 d} \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^9 \left(79380 d x \operatorname{Cos}\left[\frac{d x}{2}\right]+79380 d x \operatorname{Cos}\left[c+\frac{d x}{2}\right]+52920 d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+52920 d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+22680 d x \operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+22680 d x \operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]+5670 d x \operatorname{Cos}\left[3 c+\frac{7 d x}{2}\right]+5670 d x \operatorname{Cos}\left[4 c+\frac{7 d x}{2}\right]+630 d x \operatorname{Cos}\left[4 c+\frac{9 d x}{2}\right]+630 d x \operatorname{Cos}\left[5 c+\frac{9 d x}{2}\right]-175014 \operatorname{Sin}\left[\frac{d x}{2}\right]+143010 \operatorname{Sin}\left[c+\frac{d x}{2}\right]-138726 \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+73290 \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-70389 \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+20475 \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-21141 \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+1575 \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-3091 \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]-567 \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]-63 \operatorname{Sin}\left[5 c+\frac{11 d x}{2}\right]-63 \operatorname{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

- **Problem 94: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{a+a \operatorname{Sec}[c+d x]}\, dx$$

Optimal (type 3, 37 leaves, 2 steps) :

$$\frac{2 \sqrt{a} \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{d}$$

Result (type 4, 331 leaves) :

$$-\frac{1}{d}8\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 95: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 62 leaves, 3 steps):

$$\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a\,\text{Sin}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 389 leaves):

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(-\frac{1}{2}\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2}\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)}{d}-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)}\,\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a\,(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 96: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 102 leaves, 4 steps):

$$\frac{3\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4 d}+\frac{3 a\,\text{Sin}[c+d x]}{4 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2 d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 4, 401 leaves):

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-\frac{1}{8}\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{4}\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{8}\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)}{d}+$$

$$\frac{1}{d}3\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 97: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 138 leaves, 5 steps):

$$\frac{5\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d}+\frac{5\,a\,\text{Sin}[c+d\,x]}{8\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{5\,a\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{12\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 417 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\left(-\frac{11}{48}\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{1}{3}\text{Sin}\left[\frac{3}{2}(c+dx)\right]+\frac{1}{16}\text{Sin}\left[\frac{5}{2}(c+dx)\right]+\frac{1}{24}\text{Sin}\left[\frac{7}{2}(c+dx)\right]\right)+$$

$$\frac{1}{4d}5\left(4+3\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\sqrt{a(1+\text{Sec}[c+dx])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 98: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^4\sqrt{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 174 leaves, 6 steps):

$$\frac{35\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{64d}+\frac{35a\,\text{Sin}[c+dx]}{64d\sqrt{a+a\,\text{Sec}[c+dx]}}+$$

$$\frac{35a\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{96d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{7a\,\text{Cos}[c+dx]^2\,\text{Sin}[c+dx]}{24d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a\,\text{Cos}[c+dx]^3\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 4, 431 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}$$
$$\left(-\frac{41}{384}\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{11}{48}\text{Sin}\left[\frac{3}{2}(c+dx)\right]+\frac{15}{128}\text{Sin}\left[\frac{5}{2}(c+dx)\right]+\frac{1}{48}\text{Sin}\left[\frac{7}{2}(c+dx)\right]+\frac{1}{64}\text{Sin}\left[\frac{9}{2}(c+dx)\right]\right)+$$
$$\frac{1}{\left(-64+48\sqrt{2}\right)d}35\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\sqrt{a(1+\text{Sec}[c+dx])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 103: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+dx])^{3/2}\,dx$$

Optimal (type 3, 66 leaves, 4 steps):

$$\frac{2a^{3/2}\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{d}+\frac{2a^2\,\text{Tan}[c+dx]}{d\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 4, 374 leaves):

$$-\frac{1}{d}4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}+$$

$$\frac{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{d}$$

- **Problem 104: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 3, 65 leaves, 5 steps) :

$$\frac{3\,a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^2\,\text{Sin}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 393 leaves) :

$$\frac{\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(-\frac{1}{4}\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)}{d} -$$

$$\frac{1}{d}6\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)}\ \text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 105: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2 (a+a\,\text{Sec}[c+d x])^{3/2}\,dx$$

Optimal (type 3, 106 leaves, 5 steps):

$$\frac{7 a^{3/2}\text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4 d}+\frac{7 a^2\,\text{Sin}[c+d x]}{4 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2 d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 4, 407 leaves):

$$\frac{1}{d}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3 (a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(-\frac{5}{16}\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{8}\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{16}\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{4\,d}7\left(4+3\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3 (a\,(1+\text{Sec}[c+d\,x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 106: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3 (a+a\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 3, 144 leaves, 6 steps):

$$\frac{11\,a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d}+\frac{11\,a^2\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{11\,a^2\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 421 leaves):

$$\frac{1}{d}\mathrm{Cos}[c+dx]\,\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^3 (a(1+\mathrm{Sec}[c+dx]))^{3/2}\left(-\frac{17}{96}\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{7}{24}\mathrm{Sin}\left[\frac{3}{2}(c+dx)\right]+\frac{3}{32}\mathrm{Sin}\left[\frac{5}{2}(c+dx)\right]+\frac{1}{48}\mathrm{Sin}\left[\frac{7}{2}(c+dx)\right]\right)+$$

$$\frac{1}{8d}11\left(4+3\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+dx)\right]^2}$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\mathrm{Sec}[c+dx]))^{3/2}\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 111: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\mathrm{Sec}[c+dx])^{5/2}\,dx$$

Optimal (type 3, 98 leaves, 5 steps):

$$\frac{2a^{5/2}\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+dx]}{\sqrt{a+a\,\mathrm{Sec}[c+dx]}}\right]}{d}+\frac{14a^3\,\mathrm{Tan}[c+dx]}{3d\sqrt{a+a\,\mathrm{Sec}[c+dx]}}+\frac{2a^2\sqrt{a+a\,\mathrm{Sec}[c+dx]}\,\mathrm{Tan}[c+dx]}{3d}$$

Result (type 4, 407 leaves):

$$\frac{1}{d}\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5 (a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\left(\frac{4}{3}\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{6}\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$

$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Cos}[c+d\,x]$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\ \mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5 (a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 112: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 94 leaves, 4 steps):

$$\frac{5\,a^{5/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{d}-\frac{a^3\,\mathrm{Sin}[c+d\,x]}{d\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{2\,a^2\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 399 leaves):

$$\frac{\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(\frac{3}{8}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{8}\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)}{d}+$$

$$\frac{1}{d}5\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Cos}[c+d\,x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 113: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 106 leaves, 4 steps) :

$$\frac{19\,a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,d}+\frac{9\,a^3\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\text{Cos}[c+d\,x]\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 415 leaves) :

$$\frac{1}{d}\text{Cos}[c+d x]^2 \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \left(-\frac{9}{32}\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{5}{16}\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{32}\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{8 d} 19 \left(4+3\sqrt{2}\right) \text{Cos}\left[\frac{1}{4}(c+d x)\right]^4 \sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right) \text{Cos}[c+d x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2} \sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 114: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^{5/2}\, dx$$

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{25 a^{5/2} \text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8 d}+\frac{25 a^3 \text{Sin}[c+d x]}{8 d \sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{13 a^3 \text{Cos}[c+d x]\,\text{Sin}[c+d x]}{12 d \sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2 \text{Cos}[c+d x]^2 \sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 4, 429 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(-\frac{47}{192}\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{3}\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{5}{64}\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{96}\text{Sin}\left[\frac{7}{2}(c+d x)\right]\right)+$$
$$\frac{1}{8 d}25\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 115: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{5/2}\,dx$$

Optimal (type 3, 182 leaves, 6 steps):

$$\frac{163 a^{5/2}\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{163 a^3\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{163 a^3\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{96 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{17 a^3\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{24 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 443 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(-\frac{265\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{1536}+\frac{55}{192}\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{47}{512}\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{5}{192}\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{256}\text{Sin}\left[\frac{9}{2}(c+d x)\right]\right)+$$
$$\frac{1}{64 d}163\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 117: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{a-a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 38 leaves, 2 steps):

$$\frac{2\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a-a\,\text{Sec}[c+d x]}}\right]}{d}$$

Result (type 3, 214 leaves):

$$-\left(\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]+\right.\right.$$
$$\left.\text{Log}\left[2\left(e^{i d x}\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]\right)$$
$$\left.\sqrt{a-a\,\text{Sec}[c+d x]}\left(\text{Cos}\left[\frac{d x}{2}\right]+i\,\text{Sin}\left[\frac{d x}{2}\right]\right)\right)\Big/\left(d\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)$$

- **Problem 118: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\text{Cos}[c+d x]\sqrt{a-a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 65 leaves, 3 steps):

$$-\frac{\sqrt{a}\ \mathrm{ArcTan}\left[\frac{\sqrt{a}\ \mathrm{Tan}[c+d x]}{\sqrt{a-a\,\mathrm{Sec}[c+d x]}}\right]}{d}+\frac{a\,\mathrm{Sin}[c+d x]}{d\sqrt{a-a\,\mathrm{Sec}[c+d x]}}$$

Result (type 3, 348 leaves):

$$\frac{1}{2 d \sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}}\ \mathrm{Cos}[c+d x]\ \mathrm{Csc}\left[\frac{1}{2}(c+d x)\right] \sqrt{a-a\,\mathrm{Sec}[c+d x]}\ \left(\mathrm{Cos}\left[\frac{d x}{2}\right] \mathrm{Log}\left[2\left(e^{i d x} \mathrm{Cos}\left[\frac{c}{2}\right]+i\, e^{i d x} \mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right]+\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right] \left(\mathrm{Cos}\left[\frac{d x}{2}\right]+i\,\mathrm{Sin}\left[\frac{d x}{2}\right]\right)+i\,\mathrm{Log}\left[2\left(e^{i d x} \mathrm{Cos}\left[\frac{c}{2}\right]+i\, e^{i d x} \mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right] \mathrm{Sin}\left[\frac{d x}{2}\right]-2\sqrt{2}\ \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{\mathrm{Cos}[c+d x]\ (\mathrm{Cos}[d x]+i\,\mathrm{Sin}[d x])}\right)$$

- **Problem 141: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[c+d x]}{\sqrt{a-a\,\mathrm{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 48 leaves, 2 steps):

$$-\frac{\sqrt{2}\ \mathrm{ArcTan}\left[\frac{\sqrt{a}\ \mathrm{Tan}[c+d x]}{\sqrt{2}\ \sqrt{a-a\,\mathrm{Sec}[c+d x]}}\right]}{\sqrt{a}\ d}$$

Result (type 3, 113 leaves):

$$-\frac{i\sqrt{2}\ \left(-1+e^{i (c+d x)}\right) \left(\mathrm{Log}\left[1-e^{i (c+d x)}\right]-\mathrm{Log}\left[1+e^{i (c+d x)}+\sqrt{2}\ \sqrt{1+e^{2 i (c+d x)}}\right]\right)}{d \sqrt{1+e^{2 i (c+d x)}}\ \sqrt{a-a\,\mathrm{Sec}[c+d x]}}$$

- **Problem 142: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{1}{\sqrt{a-a\,\mathrm{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 87 leaves, 5 steps):

$$\frac{2\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\ \mathrm{Tan}[c+d x]}{\sqrt{a-a\,\mathrm{Sec}[c+d x]}}\right]}{\sqrt{a}\ d}-\frac{\sqrt{2}\ \mathrm{ArcTan}\left[\frac{\sqrt{a}\ \mathrm{Tan}[c+d x]}{\sqrt{2}\ \sqrt{a-a\,\mathrm{Sec}[c+d x]}}\right]}{\sqrt{a}\ d}$$

Result (type 3, 157 leaves):

$$-\left(\mathrm{i}\left(-1+e^{\mathrm{i}(c+dx)}\right)\left(-\mathrm{i}\,d\,x+\text{ArcSinh}\left[e^{\mathrm{i}(c+dx)}\right]+\sqrt{2}\,\text{Log}\left[1-e^{\mathrm{i}(c+dx)}\right]+\text{Log}\left[1+\sqrt{1+e^{2\mathrm{i}(c+dx)}}\right]-\sqrt{2}\,\text{Log}\left[1+e^{\mathrm{i}(c+dx)}+\sqrt{2}\,\sqrt{1+e^{2\mathrm{i}(c+dx)}}\right]\right)\right)\Big/\left(d\,\sqrt{1+e^{2\mathrm{i}(c+dx)}}\,\sqrt{a-a\,\text{Sec}[c+d\,x]}\right)$$

Problem 143: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,dx$$

Optimal (type 4, 383 leaves, 7 steps):

$$-\frac{9\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{40\,d}+\frac{57\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{80\,d\,(1+\text{Sec}[c+d\,x])}+\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{5/3}\,\text{Tan}[c+d\,x]}{8\,a\,d}-\left(19\times 3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$
$$\left.(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(80\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 105 leaves):

$$\frac{1}{80\,d}(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\left(57\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+19\times 2^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{2}{3},\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{2/3}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+6\,(2+5\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]\right)$$

Problem 144: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,dx$$

Optimal (type 4, 353 leaves, 6 steps):

$$\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,d}+\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,d\,(1+\text{Sec}[c+d\,x])}-\left(3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(5\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 97 leaves):

$$\frac{1}{5\,d}(a\,(1+\text{Sec}[c+d\,x]))^{2/3}$$

$$\left(\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{2}{3},\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{2/3}\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\left(\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Tan}[c+d\,x]\right)\right)$$

- **Problem 145: Result unnecessarily involves higher level functions.**

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,dx$$

Optimal (type 4, 326 leaves, 5 steps):

$$\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{2\,d\,(1+\text{Sec}[c+d\,x])}-$$

$$\left(3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\right.$$

$$\left.\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(2\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 75 leaves):

$$\frac{1}{2 d}(a (1+\text{Sec}[c+d x]))^{2/3} \left(3+2^{2/3} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \left(\frac{1}{1+\text{Sec}[c+d x]}\right)^{2/3}\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]$$

Problem 146: Result more than twice size of optimal antiderivative.

$$\int (a+a \text{Sec}[c+d x])^{2/3} \, dx$$

Optimal (type 6, 77 leaves, 3 steps):

$$\frac{3 \sqrt{2} \text{AppellF1}\left[\frac{7}{6},\frac{1}{2},1,\frac{13}{6},\frac{1}{2} (1+\text{Sec}[c+d x]),1+\text{Sec}[c+d x]\right] (a+a \text{Sec}[c+d x])^{2/3} \text{Tan}[c+d x]}{7 d \sqrt{1-\text{Sec}[c+d x]}}$$

Result (type 6, 1575 leaves):

$$\left(9 \text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] (1+\text{Sec}[c+d x])^{2/3} (a (1+\text{Sec}[c+d x]))^{2/3} \text{Sin}[c+d x]\right) \Big/$$
$$\left(d \left(9 \text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\right.\right.$$
$$2 \left(-3 \text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+2 \text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right)$$
$$\left.\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) \left(\left(9 \text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Cos}[c+d x] (1+\text{Sec}[c+d x])^{2/3}\right) \Big/\right.$$
$$\left(9 \text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+2 \left(-3 \text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\right.\right.$$
$$\left.\left.2 \text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)+$$
$$\left(9 (1+\text{Sec}[c+d x])^{2/3} \text{Sin}[c+d x] \left(-\frac{1}{3} \text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+\right.\right.$$
$$\left.\left.\frac{2}{9} \text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(9 \text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+2 \left(-3 \text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\right.\right.$$
$$\left.\left.2 \text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)-$$
$$\left(9 \text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] (1+\text{Sec}[c+d x])^{2/3} \text{Sin}[c+d x]\right.$$
$$\left(2 \left(-3 \text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\right.\right.$$

$$2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$9\Big(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{2}{9}\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big(-3\Big(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)+$$

$$2\Big(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\text{AppellF1}\left[\frac{5}{2},\frac{8}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2+$$

$$\Big(6\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}[c+d x]^2\Big)\Big/\Big((1+\text{Sec}[c+d x])^{1/3}$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)\Big)\Big)$$

Problem 147: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]\,(a+a\,\text{Sec}[c+d x])^{2/3}\,dx$$

Optimal (type 6, 77 leaves, 3 steps):

$$-\frac{3\sqrt{2}\,\text{AppellF1}\left[\frac{7}{6},\frac{1}{2},2,\frac{13}{6},\frac{1}{2}(1+\text{Sec}[c+d x]),1+\text{Sec}[c+d x]\right](a+a\,\text{Sec}[c+d x])^{2/3}\,\text{Tan}[c+d x]}{7\,d\,\sqrt{1-\text{Sec}[c+d x]}}$$

Result (type 6, 4011 leaves):

$$\frac{((1+\text{Cos}[c+d x])\,\text{Sec}[c+d x])^{2/3}\,(a\,(1+\text{Sec}[c+d x]))^{2/3}\left(\text{Sin}[c+d x]-\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{d\,(1+\text{Sec}[c+d x])^{2/3}}-$$

$$\left(2^{2/3}\,\text{Cos}[c+d\,x]\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^{5/3}\,(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\right.$$

$$\left(\frac{1}{6}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(1+\text{Sec}[c+d\,x])^{2/3}+\frac{1}{3}\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(1+\text{Sec}[c+d\,x])^{2/3}\right)$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{2}{3},\,1,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\right/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\,\frac{2}{3},\,1,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\frac{2}{9}\,\left(-3\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,2,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{3},\,1,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,1,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,1,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left(-3\,\text{AppellF1}\left[\frac{5}{2},\,\frac{2}{3},\,2,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{5}{3},\,1,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\Big/$$

$$\left(3\,d\,(1+\text{Sec}[c+d\,x])^{2/3}\,\left(-\frac{1}{3\times 2^{1/3}}\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^{5/3}\right.\right.$$

$$\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{2}{3},\,1,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\right/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\,\frac{2}{3},\,1,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\frac{2}{9}\,\left(-3\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,2,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{3},\,1,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,1,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/\left(15\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,1,\right.\right.$$

$$\left.\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left(-3\,\text{AppellF1}\left[\frac{5}{2},\,\frac{2}{3},\,2,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{5}{3},\,1,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)+\frac{1}{3}\,2^{2/3}$$

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^{5/3}\,\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{2}{3},\,1,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\right/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\,\frac{2}{3},\,1,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\frac{2}{9}\,\left(-3\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2}{3},\,2,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{3},\,1,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\right.\right.$$

$$\left.\left.\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-\frac{1}{3}2^{2/3}\,\text{Cos}[c+d x]\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{5/3}$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-\left(3\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.\right.\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{9}\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(5\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$\left.\left.\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{9}\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\left.2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{2}{9}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-3\left(-\frac{6}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$\left.\frac{2}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\left(-\frac{3}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\left.\left.\left.\left.\text{AppellF1}\left[\frac{5}{2},\frac{8}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2-$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\right.\right.\right.\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\left(-\frac{3}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-3\left(-\frac{10}{7}\,\text{AppellF1}\left[\frac{7}{2},\frac{2}{3},3,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$\left.\frac{10}{21}\,\text{AppellF1}\left[\frac{7}{2},\frac{5}{3},2,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\left(-\frac{5}{7}\,\text{AppellF1}\left[\frac{7}{2},\frac{5}{3},2,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{25}{21}\,\text{AppellF1}\left[\frac{7}{2},\frac{8}{3},1,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)-\frac{5}{9}\,2^{2/3}$$

$$\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{2/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)+$$
$$\Big(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big/$$
$$\Big(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)$$
$$\left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)\Big)\Big)$$

- **Problem 148: Result unnecessarily involves higher level functions.**

$$\int \text{Sec}[c+d x]^3\,(a+a\,\text{Sec}[c+d x])^{5/3}\,dx$$

Optimal (type 4, 413 leaves, 8 steps):

$$\frac{147\,a\,(a+a\,\text{Sec}[c+d x])^{2/3}\,\text{Tan}[c+d x]}{440\,d}+\frac{1029\,a\,(a+a\,\text{Sec}[c+d x])^{2/3}\,\text{Tan}[c+d x]}{880\,d\,(1+\text{Sec}[c+d x])}-$$
$$\frac{9\,(a+a\,\text{Sec}[c+d x])^{5/3}\,\text{Tan}[c+d x]}{88\,d}+\frac{3\,(a+a\,\text{Sec}[c+d x])^{8/3}\,\text{Tan}[c+d x]}{11\,a\,d}-$$
$$\Bigg(343\times 3^{3/4}\,a\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\text{Sec}[c+d x])^{2/3}\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)$$
$$\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d x])^{1/3}+(1+\text{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)^2}}\;\text{Tan}[c+d x]\Bigg)\Bigg/$$
$$\left(880\times 2^{1/3}\,d\,(1-\text{Sec}[c+d x])\,(1+\text{Sec}[c+d x])\sqrt{-\frac{(1+\text{Sec}[c+d x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 5, 116 leaves):

$$\frac{1}{880\,d} a\,(a\,(1+\text{Sec}[c+d\,x]))^{2/3} \left(1029\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] + 343\times 2^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{2/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] + 6\left(74+65\,\text{Sec}[c+d\,x]+40\,\text{Sec}[c+d\,x]^2\right)\text{Tan}[c+d\,x]\right)$$

Problem 149: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^{5/3}\,dx$$

Optimal (type 4, 383 leaves, 7 steps):

$$\frac{3\,a\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{8\,d} + \frac{21\,a\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{16\,d\,(1+\text{Sec}[c+d\,x])} + \frac{3\,(a+a\,\text{Sec}[c+d\,x])^{5/3}\,\text{Tan}[c+d\,x]}{8\,d} - \left(7\times 3^{3/4}\,a\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right] (a+a\,\text{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right) \Bigg/ \left(16\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 104 leaves):

$$\frac{1}{16\,d} a\,(a\,(1+\text{Sec}[c+d\,x]))^{2/3} \left(21\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] + 7\times 2^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{2/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] + 6\,(2+\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]\right)$$

Problem 150: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^{5/3}\,dx$$

Optimal (type 4, 356 leaves, 6 steps):

$$\frac{3 a (a+a \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]}{5 d}+\frac{21 a (a+a \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]}{10 d (1+\operatorname{Sec}[c+d x])}-$$

$$\left(7\times 3^{3/4} a \operatorname{EllipticF}\left[\operatorname{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\operatorname{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\operatorname{Sec}[c+d x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a \operatorname{Sec}[c+d x])^{2/3}\right.$$

$$\left.\left(2^{1/3}-(1+\operatorname{Sec}[c+d x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\operatorname{Sec}[c+d x])^{1/3}+(1+\operatorname{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\operatorname{Sec}[c+d x])^{1/3}\right)^2}}\operatorname{Tan}[c+d x]\right)\Bigg/$$

$$\left(10\times 2^{1/3} d (1-\operatorname{Sec}[c+d x])(1+\operatorname{Sec}[c+d x])\sqrt{-\frac{(1+\operatorname{Sec}[c+d x])^{1/3}\left(2^{1/3}-(1+\operatorname{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\operatorname{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 5, 96 leaves):

$$\frac{1}{10 d} a (a (1+\operatorname{Sec}[c+d x]))^{2/3}$$

$$\left(21 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+7\times 2^{2/3} \operatorname{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(\frac{1}{1+\operatorname{Sec}[c+d x]}\right)^{2/3}\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+6 \operatorname{Tan}[c+d x]\right)$$

Problem 151: Result more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Sec}[c+d x])^{5/3}\, dx$$

Optimal (type 6, 86 leaves, 3 steps):

$$\frac{1}{13 d \sqrt{1-\operatorname{Sec}[c+d x]}} 3 \sqrt{2}\, a \operatorname{AppellF1}\left[\frac{13}{6},\frac{1}{2},1,\frac{19}{6},\frac{1}{2}(1+\operatorname{Sec}[c+d x]),1+\operatorname{Sec}[c+d x]\right](1+\operatorname{Sec}[c+d x])(a+a \operatorname{Sec}[c+d x])^{2/3}\operatorname{Tan}[c+d x]$$

Result (type 6, 3988 leaves):

$$\frac{3 ((1+\operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x])^{2/3}(a (1+\operatorname{Sec}[c+d x]))^{5/3}\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{2 d (1+\operatorname{Sec}[c+d x])^{5/3}}+$$

$$\left(5 \operatorname{Cos}[c+d x]\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Sec}[c+d x]\right)^{5/3}(a (1+\operatorname{Sec}[c+d x]))^{5/3}\right.$$

$$\left(\frac{3}{4}\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2(1+\operatorname{Sec}[c+d x])^{2/3}+\frac{1}{2}\operatorname{Cos}[c+d x]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2(1+\operatorname{Sec}[c+d x])^{2/3}\right)$$

$$\left.\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\left(\operatorname{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\right)\Bigg/$$

$$\left(\operatorname{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\left(-3 \operatorname{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.\right.$$

$$2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+$$

$$\Big(\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big/$$

$$\Big(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)\Big)\Big/$$

$$\Big(2^{1/3}\,d\,(1+\text{Sec}[c+d\,x])^{5/3}\left(\frac{1}{2\times 2^{1/3}}5\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{5/3}\right.$$

$$\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big/\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\frac{2}{9}\Big(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+\right.\right.$$

$$\left.\left.d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+\Big(\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big/$$

$$\Big(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)-$$

$$\frac{1}{2^{1/3}}5\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{5/3}\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big/$$

$$\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\Big(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+$$

$$\Big(\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big/\Big(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)+\frac{1}{2^{1/3}}5\,\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{5/3}$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big(\Big(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{2}{9}\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big/$$

$$\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)+$$

$$\Big(\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big/$$

$$\Big(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)+$$

$$\Big(\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big/$$

$$\Big(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)-$$

$$\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big(-\frac{1}{3}\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{9}\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{9}\Big(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{2}{9}\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\Big(-3\Big(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)+$$

$$2\Big(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\text{AppellF1}\left[\frac{5}{2},\frac{8}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,\text{AppellF1}[\frac{3}{2}, \frac{5}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2]) \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2)^2 -$$

$$(\text{AppellF1}[\frac{3}{2}, \frac{2}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \,(2\,(-3\,\text{AppellF1}[\frac{5}{2}, \frac{2}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,\text{AppellF1}[\frac{5}{2}, \frac{5}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2]) \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right] + 15\,(-\frac{3}{5}\,\text{AppellF1}[\frac{5}{2}, \frac{2}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right] +$$

$$\frac{2}{5}\,\text{AppellF1}[\frac{5}{2}, \frac{5}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]) + 2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$(-3\,(-\frac{10}{7}\,\text{AppellF1}[\frac{7}{2}, \frac{2}{3}, 3, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right] +$$

$$\frac{10}{21}\,\text{AppellF1}[\frac{7}{2}, \frac{5}{3}, 2, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]) +$$

$$2\,(-\frac{5}{7}\,\text{AppellF1}[\frac{7}{2}, \frac{5}{3}, 2, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right] +$$

$$\frac{25}{21}\,\text{AppellF1}[\frac{7}{2}, \frac{8}{3}, 1, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]))))) \Big/$$

$$(15\,\text{AppellF1}[\frac{3}{2}, \frac{2}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,(-3\,\text{AppellF1}[\frac{5}{2}, \frac{2}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,\text{AppellF1}[\frac{5}{2}, \frac{5}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2]) \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2)^2) + \frac{1}{3\times 2^{1/3}}$$

$$25\,\text{Cos}[c+d x] \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^{2/3} \text{Tan}\left[\frac{1}{2}(c+d x)\right] \,(\text{AppellF1}[\frac{1}{2}, \frac{2}{3}, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \Big/$$

$$(\text{AppellF1}[\frac{1}{2}, \frac{2}{3}, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + \frac{2}{9}\,(-3\,\text{AppellF1}[\frac{3}{2}, \frac{2}{3}, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,\text{AppellF1}[\frac{3}{2}, \frac{5}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2]) \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2) +$$

$$(\text{AppellF1}[\frac{3}{2}, \frac{2}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2) \Big/$$

$$(15\,\text{AppellF1}[\frac{3}{2}, \frac{2}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,(-3\,\text{AppellF1}[\frac{5}{2}, \frac{2}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2] + 2\,\text{AppellF1}[\frac{5}{2}, \frac{5}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2]) \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2))$$

$$(-\text{Cos}\left[\frac{1}{2}(c+d x)\right] \text{Sec}[c+d x] \,\text{Sin}\left[\frac{1}{2}(c+d x)\right] + \text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x] \,\text{Tan}[c+d x])))$$

Problem 152: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]\ (a+a\,\text{Sec}[c+d x])^{5/3}\,dx$$

Optimal (type 6, 86 leaves, 3 steps):

$$-\frac{1}{13\,d\,\sqrt{1-\text{Sec}[c+d x]}}3\sqrt{2}\ a\,\text{AppellF1}\left[\frac{13}{6},\frac{1}{2},2,\frac{19}{6},\frac{1}{2}(1+\text{Sec}[c+d x]),1+\text{Sec}[c+d x]\right](1+\text{Sec}[c+d x])\ (a+a\,\text{Sec}[c+d x])^{2/3}\,\text{Tan}[c+d x]$$

Result (type 6, 4011 leaves):

$$\frac{((1+\text{Cos}[c+d x])\ \text{Sec}[c+d x])^{2/3}\ (a\ (1+\text{Sec}[c+d x]))^{5/3}\left(\text{Sin}[c+d x]-\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{d\ (1+\text{Sec}[c+d x])^{5/3}}-$$

$$\left(2^{2/3}\,\text{Cos}[c+d x]\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{5/3}(a\ (1+\text{Sec}[c+d x]))^{5/3}\right.$$

$$\left(\frac{2}{3}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2(1+\text{Sec}[c+d x])^{2/3}+\frac{5}{6}\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2(1+\text{Sec}[c+d x])^{2/3}\right)$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\right/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\right/$$

$$\left(3\,d\ (1+\text{Sec}[c+d x])^{5/3}\left(-\frac{1}{3\times 2^{1/3}}\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{5/3}\right.\right.$$

$$\left(-\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\right/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\Big(5\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big/\Big(15\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,$$

$$\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+$$

$$2\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big)+\frac{1}{3}\,2^{2/3}$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^{5/3}\,\text{Sin}[c+d\,x]\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\,\Big(-\Big(9\,\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\Big/$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)+$$

$$\Big(5\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big/\Big(15\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big)-\frac{1}{3}\,2^{2/3}\,\text{Cos}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^{5/3}$$

$$\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\,\Big(-\Big(9\,\Big(-\frac{1}{3}\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2$$

$$\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+\frac{2}{9}\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big/$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)+$$

$$\Big(5\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big/$$

$$\Big(15\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)+$$

$$\Big(5\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\Big(-\frac{3}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+$$

$$\frac{2}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{9}\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{9}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-3\left(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+2\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\text{AppellF1}\left[\frac{5}{2},\frac{8}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\Bigg/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2-$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-3\left(-\frac{10}{7}\text{AppellF1}\left[\frac{7}{2},\frac{2}{3},3,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{10}{21}\text{AppellF1}\left[\frac{7}{2},\frac{5}{3},2,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+\right.\right.\right.$$

$$2\left(-\frac{5}{7}\text{AppellF1}\left[\frac{7}{2},\frac{5}{3},2,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{25}{21}\text{AppellF1}\left[\frac{7}{2},\frac{8}{3},1,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big)\Big)\Big)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\Big)-\frac{5}{9}2^{2/3}$$

$$\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{2/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\right/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Big)\Big)\Big)$$

- **Problem 153: Result unnecessarily involves higher level functions.**

$$\int\frac{\text{Sec}[c+d\,x]^4}{(a+a\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 4, 371 leaves, 7 steps):

$$\frac{99\,\text{Tan}[c+d\,x]}{80\,d\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}+\frac{3\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{8\,d\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}-\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{40\,a\,d}+$$
$$\left(37\times 3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\ \frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$
$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\ \text{Tan}[c+d\,x]\right)\Bigg/$$
$$\left(80\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 108 leaves):

$$\frac{1}{80\,a\,d}(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\left(129\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$
$$\left.37\times 2^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{2/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+6\,(-6+5\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]\right)$$

Problem 154: Result unnecessarily involves higher level functions.

$$\int\frac{\text{Sec}[c+d\,x]^3}{(a+a\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 4, 336 leaves, 6 steps):

$$-\frac{9\,\text{Tan}[c+d\,x]}{10\,d\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}+\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,a\,d}-$$
$$\left(7\times 3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\ \frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$
$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\ \text{Tan}[c+d\,x]\right)\Bigg/$$
$$\left(10\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 98 leaves) :

$$\frac{1}{10\,a\,d}(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\left(-9\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+7\times 2^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{2/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+6\,\text{Tan}[c+d\,x]\right)$$

- **Problem 155: Result unnecessarily involves higher level functions.**

$$\int\frac{\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 4, 306 leaves, 5 steps) :

$$\frac{3\,\text{Tan}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}+\left(3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$
$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$
$$\left(2\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 78 leaves) :

$$-\frac{1}{2\,a\,d}(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\left(-3+2^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{2/3}\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

- **Problem 156: Result unnecessarily involves higher level functions.**

$$\int\frac{\text{Sec}[c+d\,x]}{(a+a\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 4, 276 leaves, 4 steps) :

$$-\left(3^{3/4}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\;\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 76 leaves) :

$$\frac{1}{a\,d}\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{2}{3},\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{2/3}\,(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

- **Problem 157: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 6, 75 leaves, 3 steps) :

$$\frac{3\,\sqrt{2}\,\text{AppellF1}\left[\frac{1}{6},\,\frac{1}{2},\,1,\,\frac{7}{6},\,\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),\,1+\text{Sec}[c+d\,x]\right]\,\text{Tan}[c+d\,x]}{d\,\sqrt{1-\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 6, 733 leaves) :

$$\left(45\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right.$$
$$\text{Cos}[c+d x]^2\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\,(a\,(1+\text{Sec}[c+d x]))^{2/3}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]$$
$$\left(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-2\left(3\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.\right.$$
$$\left.\left.\left.\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Big/$$
$$\left(a\,d\,\left(135\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]^2\,(1+2\,\text{Cos}[c+d x]+3\,\text{Cos}[2\,(c+d x)])+\right.\right.$$
$$\frac{3}{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\left(15\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\,(8+15\,\text{Cos}[c+d x]+4\,\text{Cos}[2\,(c+d x)]-3\,\text{Cos}[3\,(c+d x)])+\right.$$
$$5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\,(8+15\,\text{Cos}[c+d x]+4\,\text{Cos}[2\,(c+d x)]-3\,\text{Cos}[3\,(c+d x)])-96$$
$$\left(9\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.$$
$$\left.\left.\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Cos}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+$$
$$40\left(3\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)^2$$
$$\left.\left.\text{Cos}[c+d x]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4\right)\right)$$

Problem 158: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d x]}{(a+a\,\text{Sec}[c+d x])^{1/3}}\,dx$$

Optimal (type 6, 75 leaves, 3 steps):

$$-\frac{3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{6},\frac{1}{2},2,\frac{7}{6},\frac{1}{2}(1+\text{Sec}[c+d x]),1+\text{Sec}[c+d x]\right]\text{Tan}[c+d x]}{d\sqrt{1-\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])^{1/3}}$$

Result (type 6, 1986 leaves):

$$\frac{((1+\text{Cos}[c+d x])\,\text{Sec}[c+d x])^{2/3}\,(1+\text{Sec}[c+d x])^{1/3}\left(\text{Sin}[c+d x]-\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{d\,(a\,(1+\text{Sec}[c+d x]))^{1/3}}+$$

$$\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right](1+\text{Sec}[c+d\,x])\right.$$

$$\left.\left(\frac{1}{6}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2(1+\text{Sec}[c+d\,x])^{2/3}-\frac{1}{6}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2(1+\text{Sec}[c+d\,x])^{2/3}\right)\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/$$

$$\left(d\,(a\,(1+\text{Sec}[c+d\,x]))^{1/3}\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$

$$6\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\left(\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right](1+\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\right.$$

$$\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+6\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(5\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right](1+\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\left(45\,\text{AppellF1}\left[\right.\right.$$

$$\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+6\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+\left(10\,(1+\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\left.\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$

$$\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+6\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right](1+\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(6\left(-3\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$

$$\left.2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$45\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\frac{2}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)+$$

$$6\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big(-3\Big(-\frac{10}{7}\,\text{AppellF1}\Big[\frac{7}{2},\frac{2}{3},3,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+$$

$$\frac{10}{21}\,\text{AppellF1}\Big[\frac{7}{2},\frac{5}{3},2,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)+$$

$$2\Big(-\frac{5}{7}\,\text{AppellF1}\Big[\frac{7}{2},\frac{5}{3},2,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+$$

$$\frac{25}{21}\,\text{AppellF1}\Big[\frac{7}{2},\frac{8}{3},1,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(45\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+6\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+2\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^2+$$

$$\Big(20\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}[c+d\,x]\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\,\text{Tan}[c+d\,x]\Big)\Big/$$

$$\Big(3\,(1+\text{Sec}[c+d\,x])^{1/3}\Big(45\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+$$

$$6\Big(-3\,\text{AppellF1}\Big[\frac{5}{2},\frac{2}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+$$

$$2\,\text{AppellF1}\Big[\frac{5}{2},\frac{5}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big)\Big)\Big)$$

■ Problem 159: Result unnecessarily involves higher level functions.

$$\int\frac{\text{Sec}[c+d\,x]^4}{(a+a\,\text{Sec}[c+d\,x])^{5/3}}\,dx$$

Optimal (type 4, 766 leaves, 9 steps):

$$-\frac{33\,\text{Tan}[c+d\,x]}{28\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/3}}+\frac{3\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/3}}+$$

$$\frac{135\,\text{Tan}[c+d\,x]}{14\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{2/3}}+\frac{375\left(1+\sqrt{3}\right)(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{28\,a^2\,d\,(1+\text{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)}-$$

$$\left(375\times 3^{1/4}\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(14\times 2^{2/3}\,a^2\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)-$$

$$\left(125\times 3^{3/4}\left(1-\sqrt{3}\right)\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(28\times 2^{2/3}\,a^2\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 137 leaves):

$$\left(\frac{3}{2}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]^2\left(3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-12\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]-23\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+\right.$$

$$\left.125\,\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{1/3}\text{Tan}[c+d\,x]\right)\Big/\left(28\,a\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\right)$$

- **Problem 160: Result unnecessarily involves higher level functions.**

$$\int\frac{\text{Sec}[c+d\,x]^3}{(a+a\,\text{Sec}[c+d\,x])^{5/3}}\,dx$$

Optimal (type 4, 731 leaves, 8 steps):

$$\frac{3\,\mathrm{Tan}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/3}}-\frac{36\,\mathrm{Tan}[c+d\,x]}{7\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}-\frac{57\left(1+\sqrt{3}\right)(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{7\,a^2\,d\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(57\times 2^{1/3}\,3^{1/4}\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(7\,a^2\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(19\times 3^{3/4}\left(1-\sqrt{3}\right)\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(7\times 2^{2/3}\,a^2\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 135 leaves):

$$\left((1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\right.$$

$$\left(3\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\left(3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+4\,\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)-38\,\mathrm{Hypergeometric2F1}\left[\frac{1}{3},\frac{1}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.$$

$$\left.\left.\left(\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{1/3}\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(14\,a\,d\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{2/3}\right)$$

Problem 161: Result unnecessarily involves higher level functions.

$$\int \frac{\text{Sec}[c+d x]^2}{(a+a \text{Sec}[c+d x])^{5/3}} \, dx$$

Optimal (type 4, 731 leaves, 8 steps):

$$-\frac{3 \text{Tan}[c+d x]}{7 d (a+a \text{Sec}[c+d x])^{5/3}}+\frac{15 \text{Tan}[c+d x]}{7 a d (a+a \text{Sec}[c+d x])^{2/3}}+\frac{15 \left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3} \text{Tan}[c+d x]}{7 a d (a+a \text{Sec}[c+d x])^{2/3} \left(2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}\right)}-$$

$$\left(15\times 2^{1/3} 3^{1/4} \text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}}\right], \frac{1}{4} \left(2+\sqrt{3}\right)\right] (1+\text{Sec}[c+d x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right) \sqrt{\frac{2^{2/3}+2^{1/3} (1+\text{Sec}[c+d x])^{1/3}+(1+\text{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}\right)^2}} \text{Tan}[c+d x]\right) \Bigg/$$

$$\left(7 a d (1-\text{Sec}[c+d x]) (a+a \text{Sec}[c+d x])^{2/3} \sqrt{-\frac{(1+\text{Sec}[c+d x])^{1/3} \left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}\right)^2}}\right)-$$

$$\left(5\times 3^{3/4} \left(1-\sqrt{3}\right) \text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}}\right], \frac{1}{4} \left(2+\sqrt{3}\right)\right] (1+\text{Sec}[c+d x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right) \sqrt{\frac{2^{2/3}+2^{1/3} (1+\text{Sec}[c+d x])^{1/3}+(1+\text{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}\right)^2}} \text{Tan}[c+d x]\right) \Bigg/$$

$$\left(7\times 2^{2/3} a d (1-\text{Sec}[c+d x]) (a+a \text{Sec}[c+d x])^{2/3} \sqrt{-\frac{(1+\text{Sec}[c+d x])^{1/3} \left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right) (1+\text{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 5, 86 leaves):

$$\frac{-3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+5\times 2^{1/3} \text{Hypergeometric2F1}\left[\frac{1}{3}, \frac{1}{2}, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \left(\frac{1}{1+\text{Sec}[c+d x]}\right)^{1/3} \text{Tan}[c+d x]}{7 a d (a (1+\text{Sec}[c+d x]))^{2/3}}$$

Problem 162: Result unnecessarily involves higher level functions.

$$\int \frac{\text{Sec}[c+d x]}{(a+a\,\text{Sec}[c+d x])^{5/3}}\,dx$$

Optimal (type 4, 744 leaves, 8 steps):

$$\frac{6\,\text{Tan}[c+d x]}{7 a d\,(a+a\,\text{Sec}[c+d x])^{2/3}}+\frac{3\,\text{Tan}[c+d x]}{7 a d\,(1+\text{Sec}[c+d x])\,(a+a\,\text{Sec}[c+d x])^{2/3}}+\frac{6\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\,\text{Tan}[c+d x]}{7 a d\,(a+a\,\text{Sec}[c+d x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)}-$$

$$\left(6\times 2^{1/3}\,3^{1/4}\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](1+\text{Sec}[c+d x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d x])^{1/3}+(1+\text{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)^2}}\,\text{Tan}[c+d x]\right)\Big/$$

$$\left(7 a d\,(1-\text{Sec}[c+d x])\,(a+a\,\text{Sec}[c+d x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)^2}}\right)-$$

$$\left(2^{1/3}\,3^{3/4}\left(1-\sqrt{3}\right)\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](1+\text{Sec}[c+d x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\text{Sec}[c+d x])^{1/3}+(1+\text{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)^2}}\,\text{Tan}[c+d x]\right)\Big/$$

$$\left(7 a d\,(1-\text{Sec}[c+d x])\,(a+a\,\text{Sec}[c+d x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 5, 111 leaves):

$$\left(\left(3\,\text{Cos}[c+d x]+4\times 2^{1/3}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}\right)^{1/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\right.$$

$$\left.\text{Sec}[c+d x]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/\left(7 a d\,(a\,(1+\text{Sec}[c+d x]))^{2/3}\right)$$

Problem 163: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+a\,\text{Sec}[c+d\,x])^{5/3}}\,dx$$

Optimal (type 6, 90 leaves, 3 steps):

$$-\frac{3\sqrt{2}\;\text{AppellF1}\left[-\frac{7}{6},\frac{1}{2},1,-\frac{1}{6},\frac{1}{2}(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\text{Tan}[c+d\,x]}{7\,a\,d\sqrt{1-\text{Sec}[c+d\,x]}\;(1+\text{Sec}[c+d\,x])\;(a+a\,\text{Sec}[c+d\,x])^{2/3}}$$

Result (type 6, 4638 leaves):

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/3}}$$

$$((1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x])^{1/3}\,(1+\text{Sec}[c+d\,x])^{5/3}\left(\frac{27}{7}\text{Sin}[c+d\,x]-\frac{30}{7}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{14}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$\Bigg(2^{1/3}\,\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}(1+\text{Sec}[c+d\,x])^{5/3}\left(\frac{16}{7}(1+\text{Sec}[c+d\,x])^{1/3}-\frac{27}{7}\text{Cos}[c+d\,x]\,(1+\text{Sec}[c+d\,x])^{1/3}\right)$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg(-27-\left(5\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/$$

$$\Bigg(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Bigg(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\Bigg(-3\,\text{AppellF1}\Bigg[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg]+\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)-$$

$$\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\Bigg(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2$$

$$\Bigg(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Bigg(3\,\text{AppellF1}\Bigg[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(7\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/3}\Bigg(\frac{1}{7\times 2^{2/3}}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}$$

$$\Bigg(-27-\left(5\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\Bigg(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\Bigg(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\Bigg(-3\,\text{AppellF1}\Bigg[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg]+\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)-$$

$$\Big(45\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big/\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)$$

$$\Big(-15\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+2\Big(3\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)\Big)-$$

$$\frac{1}{7}\,2^{1/3}\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^{1/3}\,\text{Sin}[c+d x]\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big(-27-\Big(5\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\Big/\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)-$$

$$\Big(45\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big/\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)$$

$$\Big(-15\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+2\Big(3\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)\Big)+$$

$$\frac{1}{7}\,2^{1/3}\,\text{Cos}[c+d x]\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^{1/3}\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big(\Big(\Big(5\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)\Big)\Big/\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^2$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)-$$

$$\Big(5\Big(-\frac{1}{3}\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{1}{9}\,\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)\Big)\Big/$$

$$\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big(\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+$$

$$d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)+$$

$$\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right.$$
$$\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$
$$\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$
$$\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$
$$\left(45\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$
$$\left.\left.\frac{1}{5}\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$
$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$
$$2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.$$
$$\left.\left.\left.\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)+$$
$$\left(5\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$
$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{9}\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$\frac{2}{9}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$
$$\frac{4}{5}\text{AppellF1}\left[\frac{5}{2},\frac{7}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$
$$3\left(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{5}\text{AppellF1}\left[\frac{5}{2},\right.\right.$$

$$\frac{4}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\Big] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right]\Big)\Big)\Big)\Big)\Big) \Big/ \left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] + \frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] + \text{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2\right) +$$

$$\left(45\,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2 \left(2\left(3\,\text{AppellF1}\left[\frac{5}{2}, \frac{1}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] - \text{AppellF1}\left[\frac{5}{2}, \frac{4}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\Big) \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right] -$$

$$15\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2}, \frac{1}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right] +\right.$$

$$\left.\frac{1}{5}\text{AppellF1}\left[\frac{5}{2}, \frac{4}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right]\right) +$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2 \left(\frac{5}{7}\text{AppellF1}\left[\frac{7}{2}, \frac{4}{3}, 2, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right] -\right.$$

$$\frac{20}{21}\text{AppellF1}\left[\frac{7}{2}, \frac{7}{3}, 1, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right] +$$

$$3\left(-\frac{10}{7}\text{AppellF1}\left[\frac{7}{2}, \frac{1}{3}, 3, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right] +\right.$$

$$\left.\left.\left.\left.\frac{5}{21}\text{AppellF1}\left[\frac{7}{2}, \frac{4}{3}, 2, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+dx)\right]^2 \text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\right)\right)\right) \Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right) \left(-15\,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] +\right.\right.$$

$$2\left(3\,\text{AppellF1}\left[\frac{5}{2}, \frac{1}{3}, 2, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] - \text{AppellF1}\left[\frac{5}{2}, \frac{4}{3}, 1, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2\right)\right) + \frac{1}{21\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2 \text{Sec}[c+dx]\right)^{2/3}} 2^{1/3} \text{Cos}[c+dx]$$

$$\text{Tan}\left[\frac{1}{2}(c+dx)\right] \left(-27 - \left(5\,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right) \Big/ \left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right.\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] + \frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right] + \text{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right) -$$

$$\left(45\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)\Bigg)\Bigg)$$

- **Problem 164: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]}{(a+a\,\text{Sec}[c+d x])^{5/3}}\,dx$$

Optimal (type 6, 90 leaves, 3 steps):

$$\frac{3\sqrt{2}\,\text{AppellF1}\left[-\frac{7}{6},\frac{1}{2},2,-\frac{1}{6},\frac{1}{2}(1+\text{Sec}[c+d x]),1+\text{Sec}[c+d x]\right]\text{Tan}[c+d x]}{7\,a\,d\,\sqrt{1-\text{Sec}[c+d x]}\,(1+\text{Sec}[c+d x])\,(a+a\,\text{Sec}[c+d x])^{2/3}}$$

Result (type 6, 4638 leaves):

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/3}}$$

$$((1+\text{Cos}[c+d x])\,\text{Sec}[c+d x])^{1/3}(1+\text{Sec}[c+d x])^{5/3}\left(-\frac{48}{7}\text{Sin}[c+d x]+\frac{51}{7}\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{3}{14}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)-$$

$$\left(5\times 2^{1/3}\,\text{Cos}[c+d x]\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{1/3}(1+\text{Sec}[c+d x])^{5/3}\left(-\frac{30}{7}(1+\text{Sec}[c+d x])^{1/3}+\frac{55}{7}\text{Cos}[c+d x]\,(1+\text{Sec}[c+d x])^{1/3}\right)\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-33-\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\Big/\right.$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-$$

$$\left(55\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left.\left.\left.\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\right)\Big/$$

$$\left(21\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/3}\left(-\frac{1}{21\times 2^{2/3}}\,5\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}\right.\right.$$

$$\left(-33-\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(55\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)+$$

$$\frac{5}{21}\,2^{1/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-33-\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\right.\right.\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(55\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)-$$

$$\frac{5}{21}\,2^{1/3}\,\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}\left(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$-\text{Tan}[\tfrac{1}{2}(c+d x)]^2] + \text{AppellF1}[\tfrac{3}{2}, \tfrac{4}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2]) \text{Tan}[\tfrac{1}{2}(c+d x)]^2)) -$$

$$(3 (-\tfrac{1}{3} \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 2, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] \text{Sec}[\tfrac{1}{2}(c+d x)]^2 \text{Tan}[\tfrac{1}{2}(c+d x)] +$$

$$\tfrac{1}{9} \text{AppellF1}[\tfrac{3}{2}, \tfrac{4}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] \text{Sec}[\tfrac{1}{2}(c+d x)]^2 \text{Tan}[\tfrac{1}{2}(c+d x)])) /$$

$$((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2) (\text{AppellF1}[\tfrac{1}{2}, \tfrac{1}{3}, 1, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] + \tfrac{2}{9} (-3 \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 2, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+$$

$$d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] + \text{AppellF1}[\tfrac{3}{2}, \tfrac{4}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2]) \text{Tan}[\tfrac{1}{2}(c+d x)]^2)) +$$

$$(55 \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] \text{Sec}[\tfrac{1}{2}(c+d x)]^2 \text{Tan}[\tfrac{1}{2}(c+d x)]^3) /$$

$$((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2)^2 (-15 \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] +$$

$$2 (3 \text{AppellF1}[\tfrac{5}{2}, \tfrac{1}{3}, 2, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] -$$

$$\text{AppellF1}[\tfrac{5}{2}, \tfrac{4}{3}, 1, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2]) \text{Tan}[\tfrac{1}{2}(c+d x)]^2)) -$$

$$(55 \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] \text{Sec}[\tfrac{1}{2}(c+d x)]^2 \text{Tan}[\tfrac{1}{2}(c+d x)]) / ((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2)$$

$$(-15 \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] + 2 (3 \text{AppellF1}[\tfrac{5}{2}, \tfrac{1}{3}, 2, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2,$$

$$-\text{Tan}[\tfrac{1}{2}(c+d x)]^2] - \text{AppellF1}[\tfrac{5}{2}, \tfrac{4}{3}, 1, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2]) \text{Tan}[\tfrac{1}{2}(c+d x)]^2)) -$$

$$(55 \text{Tan}[\tfrac{1}{2}(c+d x)]^2 (-\tfrac{3}{5} \text{AppellF1}[\tfrac{5}{2}, \tfrac{1}{3}, 2, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] \text{Sec}[\tfrac{1}{2}(c+d x)]^2 \text{Tan}[\tfrac{1}{2}(c+d x)] +$$

$$\tfrac{1}{5} \text{AppellF1}[\tfrac{5}{2}, \tfrac{4}{3}, 1, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] \text{Sec}[\tfrac{1}{2}(c+d x)]^2 \text{Tan}[\tfrac{1}{2}(c+d x)])) /$$

$$((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2) (-15 \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 1, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] +$$

$$2 (3 \text{AppellF1}[\tfrac{5}{2}, \tfrac{1}{3}, 2, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] -$$

$$\text{AppellF1}[\tfrac{5}{2}, \tfrac{4}{3}, 1, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2]) \text{Tan}[\tfrac{1}{2}(c+d x)]^2)) +$$

$$(3 \text{AppellF1}[\tfrac{1}{2}, \tfrac{1}{3}, 1, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d x)]^2] (-\tfrac{1}{3} \text{AppellF1}[\tfrac{3}{2}, \tfrac{1}{3}, 2, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d x)]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+\frac{1}{9}\,\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+$$

$$\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{2}{9}\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big(-\frac{3}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{4}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{7}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]-$$

$$3\Big(-\frac{6}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{3},3,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+\frac{1}{5}\,\text{AppellF1}\Big[\frac{5}{2},$$

$$\frac{4}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big]\Big)\Big)\Big)\Big)\Big/\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\frac{2}{9}\Big(-3\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^2\Big)+$$

$$\Big(55\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big(2\Big(3\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]-$$

$$15\Big(-\frac{3}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{1}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)+$$

$$2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big(\frac{5}{7}\,\text{AppellF1}\Big[\frac{7}{2},\frac{4}{3},2,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]-$$

$$\frac{20}{21}\,\text{AppellF1}\Big[\frac{7}{2},\frac{7}{3},1,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$3\Big(-\frac{10}{7}\,\text{AppellF1}\Big[\frac{7}{2},\frac{1}{3},3,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{5}{21}\,\text{AppellF1}\Big[\frac{7}{2},\frac{4}{3},2,\frac{9}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big(-15\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+$$

$$2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)^2\Big)\Big)-\frac{1}{63\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{2/3}}$$

$$5\times 2^{1/3}\,\text{Cos}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg(-33-\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/$$

$$\Bigg(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Bigg(\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{2}{9}$$

$$\Bigg(-3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)-$$

$$\left(55\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\Bigg(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\Bigg(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Bigg(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)\Bigg)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Bigg)\Bigg)$$

- **Problem 172: Result unnecessarily involves higher level functions.**

$$\int \text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 187 leaves, 9 steps) :

$$-\frac{12\,a^2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{8\,a^2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{7\,d}+$$

$$\frac{12\,a^2\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,d}+\frac{8\,a^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{7\,d}+\frac{4\,a^2\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a^2\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 287 leaves) :

$$\frac{1}{70\,d}a^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4(1+\text{Sec}[c+d\,x])^2\left(-1\Big/\left(-1+e^{2\,i\,c}\right)2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^2\left(21\left(1+e^{2\,i\,(c+d\,x)}\right)+21\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+10\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\frac{42\,\text{Cos}[d\,x]\,\text{Csc}[c]+(15+14\,\text{Cos}[c+d\,x]+10\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{\text{Sec}[c+d\,x]^{3/2}}\right)$$

Problem 173: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 161 leaves, 8 steps):

$$-\frac{16\,a^2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{4\,a^2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{16\,a^2\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{4\,a^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a^2\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 269 leaves):

$$\frac{1}{30\,d}a^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4(1+\text{Sec}[c+d\,x])^2\left(-1\Big/\left(-1+e^{2\,i\,c}\right)2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^2\left(12\left(1+e^{2\,i\,(c+d\,x)}\right)+12\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\frac{24\,\text{Cos}[d\,x]\,\text{Csc}[c]+(10+3\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{\text{Sec}[c+d\,x]^{3/2}}\right)$$

Problem 174: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 131 leaves, 7 steps):

$$-\frac{4 a^2 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\frac{8 a^2 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}+\frac{4 a^2 \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{d}+\frac{2 a^2 \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 d}$$

Result (type 5, 264 leaves):

$$\frac{1}{3} a^2 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (1+\text{Sec}[c+d x])^2 \left(-\frac{1}{d\left(-1+e^{2 i c}\right)} i \sqrt{2}\, e^{-i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^2 \left(3\left(1+e^{2 i (c+d x)}\right)+3\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+2 e^{i (c+d x)}\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)+\frac{6 \text{Cos}[d x] \text{Csc}[c]+\text{Tan}[c+d x]}{2 d \text{Sec}[c+d x]^{3/2}}\right)$$

Problem 176: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \text{Sec}[c+d x])^2}{\text{Sec}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 107 leaves, 6 steps):

$$\frac{4 a^2 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\frac{8 a^2 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}+\frac{2 a^2 \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 5, 156 leaves):

$$\frac{1}{3 d \sqrt{\text{Sec}[c+d x]}} a^2 \left(\text{Cos}\left[\frac{c}{2}\right]-i \text{Sin}\left[\frac{c}{2}\right]\right)\left(-i \text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(12-\frac{24 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]}{\sqrt{1+e^{2 i (c+d x)}}}+8 \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right] \text{Sec}[c+d x]+2 i \text{Sin}[c+d x]\right)$$

Problem 177: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \text{Sec}[c+d x])^2}{\text{Sec}[c+d x]^{5/2}} \, dx$$

Optimal (type 4, 135 leaves, 7 steps):

$$\frac{16\,a^2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{4\,a^2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^2\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 136 leaves) :

$$\frac{1}{30\,d\,\sqrt{\text{Sec}[c+d\,x]}}a^2\left(-96\,i+\frac{192\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}-40\,i\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]\text{Sec}[c+d\,x]+40\,\text{Sin}[c+d\,x]+6\,\text{Sin}[2\,(c+d\,x)]\right)$$

- **Problem 178: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^2}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 161 leaves, 8 steps) :

$$\frac{12\,a^2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{8\,a^2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{7\,d}+\frac{2\,a^2\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{4\,a^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{8\,a^2\,\text{Sin}[c+d\,x]}{7\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 149 leaves) :

$$\frac{1}{140\,d\,\sqrt{\text{Sec}[c+d\,x]}}a^2\left(\frac{672\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}+2\left(-168\,i-80\,i\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]\text{Sec}[c+d\,x]+85\,\text{Sin}[c+d\,x]+28\,\text{Sin}[2\,(c+d\,x)]+5\,\text{Sin}[3\,(c+d\,x)]\right)\right)$$

- **Problem 179: Result unnecessarily involves higher level functions.**

$$\int\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 4, 187 leaves, 16 steps) :

$$-\frac{28 a^3 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{52 a^3 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+\frac{28 a^3 \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 d}+\frac{52 a^3 \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{21 d}+\frac{6 a^3 \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{5 d}+\frac{2 a^3 \text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{7 d}$$

Result (type 5, 287 leaves):

$$\frac{1}{420 d} a^3 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 (1+\text{Sec}[c+d x])^3 \left(-1 \Big/ \left(-1+e^{2 i c}\right) 2 i \sqrt{2}\ e^{-i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^3 \left(147 \left(1+e^{2 i (c+d x)}\right)+147 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+65\, e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)+\frac{294 \text{Cos}[d x] \text{Csc}[c]+(80+63 \text{Cos}[c+d x]+65 \text{Cos}[2 (c+d x)]) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{\text{Sec}[c+d x]^{5/2}}\right)$$

Problem 180: Result unnecessarily involves higher level functions.

$$\int \sqrt{\text{Sec}[c+d x]}\ (a+a \text{Sec}[c+d x])^3\, dx$$

Optimal (type 4, 157 leaves, 14 steps):

$$-\frac{36 a^3 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{4 a^3 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\frac{36 a^3 \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 d}+\frac{2 a^3 \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{d}+\frac{2 a^3 \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 5, 267 leaves):

$$\frac{1}{20 d} a^3 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 (1+\text{Sec}[c+d x])^3 \left(-1 \Big/ \left(-1+e^{2 i c}\right) 2 i \sqrt{2}\ e^{-i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^3 \left(9 \left(1+e^{2 i (c+d x)}\right)+9 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+5\, e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)+\frac{18 \text{Cos}[d x] \text{Csc}[c]+(5+\text{Sec}[c+d x]) \text{Tan}[c+d x]}{\text{Sec}[c+d x]^{5/2}}\right)$$

- **Problem 181: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 131 leaves, 12 steps):

$$-\frac{4\,a^3\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{20\,a^3\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{6\,a^3\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}+\frac{2\,a^3\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 187 leaves):

$$\frac{1}{3\,d}a^3\,e^{-2\,i\,(c+d\,x)}\,\text{Sec}[c+d\,x]^{3/2}\left(-6-6\,\text{Cos}[2\,(c+d\,x)]+6\,e^{-2\,i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{3/2}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+20\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,i\,\text{Sin}[c+d\,x]+9\,i\,\text{Sin}[2\,(c+d\,x)]\right)\,(-i\,\text{Cos}[2\,(c+d\,x)]+\text{Sin}[2\,(c+d\,x)])$$

- **Problem 182: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 131 leaves, 12 steps):

$$\frac{4\,a^3\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{20\,a^3\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a^3\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a^3\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 5, 169 leaves):

$$\frac{1}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}a^3\,\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\frac{24\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}+2\,\left(-6\,i-10\,i\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]\,\text{Sec}[c+d\,x]+\text{Sin}[c+d\,x]+3\,\text{Tan}[c+d\,x]\right)\right)$$

Problem 183: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^3}{\operatorname{Sec}[c + d x]^{5/2}} \, dx$$

Optimal (type 4, 131 leaves, 12 steps):

$$\frac{36 a^3 \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{5 d} + \frac{4 a^3 \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{d} + \frac{2 a^3 \operatorname{Sin}[c+d x]}{5 d \operatorname{Sec}[c+d x]^{3/2}} + \frac{2 a^3 \operatorname{Sin}[c+d x]}{d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 5, 171 leaves):

$$\frac{1}{10 d \sqrt{\operatorname{Sec}[c+d x]}} a^3 \left(\operatorname{Cos}\left[\frac{c}{2}\right] - i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right] + i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\frac{144 i \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]}{\sqrt{1+e^{2 i (c+d x)}}} + 2 \left(-36 i - 20 i \sqrt{1+e^{2 i (c+d x)}}\ \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -e^{2 i (c+d x)}\right] \operatorname{Sec}[c+d x] + 10 \operatorname{Sin}[c+d x] + \operatorname{Sin}[2 (c+d x)]\right)\right)$$

Problem 184: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^3}{\operatorname{Sec}[c + d x]^{7/2}} \, dx$$

Optimal (type 4, 161 leaves, 14 steps):

$$\frac{28 a^3 \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{5 d} + \frac{52 a^3 \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{21 d} + \frac{2 a^3 \operatorname{Sin}[c+d x]}{7 d \operatorname{Sec}[c+d x]^{5/2}} + \frac{6 a^3 \operatorname{Sin}[c+d x]}{5 d \operatorname{Sec}[c+d x]^{3/2}} + \frac{52 a^3 \operatorname{Sin}[c+d x]}{21 d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 5, 146 leaves):

$$\frac{1}{420 d \sqrt{\operatorname{Sec}[c+d x]}} a^3 \left(-2352 i + \frac{4704 i \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]}{\sqrt{1+e^{2 i (c+d x)}}} - 1040 i \sqrt{1+e^{2 i (c+d x)}}\ \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -e^{2 i (c+d x)}\right] \operatorname{Sec}[c+d x] + 1070 \operatorname{Sin}[c+d x] + 252 \operatorname{Sin}[2 (c+d x)] + 30 \operatorname{Sin}[3 (c+d x)]\right)$$

Problem 185: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 187 leaves, 16 steps):

$$\frac{68\,a^3\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+\frac{44\,a^3\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+$$
$$\frac{2\,a^3\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{6\,a^3\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{68\,a^3\,\text{Sin}[c+d\,x]}{45\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{44\,a^3\,\text{Sin}[c+d\,x]}{21\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 156 leaves):

$$\frac{1}{2520\,d\sqrt{\text{Sec}[c+d\,x]}}a^3$$
$$\left(-11424\,i+\frac{22848\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}-5280\,i\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\text{Sec}[c+d\,x]+\right.$$
$$\left.5820\,\text{Sin}[c+d\,x]+2044\,\text{Sin}[2\,(c+d\,x)]+540\,\text{Sin}[3\,(c+d\,x)]+70\,\text{Sin}[4\,(c+d\,x)]\right)$$

Problem 186: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^4\,dx$$

Optimal (type 4, 213 leaves, 21 steps):

$$-\frac{152\,a^4\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+$$
$$\frac{32\,a^4\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{7\,d}+\frac{152\,a^4\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,d}+\frac{32\,a^4\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{7\,d}+$$
$$\frac{122\,a^4\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{45\,d}+\frac{8\,a^4\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}+\frac{2\,a^4\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 396 leaves):

$$-\frac{1}{105\sqrt{2}\,d\left(-1+e^{2ic}\right)} i\,e^{-i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}[c+dx]^4\left(133\left(1+e^{2i(c+dx)}\right)+133\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+60\,e^{i(c+dx)}\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\mathrm{Sec}[c+dx])^4+\frac{1}{\mathrm{Sec}[c+dx]^{7/2}}$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\mathrm{Sec}[c+dx])^4\left(\frac{19\,\mathrm{Cos}[dx]\,\mathrm{Csc}[c]}{30\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^4\,\mathrm{Sin}[dx]}{72\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^3\,(7\,\mathrm{Sin}[c]+36\,\mathrm{Sin}[dx])}{504\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^2\,(180\,\mathrm{Sin}[c]+427\,\mathrm{Sin}[dx])}{2520\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]\,(427\,\mathrm{Sin}[c]+720\,\mathrm{Sin}[dx])}{2520\,d}+\frac{2\,\mathrm{Tan}[c]}{7\,d}\right)$$

- **Problem 187: Result unnecessarily involves higher level functions.**

$$\int\sqrt{\mathrm{Sec}[c+dx]}\,(a+a\,\mathrm{Sec}[c+dx])^4\,dx$$

Optimal (type 4, 187 leaves, 18 steps):

$$-\frac{64a^4\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{5d}+\frac{136a^4\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{21d}+\frac{64a^4\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c+dx]}{5d}+\frac{94a^4\,\mathrm{Sec}[c+dx]^{3/2}\,\mathrm{Sin}[c+dx]}{21d}+\frac{8a^4\,\mathrm{Sec}[c+dx]^{5/2}\,\mathrm{Sin}[c+dx]}{5d}+\frac{2a^4\,\mathrm{Sec}[c+dx]^{7/2}\,\mathrm{Sin}[c+dx]}{7d}$$

Result (type 5, 279 leaves):

$$\frac{1}{840\,d}a^4\,\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^8(1+\mathrm{Sec}[c+dx])^4\left(-1\Big/\left(\left(-1+e^{2ic}\right)4\,i\sqrt{2}\,e^{-i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}[c+dx]^4\left(168\left(1+e^{2i(c+dx)}\right)+168\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+85\,e^{i(c+dx)}\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2i(c+dx)}\right]\right)\right)+\frac{672\,\mathrm{Cos}[dx]\,\mathrm{Csc}[c]+\left(235+84\,\mathrm{Sec}[c+dx]+15\,\mathrm{Sec}[c+dx]^2\right)\mathrm{Tan}[c+dx]}{\mathrm{Sec}[c+dx]^{7/2}}\right)$$

- **Problem 188: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\mathrm{Sec}[c+dx])^4}{\sqrt{\mathrm{Sec}[c+dx]}}\,dx$$

Optimal (type 4, 161 leaves, 16 steps):

$$-\frac{56\, a^4 \sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{32\, a^4 \sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{66\, a^4 \sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{5\,d}+\frac{8\, a^4\, \text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\, a^4\, \text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 286 leaves):

$$\frac{1}{240\,d} a^4\, \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^8 (1+\text{Sec}[c+d\,x])^4 \left(-1\Big/\left(-1+e^{2\,i\,c}\right) 8\,i\,\sqrt{2}\, e^{-i\,(c+d\,x)} \sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\ \text{Cos}[c+d\,x]^4 \left(21\left(1+e^{2\,i\,(c+d\,x)}\right)+21\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+20\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\frac{-3\,(-61+5\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]+30\,\text{Cos}[c]\,\text{Sin}[d\,x]+2\,(20+3\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{\text{Sec}[c+d\,x]^{7/2}}\right)$$

- **Problem 190: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^4}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 159 leaves, 15 steps):

$$\frac{56\, a^4 \sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{32\, a^4 \sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\, a^4\, \text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{8\, a^4\, \text{Sin}[c+d\,x]}{3\,d\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\, a^4 \sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{d}$$

Result (type 5, 184 leaves):

$$\frac{1}{30\,d\,\sqrt{\text{Sec}[c+d\,x]}}a^4\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\left(-336\,i+\frac{672\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}-320\,i\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\text{Sec}[c+d\,x]+80\,\text{Sin}[c+d\,x]+3\,\text{Sec}[c+d\,x]\,\text{Sin}[3\,(c+d\,x)]+63\,\text{Tan}[c+d\,x]\right)$$

Problem 191: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^4}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 161 leaves, 16 steps):

$$\frac{64\,a^4\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{136\,a^4\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a^4\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{8\,a^4\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{94\,a^4\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 180 leaves):

$$\frac{1}{420\,d\,\sqrt{\text{Sec}[c+d\,x]}}a^4\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\left(-5376\,i+\frac{10752\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}-2720\,i\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\text{Sec}[c+d\,x]+1910\,\text{Sin}[c+d\,x]+336\,\text{Sin}[2\,(c+d\,x)]+30\,\text{Sin}[3\,(c+d\,x)]\right)$$

Problem 192: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^4}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 187 leaves, 18 steps):

$$\frac{152\,a^4\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+\frac{32\,a^4\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{7\,d}+\frac{2\,a^4\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{8\,a^4\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{122\,a^4\,\text{Sin}[c+d\,x]}{45\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{32\,a^4\,\text{Sin}[c+d\,x]}{7\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 156 leaves):

$$\frac{1}{2520\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

$$a^4 \left(-25\,536\,i + \frac{51\,072\,i\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}} - 11\,520\,i\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right.$$
$$\left.\mathrm{Sec}[c+d\,x] + 12\,240\,\mathrm{Sin}[c+d\,x] + 3556\,\mathrm{Sin}[2\,(c+d\,x)] + 720\,\mathrm{Sin}[3\,(c+d\,x)] + 70\,\mathrm{Sin}[4\,(c+d\,x)]\right)$$

- **Problem 193: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^4}{\mathrm{Sec}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 213 leaves, 21 steps):

$$\frac{128\,a^4\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{15\,d} + \frac{904\,a^4\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{231\,d} +$$
$$\frac{2\,a^4\,\mathrm{Sin}[c+d\,x]}{11\,d\,\mathrm{Sec}[c+d\,x]^{9/2}} + \frac{8\,a^4\,\mathrm{Sin}[c+d\,x]}{9\,d\,\mathrm{Sec}[c+d\,x]^{7/2}} + \frac{150\,a^4\,\mathrm{Sin}[c+d\,x]}{77\,d\,\mathrm{Sec}[c+d\,x]^{5/2}} + \frac{128\,a^4\,\mathrm{Sin}[c+d\,x]}{45\,d\,\mathrm{Sec}[c+d\,x]^{3/2}} + \frac{904\,a^4\,\mathrm{Sin}[c+d\,x]}{231\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 306 leaves):

$$-\frac{1}{1\,774\,080\,d\,\mathrm{Sec}[c+d\,x]^{7/2}}$$
$$i\,a^4\,e^{-6\,i\,(c+d\,x)}\left(-315 - 3080\,e^{i\,(c+d\,x)} - 14\,760\,e^{2\,i\,(c+d\,x)} - 48\,664\,e^{3\,i\,(c+d\,x)} - 137\,055\,e^{4\,i\,(c+d\,x)} + 427\,504\,e^{5\,i\,(c+d\,x)} + 518\,672\,e^{7\,i\,(c+d\,x)} +\right.$$
$$137\,055\,e^{8\,i\,(c+d\,x)} + 48\,664\,e^{9\,i\,(c+d\,x)} + 14\,760\,e^{10\,i\,(c+d\,x)} + 3080\,e^{11\,i\,(c+d\,x)} + 315\,e^{12\,i\,(c+d\,x)} -$$
$$946\,176\,e^{5\,i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right] +$$
$$\left.433\,920\,e^{6\,i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^8\,(1+\mathrm{Sec}[c+d\,x])^4$$

- **Problem 194: Result unnecessarily involves higher level functions.**

$$\int \frac{\mathrm{Sec}[c+d\,x]^{7/2}}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 164 leaves, 8 steps):

$$\frac{3\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,d}+\frac{5\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a\,d}-\frac{3\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{a\,d}+\frac{5\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}-\frac{\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 291 leaves):

$$\frac{1}{3\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\left(\frac{1}{-1+e^{2\,i\,c}}2\,i\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\left(9\left(1+e^{2\,i\,(c+d\,x)}\right)+9\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-\sqrt{\text{Sec}[c+d\,x]}\left(18\,\text{Cos}[d\,x]\,\text{Csc}[c]+\text{Sec}[c+d\,x]\left(-5\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)$$

- **Problem 195: Result unnecessarily involves higher level functions.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 136 leaves, 7 steps):

$$-\frac{3\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,d}-\frac{\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,d}+\frac{3\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{a\,d}-\frac{\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 262 leaves):

$$\frac{1}{a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\left(-1\Big/\left(d\left(-1+e^{2\,i\,c}\right)\right)2\,i\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\left(3\left(1+e^{2\,i\,(c+d\,x)}\right)+3\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\frac{\sqrt{\text{Sec}[c+d\,x]}\left(6\,\text{Cos}[d\,x]\,\text{Csc}[c]-2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)}{d}\right)$$

Problem 196: Result unnecessarily involves higher level functions.

$$\int \frac{\text{Sec}[c+d x]^{3/2}}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 110 leaves, 6 steps):

$$\frac{\sqrt{\text{Cos}[c+d x]} \ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}+\frac{\sqrt{\text{Cos}[c+d x]} \ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}-\frac{\sqrt{\text{Sec}[c+d x]} \ \text{Sin}[c+d x]}{d (a+a \text{Sec}[c+d x])}$$

Result (type 5, 201 leaves):

$$-\left(2 i e^{-i (c+d x)} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \left(1+e^{2 i (c+d x)}-\left(1+e^{i (c+d x)}\right) \sqrt{1+e^{2 i (c+d x)}} \ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+\right.\right.$$
$$\left.\left.e^{i (c+d x)} \left(1+e^{i (c+d x)}\right) \sqrt{1+e^{2 i (c+d x)}} \ \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -e^{2 i (c+d x)}\right]\right) \text{Sec}[c+d x]^{3/2}\right) \Big/ \left(a d \left(1+e^{i (c+d x)}\right) (1+\text{Sec}[c+d x])\right)$$

Problem 197: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{\text{Sec}[c+d x]}}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 110 leaves, 6 steps):

$$-\frac{\sqrt{\text{Cos}[c+d x]} \ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}+\frac{\sqrt{\text{Cos}[c+d x]} \ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}+\frac{\sqrt{\text{Sec}[c+d x]} \ \text{Sin}[c+d x]}{d (a+a \text{Sec}[c+d x])}$$

Result (type 5, 202 leaves):

$$-\left(2 i e^{-i (c+d x)} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \left(-1-e^{2 i (c+d x)}+\left(1+e^{i (c+d x)}\right) \sqrt{1+e^{2 i (c+d x)}} \ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+\right.\right.$$
$$\left.\left.e^{i (c+d x)} \left(1+e^{i (c+d x)}\right) \sqrt{1+e^{2 i (c+d x)}} \ \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -e^{2 i (c+d x)}\right]\right) \text{Sec}[c+d x]^{3/2}\right) \Big/ \left(a d \left(1+e^{i (c+d x)}\right) (1+\text{Sec}[c+d x])\right)$$

Problem 198: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{\text{Sec}[c+d x]} \ (a+a \text{Sec}[c+d x])} \, dx$$

Optimal (type 4, 112 leaves, 6 steps):

$$\frac{3 \sqrt{\text{Cos}[c+d x]} \ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}-\frac{\sqrt{\text{Cos}[c+d x]} \ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}-\frac{\sqrt{\text{Sec}[c+d x]} \ \text{Sin}[c+d x]}{d (a+a \text{Sec}[c+d x])}$$

Result (type 5, 317 leaves):

$$\frac{1}{a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(1\Big/\left(d\left(-1+e^{2\,i\,c}\right)\right)2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\left(3\left(1+e^{2\,i\,(c+d\,x)}\right)+3\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-1/(2\,d)\left(\text{Cos}\left[\frac{1}{2}(c-d\,x)\right]+2\,\text{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+2\,\text{Cos}\left[\frac{1}{2}(c+3\,d\,x)\right]+\text{Cos}\left[\frac{1}{2}(5\,c+3\,d\,x)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\right)\text{Sec}[c+d\,x]$$

- **Problem 199: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 140 leaves, 7 steps):

$$-\frac{3\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,d}+\frac{5\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a\,d}+\frac{5\,\text{Sin}[c+d\,x]}{3\,a\,d\sqrt{\text{Sec}[c+d\,x]}}-\frac{\text{Sin}[c+d\,x]}{d\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 380 leaves):

$$-\left(2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(9\left(1+e^{2\,i\,(c+d\,x)}\right)+9\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\left(3\,d\left(-1+e^{2\,i\,c}\right)(a+a\,\text{Sec}[c+d\,x])\right)+\frac{1}{a+a\,\text{Sec}[c+d\,x]}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[c+d\,x]^{3/2}\left(\frac{(2+\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{2\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{3\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{d}-\frac{4\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{2\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{3\,d}-\frac{2\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)$$

Problem 200: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{1}{\text{Sec}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])} \, dx$$

Optimal (type 4, 168 leaves, 8 steps):

$$\frac{21 \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 a d} - \frac{5 \sqrt{\text{Cos}[c+d x]} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a d} + \frac{7 \text{Sin}[c+d x]}{5 a d \text{Sec}[c+d x]^{3/2}} - \frac{5 \text{Sin}[c+d x]}{3 a d \sqrt{\text{Sec}[c+d x]}} - \frac{\text{Sin}[c+d x]}{d \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])}$$

Result (type 5, 347 leaves):

$$\frac{1}{60 a d (1+\text{Sec}[c+d x])} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}[c+d x] \left(\frac{1}{-1+e^{2 i c}} 8 i \sqrt{2} \, e^{-i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \left(63 \left(1+e^{2 i (c+d x)}\right) + 63 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right] + 25 e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \, \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -e^{2 i (c+d x)}\right]\right) - \sqrt{\text{Sec}[c+d x]} \left(18 (17+11 \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}[c] + 4 \left(10 \text{Cos}[2 d x] \text{Sin}[2 c] - 3 \text{Cos}[3 d x] \text{Sin}[3 c] - 30 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right] \text{Sin}\left[\frac{d x}{2}\right] - 99 \text{Cos}[c] \text{Sin}[d x] + 10 \text{Cos}[2 c] \text{Sin}[2 d x] - 3 \text{Cos}[3 c] \text{Sin}[3 d x] - 30 \text{Tan}\left[\frac{c}{2}\right]\right)\right)\right)$$

Problem 201: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^{9/2}}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 4, 202 leaves, 9 steps):

$$\frac{7 \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d} + \frac{10 \sqrt{\text{Cos}[c+d x]} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^2 d} - \frac{7 \sqrt{\text{Sec}[c+d x]} \, \text{Sin}[c+d x]}{a^2 d} + \frac{10 \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a^2 d} - \frac{7 \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])} - \frac{\text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 5, 451 leaves):

$$\frac{1}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}7\sqrt{2}\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^2+$$
$$\frac{20\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c]}{3\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{1}{(a+a\,\mathrm{Sec}[c+d\,x])^2}$$
$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Sec}[c+d\,x]^{5/2}\left(-\frac{14\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]\left(-3\,\mathrm{Sin}\left[\frac{c}{2}\right]+5\,\mathrm{Sin}\left[\frac{3\,c}{2}\right]\right)}{3\,d}+\right.$$
$$\left.\frac{32\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{3\,d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{3\,d}+\frac{8\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

- **Problem 202: Result unnecessarily involves higher level functions.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{7/2}}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 176 leaves, 8 steps):

$$-\frac{4\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a^2\,d}-\frac{5\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,a^2\,d}+$$
$$\frac{4\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{a^2\,d}-\frac{5\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\mathrm{Sec}[c+d\,x])}-\frac{\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}$$

Result (type 5, 259 leaves):

$$-\frac{1}{6\,a^2\,d\,(1+\mathrm{Sec}[c+d\,x])^2}$$
$$e^{-i\,(2\,c+d\,x)}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Sec}[c+d\,x]^{5/2}\left(12\,i\,e^{-2\,i\,(c+d\,x)}\left(1+e^{i\,(c+d\,x)}\right)^3\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+\right.$$
$$40\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+i\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$
$$\left.i\,(29+50\,\mathrm{Cos}[c+d\,x]+17\,\mathrm{Cos}[2\,(c+d\,x)]-12\,i\,\mathrm{Sin}[c+d\,x]-7\,i\,\mathrm{Sin}[2\,(c+d\,x)])\right)\left(\mathrm{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+i\,\mathrm{Sin}\left[\frac{1}{2}(3\,c+d\,x)\right]\right)$$

- **Problem 203: Result unnecessarily involves higher level functions.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{5/2}}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 149 leaves, 7 steps):

$$\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}+\frac{2\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 a^2 d}-\frac{\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{a^2 d(1+\text{Sec}[c+d x])}-\frac{\text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{3 d(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 249 leaves):

$$\frac{1}{6 a^2 d(1+\text{Sec}[c+d x])^2}e^{-i(2c+d x)}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]^{5/2}\left(3\,i\,e^{-2 i(c+d x)}\left(1+e^{i(c+d x)}\right)^3\sqrt{1+e^{2 i(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i(c+d x)}\right]+16\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+i\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)-i\,(5+14\,\text{Cos}[c+d x]+5\,\text{Cos}[2(c+d x)]-i\,\text{Sin}[2(c+d x)])\right)\left(\text{Cos}\left[\frac{1}{2}(3c+d x)\right]+i\,\text{Sin}\left[\frac{1}{2}(3c+d x)\right]\right)$$

■ Problem 205: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{\text{Sec}[c+d x]}}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 149 leaves, 7 steps):

$$-\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}+\frac{2\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 a^2 d}+\frac{\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{a^2 d(1+\text{Sec}[c+d x])}-\frac{\text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{3 d(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 247 leaves):

$$\frac{1}{6 a^2 d(1+\text{Sec}[c+d x])^2}e^{-i(2c+d x)}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]^{5/2}\left(16\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+i\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)-i\left(-7-10\,\text{Cos}[c+d x]-7\,\text{Cos}[2(c+d x)]+3\,e^{-2 i(c+d x)}\left(1+e^{i(c+d x)}\right)^3\sqrt{1+e^{2 i(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i(c+d x)}\right]-i\,\text{Sin}[2(c+d x)]\right)\right)\left(\text{Cos}\left[\frac{1}{2}(3c+d x)\right]+i\,\text{Sin}\left[\frac{1}{2}(3c+d x)\right]\right)$$

- **Problem 206: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\sqrt{\text{Sec}[c+d x]}\ (a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 152 leaves, 7 steps):

$$\frac{4\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}-\frac{5\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3a^2 d}-\frac{5\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3a^2 d\,(1+\text{Sec}[c+d x])}-\frac{\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3d\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 430 leaves):

$$\frac{1}{d\,(a+a\,\text{Sec}[c+d x])^2}4\sqrt{2}\ e^{-i(2c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2i(c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+d x)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2-$$
$$\frac{10\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c]}{3d\,(a+a\,\text{Sec}[c+d x])^2}+\frac{1}{(a+a\,\text{Sec}[c+d x])^2}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Sec}[c+d x]^{5/2}\left(-\frac{2\,(3+\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{28\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{3d}-\right.$$
$$\left.\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\text{Sin}\left[\frac{d x}{2}\right]}{3d}+\frac{8\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\frac{28\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)$$

- **Problem 207: Result unnecessarily involves higher level functions.**

$$\int \frac{1}{\text{Sec}[c+d x]^{3/2}\ (a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 178 leaves, 8 steps):

$$-\frac{7\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}+\frac{10\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3a^2 d}+\frac{10\,\text{Sin}[c+d x]}{3a^2 d\sqrt{\text{Sec}[c+d x]}}-\frac{7\,\text{Sin}[c+d x]}{3a^2 d\sqrt{\text{Sec}[c+d x]}\ (1+\text{Sec}[c+d x])}-\frac{\text{Sin}[c+d x]}{3d\sqrt{\text{Sec}[c+d x]}\ (a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 278 leaves):

$$\frac{1}{3 a^2 (1+\text{Sec}[c+d x])^2}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \left(\frac{40 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\right.$$

$$1\Big/\left(d \left(1+e^{i (c+d x)}\right)^3\right) 2\, i\, e^{-2 i (c+d x)} \left(1+33 e^{i (c+d x)}+73 e^{2 i (c+d x)}+87 e^{3 i (c+d x)}+81 e^{4 i (c+d x)}+53 e^{5 i (c+d x)}+9 e^{6 i (c+d x)}-e^{7 i (c+d x)}-\right.$$

$$\left.\left. 42 e^{i (c+d x)} \left(1+e^{i (c+d x)}\right)^3 \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \sqrt{\text{Sec}[c+d x]}\right) \text{Sec}[c+d x]^2$$

- **Problem 208: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\text{Sec}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 4, 200 leaves, 9 steps):

$$\frac{56 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{5 a^2 d}-\frac{5 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d}+$$

$$\frac{56 \text{Sin}[c+d x]}{15 a^2 d \text{Sec}[c+d x]^{3/2}}-\frac{5 \text{Sin}[c+d x]}{a^2 d \sqrt{\text{Sec}[c+d x]}}-\frac{3 \text{Sin}[c+d x]}{a^2 d \text{Sec}[c+d x]^{3/2} (1+\text{Sec}[c+d x])}-\frac{\text{Sin}[c+d x]}{3 d \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^2}$$

Result (type 5, 500 leaves):

$$\frac{1}{5 d (a+a \text{Sec}[c+d x])^2}56 \sqrt{2}\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right]$$

$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2-$$

$$\frac{10 \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{5/2} \text{Sin}[c]}{d (a+a \text{Sec}[c+d x])^2}+$$

$$\frac{1}{(a+a \text{Sec}[c+d x])^2}\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^{5/2}$$

$$\left(-\frac{(151+73 \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{10 d}-\frac{8 \text{Cos}[2 d x] \text{Sin}[2 c]}{3 d}+\frac{2 \text{Cos}[3 d x] \text{Sin}[3 c]}{5 d}+\frac{52 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]}{3 d}-\right.$$

$$\left.\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Sin}\left[\frac{d x}{2}\right]}{3 d}+\frac{146 \text{Cos}[c] \text{Sin}[d x]}{5 d}-\frac{8 \text{Cos}[2 c] \text{Sin}[2 d x]}{3 d}+\frac{2 \text{Cos}[3 c] \text{Sin}[3 d x]}{5 d}+\frac{52 \text{Tan}\left[\frac{c}{2}\right]}{3 d}-\frac{2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)$$

- **Problem 209: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{11/2}}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 247 leaves, 10 steps):

$$\frac{119\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{10 a^3 d}+\frac{11\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{2 a^3 d}-\frac{119\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{10 a^3 d}+\frac{11\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{2 a^3 d}-\frac{\text{Sec}[c+d x]^{9/2}\,\text{Sin}[c+d x]}{5 d (a+a\,\text{Sec}[c+d x])^3}-\frac{2\,\text{Sec}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{3 a d (a+a\,\text{Sec}[c+d x])^2}-\frac{119\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{30 d\left(a^3+a^3\,\text{Sec}[c+d x]\right)}$$

Result (type 5, 516 leaves):

$$\frac{1}{5 d (a+a\,\text{Sec}[c+d x])^3}119\sqrt{2}\ e^{-i(2c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^3+\frac{22\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^{7/2}\,\text{Sin}[c]}{d (a+a\,\text{Sec}[c+d x])^3}+\frac{1}{(a+a\,\text{Sec}[c+d x])^3}\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Sec}[c+d x]^{7/2}\left(-\frac{238\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5 d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\left(-25\,\text{Sin}\left[\frac{c}{2}\right]+33\,\text{Sin}\left[\frac{3c}{2}\right]\right)}{3 d}+\frac{116\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{3 d}+\frac{52\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\text{Sin}\left[\frac{d x}{2}\right]}{15 d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Sin}\left[\frac{d x}{2}\right]}{5 d}+\frac{16\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{3 d}+\frac{52\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15 d}+\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)$$

- **Problem 210: Result unnecessarily involves higher level functions.**

$$\int \frac{\text{Sec}[c+d x]^{9/2}}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 221 leaves, 9 steps):

$$-\frac{49\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{10 a^3 d}-\frac{13\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{6 a^3 d}+\frac{49\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{10 a^3 d}-\frac{\text{Sec}[c+d x]^{7/2}\ \text{Sin}[c+d x]}{5 d (a+a\ \text{Sec}[c+d x])^3}-\frac{8\ \text{Sec}[c+d x]^{5/2}\ \text{Sin}[c+d x]}{15 a d (a+a\ \text{Sec}[c+d x])^2}-\frac{13\ \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{6 d \left(a^3+a^3\ \text{Sec}[c+d x]\right)}$$

Result (type 5, 371 leaves) :

$$\frac{1}{15 a^3 d (1+\text{Sec}[c+d x])^3} 2\ \text{Cos}\left[\frac{1}{2}(c+d x)\right]^6 \left(-\frac{1}{-1+e^{2 i c}} 2 i \sqrt{2}\ e^{-i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \left(147 \left(1+e^{2 i (c+d x)}\right)+147 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]-65 e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)+\frac{1}{32} \left(1284\ \text{Cos}\left[\frac{1}{2}(c-d x)\right]+921\ \text{Cos}\left[\frac{1}{2}(3 c+d x)\right]+1243\ \text{Cos}\left[\frac{1}{2}(c+3 d x)\right]+374\ \text{Cos}\left[\frac{1}{2}(5 c+3 d x)\right]+670\ \text{Cos}\left[\frac{1}{2}(3 c+5 d x)\right]+65\ \text{Cos}\left[\frac{1}{2}(7 c+5 d x)\right]+147\ \text{Cos}\left[\frac{1}{2}(5 c+7 d x)\right]\right) \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\text{Sec}[c+d x]}\right) \text{Sec}[c+d x]^3$$

Problem 211: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^{7/2}}{(a+a\ \text{Sec}[c+d x])^3}\, dx$$

Optimal (type 4, 195 leaves, 8 steps) :

$$\frac{9\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{10 a^3 d}+\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{2 a^3 d}-\frac{\text{Sec}[c+d x]^{5/2}\ \text{Sin}[c+d x]}{5 d (a+a\ \text{Sec}[c+d x])^3}-\frac{2\ \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{5 a d (a+a\ \text{Sec}[c+d x])^2}-\frac{9\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{10 d \left(a^3+a^3\ \text{Sec}[c+d x]\right)}$$

Result (type 5, 474 leaves) :

$$\frac{1}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}9\sqrt{2}\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^3+$$
$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c]}{d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{1}{(a+a\,\text{Sec}[c+d\,x])^3}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Sec}[c+d\,x]^{7/2}\left(-\frac{18\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+\right.$$
$$\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}+\frac{4\,\text{Tan}\left[\frac{c}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{5\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 212: Result unnecessarily involves higher level functions.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 195 leaves, 8 steps):

$$\frac{\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-$$
$$\frac{\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{4\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 371 leaves):

$$\frac{1}{15\,a^3\,d\,(1+\text{Sec}[c+d\,x])^3}2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^6$$
$$\left(\frac{1}{-1+e^{2\,i\,c}}2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\left(3\left(1+e^{2\,i\,(c+d\,x)}\right)+3\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.\right.$$
$$\left.5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-$$
$$\frac{1}{32}\left(36\,\text{Cos}\left[\frac{1}{2}\,(c-d\,x)\right]+9\,\text{Cos}\left[\frac{1}{2}\,(3\,c+d\,x)\right]+7\,\text{Cos}\left[\frac{1}{2}\,(c+3\,d\,x)\right]+26\,\text{Cos}\left[\frac{1}{2}\,(5\,c+3\,d\,x)\right]+10\,\text{Cos}\left[\frac{1}{2}\,(3\,c+5\,d\,x)\right]+\right.$$
$$\left.\left.5\,\text{Cos}\left[\frac{1}{2}\,(7\,c+5\,d\,x)\right]+3\,\text{Cos}\left[\frac{1}{2}\,(5\,c+7\,d\,x)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\right)\text{Sec}[c+d\,x]^3$$

Problem 213: Result unnecessarily involves higher level functions.

$$\int \frac{\text{Sec}[c+d x]^{3/2}}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 195 leaves, 8 steps):

$$-\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{10 a^3 d}+\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{6 a^3 d}+\frac{\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5 d (a+a\,\text{Sec}[c+d x])^3}-\frac{\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 a d (a+a\,\text{Sec}[c+d x])^2}+\frac{\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{6 d \left(a^3+a^3\,\text{Sec}[c+d x]\right)}$$

Result (type 5, 371 leaves):

$$\frac{1}{15 a^3 d (1+\text{Sec}[c+d x])^3}\,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^6\left(-\frac{1}{-1+e^{2 i c}}2\,i\sqrt{2}\,e^{-i(c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2 i (c+d x)}}}\left(3\left(1+e^{2 i (c+d x)}\right)+3\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+5\,e^{i(c+d x)}\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)+\frac{1}{32}\left(36\,\text{Cos}\left[\frac{1}{2}(c-d x)\right]+9\,\text{Cos}\left[\frac{1}{2}(3 c+d x)\right]+17\,\text{Cos}\left[\frac{1}{2}(c+3 d x)\right]+16\,\text{Cos}\left[\frac{1}{2}(5 c+3 d x)\right]+20\,\text{Cos}\left[\frac{1}{2}(3 c+5 d x)\right]-5\,\text{Cos}\left[\frac{1}{2}(7 c+5 d x)\right]+3\,\text{Cos}\left[\frac{1}{2}(5 c+7 d x)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5\sqrt{\text{Sec}[c+d x]}\right)\text{Sec}[c+d x]^3$$

Problem 214: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Sec}[c+d x]}}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 195 leaves, 8 steps):

$$-\frac{9\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{10 a^3 d}+\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{2 a^3 d}-\frac{\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5 d (a+a\,\text{Sec}[c+d x])^3}+\frac{2\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 a d (a+a\,\text{Sec}[c+d x])^2}+\frac{\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{2 d \left(a^3+a^3\,\text{Sec}[c+d x]\right)}$$

Result (type 5, 474 leaves):

$$-\frac{1}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}9\sqrt{2}\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]$$

$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^3+$$

$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c]}{d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{1}{(a+a\,\text{Sec}[c+d\,x])^3}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Sec}[c+d\,x]^{7/2}\left(\frac{18\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}-\frac{12\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}-\right.$$

$$\left.\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}-\frac{12\,\text{Tan}\left[\frac{c}{2}\right]}{d}+\frac{16\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{5\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 215: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 195 leaves, 8 steps):

$$\frac{49\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}-\frac{13\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-$$

$$\frac{\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{8\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{13\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{6\,d\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 386 leaves):

$$\frac{1}{15\,a^3\,d\,(1+\text{Sec}[c+d\,x])^3}\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^6$$
$$\left(\frac{1}{-1+e^{2\,i\,c}}2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\left(147\,\left(1+e^{2\,i\,(c+d\,x)}\right)+147\,\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+\right.\right.$$
$$\left.65\,e^{i\,(c+d\,x)}\,\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)-$$
$$\frac{1}{32}\left(1134\,\text{Cos}\left[\frac{1}{2}\,(c-d\,x)\right]+1071\,\text{Cos}\left[\frac{1}{2}\,(3\,c+d\,x)\right]+923\,\text{Cos}\left[\frac{1}{2}\,(c+3\,d\,x)\right]+694\,\text{Cos}\left[\frac{1}{2}\,(5\,c+3\,d\,x)\right]+470\,\text{Cos}\left[\frac{1}{2}\,(3\,c+5\,d\,x)\right]+\right.$$
$$\left.\left.265\,\text{Cos}\left[\frac{1}{2}\,(7\,c+5\,d\,x)\right]+117\,\text{Cos}\left[\frac{1}{2}\,(5\,c+7\,d\,x)\right]+30\,\text{Cos}\left[\frac{1}{2}\,(9\,c+7\,d\,x)\right]\right)\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\text{Sec}[c+d\,x]}\right)\,\text{Sec}[c+d\,x]^3$$

- **Problem 216: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 221 leaves, 9 steps) :

$$-\frac{119\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{11\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a^3\,d}+\frac{11\,\text{Sin}[c+d\,x]}{2\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}}-$$
$$\frac{\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{2\,\text{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{119\,\text{Sin}[c+d\,x]}{30\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 529 leaves) :

$$-\frac{1}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}119\sqrt{2}\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^3+$$
$$\frac{22\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}+\frac{1}{(a+a\,\mathrm{Sec}[c+d\,x])^3}$$
$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Sec}[c+d\,x]^{7/2}\left(\frac{2\,(89+30\,\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5\,d}+\frac{8\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{3\,d}-\right.$$
$$\frac{172\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{3\,d}+\frac{88\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{15\,d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}-$$
$$\left.\frac{48\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}+\frac{8\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{3\,d}-\frac{172\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{88\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 217: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{\mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 247 leaves, 10 steps):

$$\frac{231\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{10\,a^3\,d}-$$
$$\frac{21\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,a^3\,d}+\frac{77\,\mathrm{Sin}[c+d\,x]}{10\,a^3\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}-\frac{21\,\mathrm{Sin}[c+d\,x]}{2\,a^3\,d\sqrt{\mathrm{Sec}[c+d\,x]}}-$$
$$\frac{\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3}-\frac{4\,\mathrm{Sin}[c+d\,x]}{5\,a\,d\,\mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{63\,\mathrm{Sin}[c+d\,x]}{10\,d\,\mathrm{Sec}[c+d\,x]^{3/2}\left(a^3+a^3\,\mathrm{Sec}[c+d\,x]\right)}$$

Result (type 5, 332 leaves):

$$-\frac{1}{5 a^3 d \left(1+e^{i (c+d x)}\right)^5 (1+\text{Sec}[c+d x])^3}$$
$$2 i e^{-3 i (c+d x)} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^6 \left(-1+5 e^{i (c+d x)}+369 e^{2 i (c+d x)}+1505 e^{3 i (c+d x)}+2900 e^{4 i (c+d x)}+3590 e^{5 i (c+d x)}+3340 e^{6 i (c+d x)}+2182 e^{7 i (c+d x)}+\right.$$
$$805 e^{8 i (c+d x)}+93 e^{9 i (c+d x)}-5 e^{10 i (c+d x)}+e^{11 i (c+d x)}-210 i e^{3 i (c+d x)} \left(1+e^{i (c+d x)}\right)^5 \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]-$$
$$\left.462 e^{2 i (c+d x)} \left(1+e^{i (c+d x)}\right)^5 \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}[c+d x]^{7/2}$$

- **Problem 218: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{5/2} \sqrt{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 116 leaves, 4 steps):

$$\frac{3 \sqrt{a} \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{4 d}+\frac{3 a \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{4 d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{a \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{2 d \sqrt{a+a \text{Sec}[c+d x]}}$$

Result (type 3, 434 leaves):

$$\frac{1}{32 \sqrt{2} d \sqrt{\text{Sec}[c+d x]}} \text{Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{a (1+\text{Sec}[c+d x])}$$
$$\left(-12 i \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(-1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]-12 i \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(-1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]+\right.$$
$$\text{Sec}[c+d x]^2 \left(6 \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-3 \text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$
$$\left.3 \text{Log}\left[2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\right.$$
$$\text{Cos}[2 (c+d x)] \left(6 \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-3 \left(\text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\text{Log}\left[\right.\right.\right.$$
$$\left.\left.\left.\left.2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)\right)+4 \sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+12 \sqrt{2} \text{Sin}\left[\frac{3}{2} (c+d x)\right]\right)\right)$$

- **Problem 219: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2} \sqrt{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 72 leaves, 3 steps):

$$\frac{\sqrt{a}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 306 leaves) :

$$\frac{1}{4\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$
$$2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\sqrt{2}\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

- **Problem 220: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 37 leaves, 2 steps) :

$$\frac{2\sqrt{a}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}$$

Result (type 3, 283 leaves) :

$$\frac{1}{2\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}}\left(-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$
$$2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

- **Problem 225: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 3, 160 leaves, 6 steps) :

$$\frac{11 a^{3/2} \text{ArcSinh}\left[\frac{\sqrt{a} \text{ Tan}[c+d x]}{\sqrt{a+a \text{ Sec}[c+d x]}}\right]}{8 d}+\frac{11 a^2 \text{ Sec}[c+d x]^{3/2} \text{ Sin}[c+d x]}{8 d \sqrt{a+a \text{ Sec}[c+d x]}}+\frac{11 a^2 \text{ Sec}[c+d x]^{5/2} \text{ Sin}[c+d x]}{12 d \sqrt{a+a \text{ Sec}[c+d x]}}+\frac{a^2 \text{ Sec}[c+d x]^{7/2} \text{ Sin}[c+d x]}{3 d \sqrt{a+a \text{ Sec}[c+d x]}}$$

Result (type 3, 456 leaves) :

$$\frac{1}{384 \sqrt{2} d \sqrt{\text{Sec}[c+d x]}} a \text{ Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{a (1+\text{Sec}[c+d x])}$$
$$\left(-264 i \text{ ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(-1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]-264 i \text{ ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(-1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]+\right.$$
$$\text{Sec}[c+d x]^3 \left(99 \text{ Cos}[c+d x] \left(2 \text{ Log}\left[\sqrt{2}+2 \text{ Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[2-\sqrt{2} \text{ Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{ Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.\right.$$
$$\left.\text{Log}\left[2+\sqrt{2} \text{ Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{ Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+$$
$$33 \text{ Cos}[3 (c+d x)] \left(2 \text{ Log}\left[\sqrt{2}+2 \text{ Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[2-\sqrt{2} \text{ Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{ Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$
$$\left.\left.\left.\text{Log}\left[2+\sqrt{2} \text{ Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{ Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+4 \sqrt{2} \left(54 \text{ Sin}\left[\frac{1}{2} (c+d x)\right]+11 \text{ Sin}\left[\frac{3}{2} (c+d x)\right]+33 \text{ Sin}\left[\frac{5}{2} (c+d x)\right]\right)\right)\right)$$

- **Problem 226: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2} (a+a \text{ Sec}[c+d x])^{3/2} \, dx$$

Optimal (type 3, 120 leaves, 5 steps) :

$$\frac{7 a^{3/2} \text{ArcSinh}\left[\frac{\sqrt{a} \text{ Tan}[c+d x]}{\sqrt{a+a \text{ Sec}[c+d x]}}\right]}{4 d}+\frac{7 a^2 \text{ Sec}[c+d x]^{3/2} \text{ Sin}[c+d x]}{4 d \sqrt{a+a \text{ Sec}[c+d x]}}+\frac{a^2 \text{ Sec}[c+d x]^{5/2} \text{ Sin}[c+d x]}{2 d \sqrt{a+a \text{ Sec}[c+d x]}}$$

Result (type 3, 432 leaves) :

$$-\frac{1}{32\sqrt{2}\,d\sqrt{\text{Sec}[c+d\,x]}}\,a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(28\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+28\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$
$$\text{Sec}[c+d\,x]^2\left(7\,\text{Cos}[2\,(c+d\,x)]\left(-2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.\right.$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+12\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+7\left(-2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\text{Log}\left[\right.\right.$$
$$\left.\left.\left.\left.2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-4\sqrt{2}\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)\right)\right)$$

- **Problem 227: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 3, 75 leaves, 4 steps):

$$\frac{3\,a^{3/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 307 leaves):

$$\frac{1}{4\sqrt{2}\,d\sqrt{\text{Sec}[c+d\,x]}}\,a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-6\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-6\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$
$$6\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-3\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\left.3\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\sqrt{2}\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

- **Problem 228: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{3/2}}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 76 leaves, 4 steps):

$$\frac{2\,a^{3/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 301 leaves) :

$$\frac{1}{2\,\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}}\,a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+\right.$$
$$2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+4\,\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 233: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 200 leaves, 6 steps) :

$$\frac{163\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{64\,d}+\frac{163\,a^3\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{163\,a^3\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{17\,a^3\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\text{Sec}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 1098 leaves) :

$$-\frac{163\, i\, \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\, \text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\, \text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{512 \sqrt{2}\, d\, \text{Sec}[c+d x]^{5/2}} -$$

$$\frac{163\, i\, \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\, \text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\, \text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{512 \sqrt{2}\, d\, \text{Sec}[c+d x]^{5/2}} +$$

$$\frac{163\, i\, \text{Log}\left[\sqrt{2}+2\, \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{256 \left((-1+i)+\sqrt{2}\right) \left((1+i)+\sqrt{2}\right) d\, \text{Sec}[c+d x]^{5/2}} -$$

$$\frac{163\, \text{Log}\left[2-\sqrt{2}\, \text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\, \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{1024 \sqrt{2}\, d\, \text{Sec}[c+d x]^{5/2}} -$$

$$\frac{163\, \text{Log}\left[2+\sqrt{2}\, \text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\, \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{1024 \sqrt{2}\, d\, \text{Sec}[c+d x]^{5/2}} +$$

$$\frac{23\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{384\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3} + \frac{163\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{512\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)} -$$

$$\frac{23\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{384\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3} - \frac{163\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{512\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)} +$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{64\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4} + \frac{43\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{256\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} +$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{64\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4} + \frac{43\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{256\, d\, \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}$$

- **Problem 234: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2} (a+a\, \text{Sec}[c+d x])^{5/2}\, dx$$

Optimal (type 3, 160 leaves, 5 steps) :

$$\frac{25\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d}+\frac{25\,a^3\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{13\,a^3\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 458 leaves):

$$\frac{1}{384\,\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}}\,a^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\Bigg(-600\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-600\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+$$
$$\text{Sec}[c+d\,x]^3\,\Bigg(225\,\text{Cos}[c+d\,x]\,\left(2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+$$
$$75\,\text{Cos}[3\,(c+d\,x)]\,\left(2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+4\,\sqrt{2}\,\left(114\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-7\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+75\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]\right)\Bigg)\Bigg)$$

- **Problem 235: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 120 leaves, 4 steps):

$$\frac{19\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,d}+\frac{9\,a^3\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 435 leaves):

$$-\frac{1}{32\sqrt{2}\,d\sqrt{\text{Sec}[c+d\,x]}}\,a^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(76\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+76\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$
$$\text{Sec}[c+d\,x]^2\left(-38\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+19\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+19\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\right.\right.$$
$$\left.\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+19\,\text{Cos}[2\,(c+d\,x)]\left(-2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$\left.\left.\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+28\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-44\sqrt{2}\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)\right)$$

- **Problem 236: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 112 leaves, 4 steps) :

$$\frac{5\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^3\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 309 leaves) :

$$\frac{1}{4\sqrt{2}\,d\sqrt{\text{Sec}[c+d\,x]}}\,a^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-10\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-10\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$
$$10\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-5\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\left.5\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\sqrt{2}\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)$$

- **Problem 237: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 118 leaves, 4 steps) :

$$\frac{2 a^{5/2} \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{d}+\frac{14 a^3 \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{2 a^2 \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 320 leaves):

$$\frac{1}{6 \sqrt{2} d \sqrt{\text{Sec}[c+d x]}} a^2 \text{Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{a (1+\text{Sec}[c+d x])} \left(-6 i \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(-1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]-6 i \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(-1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]+6 \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-3 \text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-3 \text{Log}\left[2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+30 \sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 \sqrt{2} \text{Sin}\left[\frac{3}{2} (c+d x)\right]\right)$$

- **Problem 243: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{\text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 37 leaves, 2 steps):

$$\frac{2 \sqrt{a} \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{a+a \text{Sec}[e+f x]}}\right]}{f}$$

Result (type 3, 283 leaves):

$$\frac{1}{2 \sqrt{2} f \sqrt{\text{Sec}[e+f x]}} \left(-2 i \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (e+f x)\right]-\left(-1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (e+f x)\right]}{\left(1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (e+f x)\right]-\text{Sin}\left[\frac{1}{4} (e+f x)\right]}\right]-2 i \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (e+f x)\right]-\left(1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (e+f x)\right]}{\left(-1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (e+f x)\right]-\text{Sin}\left[\frac{1}{4} (e+f x)\right]}\right]+2 \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (e+f x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (e+f x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right) \text{Sec}\left[\frac{1}{2} (e+f x)\right] \sqrt{a (1+\text{Sec}[e+f x])}$$

- **Problem 244: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{-\text{Sec}[e+f x]} \sqrt{a-a \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 38 leaves, 2 steps):

$$\frac{2\sqrt{a}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a-a\,\text{Sec}[e+f x]}}\right]}{f}$$

Result (type 3, 299 leaves) :

$$\frac{1}{2\sqrt{2}\,f\sqrt{-\text{Sec}[e+f x]}}\text{Csc}\left[\frac{1}{2}(e+f x)\right]\left(-2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(e+f x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\text{Sin}\left[\frac{1}{4}(e+f x)\right]}\right]+2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(e+f x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\text{Sin}\left[\frac{1}{4}(e+f x)\right]}\right]-4\,\text{ArcTanh}\left[\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(2e+f x)\right]\text{Sec}\left[\frac{f x}{4}\right]+\text{Tan}\left[\frac{f x}{4}\right]\right]+\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)\sqrt{a-a\,\text{Sec}[e+f x]}$$

- **Problem 245: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^{5/2}}{\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 128 leaves, 6 steps) :

$$-\frac{\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{\sqrt{2}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 362 leaves) :

$$\frac{1}{2\sqrt{2}\,d\sqrt{a\,(1+\text{Sec}[c+d x])}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\left(2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+2\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-4\sqrt{2}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+4\sqrt{2}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]-2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+4\sqrt{2}\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

- **Problem 246: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{3/2}}{\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 95 leaves, 5 steps):

$$\frac{2\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}$$

Result (type 3, 394 leaves):

$$\frac{1}{\left((-1+i)+\sqrt{2}\right)d\sqrt{a\,(1+\text{Sec}[c+d x])}}\left(\frac{1}{2}+\frac{i}{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(2\left((-1-i)+\sqrt{2}\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+\right.$$
$$2\left((-1-i)+\sqrt{2}\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-$$
$$i\left(\left(-4+(2+2 i)\sqrt{2}\right)\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+\left(4-(2+2 i)\sqrt{2}\right)\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]-\right.$$
$$\left((-1-i)+\sqrt{2}\right)\left(2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\right.$$
$$\left.\left.\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\right)\right)\sqrt{\text{Sec}[c+d x]}$$

- **Problem 251: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{7/2}}{(a+a\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$-\frac{3\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{a^{3/2}\,d}+\frac{9\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{2\,d\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{3\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{2\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 457 leaves):

$$\frac{1}{2 d (a (1 + \mathrm{Sec}[c + d x]))^{3/2}} \mathrm{Cos}\left[\frac{1}{2} (c + d x)\right]^3 \mathrm{Sec}[c + d x]^{3/2}$$
$$\left(6 i \sqrt{2} \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] - \left(-1 + \sqrt{2}\right) \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]}{\left(1 + \sqrt{2}\right) \mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] - \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]}\right] + 6 i \sqrt{2} \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] - \left(1 + \sqrt{2}\right) \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]}{\left(-1 + \sqrt{2}\right) \mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] - \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]}\right] -\right.$$
$$18 \mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] - \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]\right] + 18 \mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] + \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]\right] -$$
$$6 \sqrt{2} \mathrm{Log}\left[\sqrt{2} + 2 \mathrm{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 3 \sqrt{2} \mathrm{Log}\left[2 - \sqrt{2} \mathrm{Cos}\left[\frac{1}{2} (c + d x)\right] - \sqrt{2} \mathrm{Sin}\left[\frac{1}{2} (c + d x)\right]\right] +$$
$$3 \sqrt{2} \mathrm{Log}\left[2 + \sqrt{2} \mathrm{Cos}\left[\frac{1}{2} (c + d x)\right] - \sqrt{2} \mathrm{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \frac{1}{\left(\mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] - \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]\right)^2} -$$
$$\left.\frac{1}{\left(\mathrm{Cos}\left[\frac{1}{4} (c + d x)\right] + \mathrm{Sin}\left[\frac{1}{4} (c + d x)\right]\right)^2} + \frac{4}{\mathrm{Cos}\left[\frac{1}{2} (c + d x)\right] - \mathrm{Sin}\left[\frac{1}{2} (c + d x)\right]} - \frac{4}{\mathrm{Cos}\left[\frac{1}{2} (c + d x)\right] + \mathrm{Sin}\left[\frac{1}{2} (c + d x)\right]}\right)$$

- **Problem 252: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[c + d x]^{5/2}}{(a + a \mathrm{Sec}[c + d x])^{3/2}} \, dx$$

Optimal (type 3, 134 leaves, 6 steps):

$$\frac{2 \mathrm{ArcSinh}\left[\frac{\sqrt{a} \mathrm{Tan}[c+d x]}{\sqrt{a+a \mathrm{Sec}[c+d x]}}\right]}{a^{3/2} d} - \frac{5 \mathrm{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\mathrm{Sec}[c+d x]} \mathrm{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \mathrm{Sec}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d} - \frac{\mathrm{Sec}[c + d x]^{3/2} \mathrm{Sin}[c + d x]}{2 d (a + a \mathrm{Sec}[c + d x])^{3/2}}$$

Result (type 3, 437 leaves):

$$\frac{1}{2\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\text{Sec}[c+d\,x]^{3/2}$$

$$\left(\frac{(4+4\,i)\left((-1-i)+\sqrt{2}\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]}{(-1+i)+\sqrt{2}}-4\,i\,\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\right.$$

$$10\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]-10\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+4\sqrt{2}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$

$$2\sqrt{2}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\frac{(2-2\,i)\left((-1-i)+\sqrt{2}\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{(-1+i)+\sqrt{2}}-$$

$$\left.\frac{1}{\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2}+\frac{1}{\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2}\right)$$

- **Problem 258: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{9/2}}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 214 leaves, 8 steps):

$$-\frac{5\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{115\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-$$

$$\frac{\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{15\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{35\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 1042 leaves):

$$\frac{10\,i\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{10\,i\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}-$$

$$\frac{115\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\text{Sec}[c+d x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{115\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\text{Sec}[c+d x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}-$$

$$\frac{40\,i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}[c+d x]^{5/2}}{\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{5\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{5\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4}+\frac{19\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2}-$$

$$\frac{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4}-\frac{19\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2}+$$

$$\frac{4\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-\frac{4\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}$$

- **Problem 259: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^{7/2}}{(a+a\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$\frac{2\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{a^{5/2}\,d}-\frac{43\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-\frac{\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{4\,d\,(a+a\,\text{Sec}[c+d x])^{5/2}}-\frac{11\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d x])^{3/2}}$$

Result (type 3, 925 leaves):

$$-\frac{4\,i\,\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\left((4+4\,i)\left((-1-i)+\sqrt{2}\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}\right)\Big/$$

$$\left(\left((-1+i)+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+\frac{43\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}-$$

$$\frac{43\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\frac{4\,\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}-$$

$$\frac{2\,\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\left((2-2\,i)\left((-1-i)+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}\right)\Big/$$

$$\left(\left((-1+i)+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)-\frac{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^4}-$$

$$\frac{11\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2}+\frac{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^4}+$$

$$\frac{11\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2}$$

- **Problem 265: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{7/2}}{\sqrt{1+\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 126 leaves, 7 steps):

$$-\frac{\sqrt{2}\,\text{ArcSinh}\left[\frac{\text{Tan}[c+d\,x]}{1+\text{Sec}[c+d\,x]}\right]}{d}+\frac{7\,\text{ArcSinh}\left[\frac{\text{Tan}[c+d\,x]}{\sqrt{1+\text{Sec}[c+d\,x]}}\right]}{4\,d}-\frac{\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{1+\text{Sec}[c+d\,x]}}+\frac{\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{1+\text{Sec}[c+d\,x]}}$$

Result (type 3, 542 leaves) :

$$\frac{1}{32\,d}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(-28\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-28\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\text{Sec}[c+d\,x]^2\left(16\sqrt{2}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]-16\sqrt{2}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+14\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-7\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\text{Cos}[2(c+d\,x)]\left(16\sqrt{2}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]-16\sqrt{2}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+14\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-7\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-7\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-7\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+20\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-4\sqrt{2}\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)\right)$$

- **Problem 266: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}}{\sqrt{1+\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 85 leaves, 6 steps) :

$$\frac{\sqrt{2}\,\text{ArcSinh}\left[\frac{\text{Tan}[c+d\,x]}{1+\text{Sec}[c+d\,x]}\right]}{d}-\frac{\text{ArcSinh}\left[\frac{\text{Tan}[c+d\,x]}{\sqrt{1+\text{Sec}[c+d\,x]}}\right]}{d}+\frac{\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\sqrt{1+\text{Sec}[c+d\,x]}}$$

Result (type 3, 349 leaves) :

$$\frac{1}{4 d} \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(2 i \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right) \mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right) \mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+2 i \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right) \mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right) \mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-\right.$$

$$4 \sqrt{2} \mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+4 \sqrt{2} \mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]\right]-2 \mathrm{Log}\left[\sqrt{2}+2 \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\mathrm{Log}\left[\right.$$

$$\left.\left.2-\sqrt{2} \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\mathrm{Log}\left[2+\sqrt{2} \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+4 \sqrt{2} \mathrm{Sec}[c+d x] \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

- **Problem 267: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[c+d x]^{3/2}}{\sqrt{1+\mathrm{Sec}[c+d x]}} \, dx$$

Optimal (type 3, 54 leaves, 5 steps):

$$-\frac{\sqrt{2} \mathrm{ArcSinh}\left[\frac{\mathrm{Tan}[c+d x]}{1+\mathrm{Sec}[c+d x]}\right]}{d}+\frac{2 \mathrm{ArcSinh}\left[\frac{\mathrm{Tan}[c+d x]}{\sqrt{1+\mathrm{Sec}[c+d x]}}\right]}{d}$$

Result (type 3, 384 leaves):

$$\frac{1}{\left((-1+i)+\sqrt{2}\right) d}\left(\frac{1}{2}+\frac{i}{2}\right) \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{1}{1+\mathrm{Cos}[c+d x]}} \left(2 \left((-1-i)+\sqrt{2}\right) \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right) \mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right) \mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+\right.$$

$$2 \left((-1-i)+\sqrt{2}\right) \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right) \mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right) \mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-$$

$$i \left(\left(-4+(2+2 i) \sqrt{2}\right) \mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+\left(4-(2+2 i) \sqrt{2}\right) \mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{4}(c+d x)\right]\right]-\right.$$

$$\left((-1-i)+\sqrt{2}\right) \left(2 \mathrm{Log}\left[\sqrt{2}+2 \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\mathrm{Log}\left[2-\sqrt{2} \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\right.$$

$$\left.\left.\left.\mathrm{Log}\left[2+\sqrt{2} \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\right)\right)$$

- **Problem 268: Result more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\mathrm{Sec}[c+d x]}}{\sqrt{1+\mathrm{Sec}[c+d x]}} \, dx$$

Optimal (type 3, 27 leaves, 2 steps):

$$\frac{\sqrt{2}\,\text{ArcSinh}\left[\frac{\text{Tan}[c+d\,x]}{1+\text{Sec}[c+d\,x]}\right]}{d}$$

Result (type 3, 78 leaves):

$$\frac{1}{d}2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\left(-\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\right)$$

- **Problem 272: Result unnecessarily involves higher level functions.**

$$\int (e\,\text{Sec}[c+d\,x])^{4/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 325 leaves, 4 steps):

$$\frac{6\,a\,e\,(e\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{5\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\left(4\times 3^{3/4}\sqrt{2+\sqrt{3}}\,a^2\,e\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\right.$$

$$\left.\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(5\,d\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 160 leaves):

$$-\frac{1}{10\,d\left(1+e^{i(c+d\,x)}\right)}3\,i\,e\left(-4+4\,e^{i(c+d\,x)}+4\left(1+e^{2i(c+d\,x)}\right)^{5/6}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{5}{6},\frac{7}{6},-e^{2i(c+d\,x)}\right]+\right.$$

$$\left.e^{i(c+d\,x)}\left(1+e^{2i(c+d\,x)}\right)^{5/6}\text{Hypergeometric2F1}\left[\frac{2}{3},\frac{5}{6},\frac{5}{3},-e^{2i(c+d\,x)}\right]\right)(e\,\text{Sec}[c+d\,x])^{1/3}\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

- **Problem 273: Result unnecessarily involves higher level functions.**

$$\int (e\,\text{Sec}[c+d\,x])^{1/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 280 leaves, 3 steps):

$$\left(2\times 3^{3/4}\sqrt{2+\sqrt{3}}\ a^2\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],\,-7-4\sqrt{3}\right]\right.$$

$$\left.\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\ \text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(d\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\ \sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 153 leaves) :

$$-\frac{1}{2\times 2^{2/3}\,d\left(1+e^{i\,(c+d\,x)}\right)}3\,i\left(\frac{e\,e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\left(1+e^{2\,i\,(c+d\,x)}\right)^{5/6}$$

$$\left(4\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{5}{6},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{2}{3},\frac{5}{6},\frac{5}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

- **Problem 274: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{(e\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 4, 326 leaves, 4 steps) :

$$\frac{3\,a\,\text{Tan}[c+d\,x]}{2\,d\,(e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\left(3^{3/4}\sqrt{2+\sqrt{3}}\ a^2\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],\,-7-4\sqrt{3}\right]\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\right.$$

$$\left.\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\ \text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(2\,d\,e\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\ \sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 231 leaves) :

$$\frac{1}{16\times 2^{2/3}\,d\,e}3\,e^{-2\,i\,(c+d\,x)}\left(\frac{e\,e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\left(4\left(-1+e^{i\,(c+d\,x)}-e^{2\,i\,(c+d\,x)}+e^{3\,i\,(c+d\,x)}\right)+4\,e^{i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{5/6}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{5}{6},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]+e^{2\,i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{5/6}\text{Hypergeometric2F1}\left[\frac{2}{3},\frac{5}{6},\frac{5}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(-i+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

- **Problem 275: Result unnecessarily involves higher level functions.**

$$\int(e\,\text{Sec}[c+d\,x])^{8/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 716 leaves, 7 steps) :

$$\frac{60\,a\,e^2\,(e\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{91\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{6\,a\,e\,(e\,\text{Sec}[c+d\,x])^{5/3}\,\text{Tan}[c+d\,x]}{13\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{240\,a\,e^3\,\text{Tan}[c+d\,x]}{91\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(120\times 3^{1/4}\sqrt{2-\sqrt{3}}\,a^2\,e^{7/3}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/\left(91\,d\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)-$$

$$\left(80\sqrt{2}\,3^{3/4}\,a^2\,e^{7/3}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/\left(91\,d\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 221 leaves) :

$$\frac{1}{91 d} 3 i e e^{-\frac{5}{2} i (c+d x)} \left(10 - 5 e^{i (c+d x)} + 22 e^{2 i (c+d x)} - 22 e^{3 i (c+d x)} + 5 e^{4 i (c+d x)} - 10 e^{5 i (c+d x)} - 10 \left(1 + e^{2 i (c+d x)}\right)^{13/6} \text{Hypergeometric2F1}\left[-\frac{1}{6}, \frac{1}{6}, \frac{5}{6}, -e^{2 i (c+d x)}\right] + 5 e^{i (c+d x)} \left(1 + e^{2 i (c+d x)}\right)^{13/6} \text{Hypergeometric2F1}\left[\frac{1}{6}, \frac{1}{3}, \frac{4}{3}, -e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right] (e \text{Sec}[c+d x])^{5/3} \sqrt{a (1+\text{Sec}[c+d x])}$$

- **Problem 276: Result unnecessarily involves higher level functions.**

$$\int (e \text{Sec}[c+d x])^{5/3} \sqrt{a + a \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 673 leaves, 6 steps):

$$\frac{6 a e (e \text{Sec}[c+d x])^{2/3} \text{Tan}[c+d x]}{7 d \sqrt{a + a \text{Sec}[c+d x]}} - \frac{24 a e^2 \text{Tan}[c+d x]}{7 d \sqrt{a + a \text{Sec}[c+d x]} \left(\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)} +$$

$$\left(12 \times 3^{1/4} \sqrt{2-\sqrt{3}} \, a^2 e^{4/3} \text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}}{\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}}\right], -7-4\sqrt{3}\right] \left(e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right) \sqrt{\frac{e^{2/3} + e^{1/3} (e \text{Sec}[c+d x])^{1/3} + (e \text{Sec}[c+d x])^{2/3}}{\left(\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)^2}} \, \text{Tan}[c+d x]\right) \Bigg/ \left(7 d (a - a \text{Sec}[c+d x]) \sqrt{a + a \text{Sec}[c+d x]} \sqrt{\frac{e^{1/3} \left(e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)^2}}\right) -$$

$$\left(8 \sqrt{2} \, 3^{3/4} a^2 e^{4/3} \text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}}{\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}}\right], -7-4\sqrt{3}\right] \left(e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right) \sqrt{\frac{e^{2/3} + e^{1/3} (e \text{Sec}[c+d x])^{1/3} + (e \text{Sec}[c+d x])^{2/3}}{\left(\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)^2}} \, \text{Tan}[c+d x]\right) \Bigg/ \left(7 d (a - a \text{Sec}[c+d x]) \sqrt{a + a \text{Sec}[c+d x]} \sqrt{\frac{e^{1/3} \left(e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right) e^{1/3} - (e \text{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 5, 192 leaves):

$$\frac{1}{7\,d}3\,i\,e\,e^{-\frac{3}{2}i\,(c+d\,x)}\left(2-e^{i\,(c+d\,x)}+e^{2\,i\,(c+d\,x)}-2\,e^{3\,i\,(c+d\,x)}-2\left(1+e^{2\,i\,(c+d\,x)}\right)^{7/6}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{6},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{7/6}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right](e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

Problem 277: Result unnecessarily involves higher level functions.

$$\int(e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 624 leaves, 5 steps):

$$-\frac{6\,a\,e\,\text{Tan}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}+$$
$$\left(3\times 3^{1/4}\sqrt{2-\sqrt{3}}\;a^2\,e^{1/3}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\right.$$
$$\left.\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\;\text{Tan}[c+d\,x]\right)\Bigg/$$
$$\left(d\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)-$$
$$\left(2\sqrt{2}\;3^{3/4}\,a^2\,e^{1/3}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\right.$$
$$\left.\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\;\text{Tan}[c+d\,x]\right)\Bigg/$$
$$\left(d\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 158 leaves):

$$\left(3\, i\, e \left(2-2\, e^{i (c+d x)}-2 \left(1+e^{2 i (c+d x)}\right)^{1/6} \text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{6},\frac{5}{6},-e^{2 i (c+d x)}\right]+e^{i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{1/6} \text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{4}{3},-e^{2 i (c+d x)}\right]\right) \sqrt{a\, (1+\text{Sec}[c+d x])}\right) \Big/ \left(d \left(1+e^{i (c+d x)}\right) (e\, \text{Sec}[c+d x])^{1/3}\right)$$

- **Problem 278: Result unnecessarily involves higher level functions.**

$$\int \frac{\sqrt{a+a\,\text{Sec}[c+d x]}}{(e\,\text{Sec}[c+d x])^{1/3}}\, dx$$

Optimal (type 4, 662 leaves, 6 steps):

$$\frac{3\, a\, \text{Tan}[c+d x]}{d\, (e\, \text{Sec}[c+d x])^{1/3} \sqrt{a+a\, \text{Sec}[c+d x]}}+\frac{3\, a\, \text{Tan}[c+d x]}{d \sqrt{a+a\, \text{Sec}[c+d x]} \left(\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)}-$$
$$\left(3\times 3^{1/4} \sqrt{2-\sqrt{3}}\, a^2\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}}{\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}}\right],-7-4 \sqrt{3}\right]\right.$$
$$\left.\left(e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right) \sqrt{\frac{e^{2/3}+e^{1/3} (e\, \text{Sec}[c+d x])^{1/3}+(e\, \text{Sec}[c+d x])^{2/3}}{\left(\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)^2}}\, \text{Tan}[c+d x]\right) \Big/$$
$$\left(2\, d\, e^{2/3} (a-a\, \text{Sec}[c+d x]) \sqrt{a+a\, \text{Sec}[c+d x]} \sqrt{\frac{e^{1/3} \left(e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)^2}}\right)+$$
$$\left(\sqrt{2}\, 3^{3/4} a^2\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}}{\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}}\right],-7-4 \sqrt{3}\right]\right.$$
$$\left.\left(e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right) \sqrt{\frac{e^{2/3}+e^{1/3} (e\, \text{Sec}[c+d x])^{1/3}+(e\, \text{Sec}[c+d x])^{2/3}}{\left(\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)^2}}\, \text{Tan}[c+d x]\right) \Big/$$
$$\left(d\, e^{2/3} (a-a\, \text{Sec}[c+d x]) \sqrt{a+a\, \text{Sec}[c+d x]} \sqrt{\frac{e^{1/3} \left(e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right) e^{1/3}-(e\, \text{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 5, 153 leaves):

$$-\left(3\,i\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/6}\left(-2\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{6},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)\Big/\left(2\times 2^{1/3}\,d\,\left(1+e^{i\,(c+d\,x)}\right)\left(\frac{e\,e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\right)$$

- **Problem 279: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{(e\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 4, 715 leaves, 7 steps):

$$\frac{3\,a\,\text{Tan}[c+d\,x]}{4\,d\,(e\,\text{Sec}[c+d\,x])^{4/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{15\,a\,\text{Tan}[c+d\,x]}{8\,d\,e\,(e\,\text{Sec}[c+d\,x])^{1/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{15\,a\,\text{Tan}[c+d\,x]}{8\,d\,e\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}-$$

$$\left(15\times 3^{1/4}\sqrt{2-\sqrt{3}}\;a^2\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\right.$$
$$\left.\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}\,(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\;\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(16\,d\,e^{5/3}\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(5\times 3^{3/4}\,a^2\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}{\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}}\right],-7-4\sqrt{3}\right]\right.$$
$$\left.\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{e^{2/3}+e^{1/3}\,(e\,\text{Sec}[c+d\,x])^{1/3}+(e\,\text{Sec}[c+d\,x])^{2/3}}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\;\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(4\sqrt{2}\;d\,e^{5/3}\,(a-a\,\text{Sec}[c+d\,x])\sqrt{a+a\,\text{Sec}[c+d\,x]}\sqrt{\frac{e^{1/3}\left(e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)}{\left(\left(1+\sqrt{3}\right)e^{1/3}-(e\,\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 5, 248 leaves):

$$\left(3\, e^{-2 i (c+d x)} \left(2 \left(-1+e^{i (c+d x)}-e^{2 i (c+d x)}+e^{3 i (c+d x)}\right)-10\, e^{i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{1/6} \text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{6},\frac{5}{6},-e^{2 i (c+d x)}\right]+5\, e^{2 i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{1/6} \text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{4}{3},-e^{2 i (c+d x)}\right]\right) \sqrt{a (1+\text{Sec}[c+d x])} \left(-i+\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/ \left(16\times 2^{5/6}\, d \left(e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)\right)^{1/6} \text{Cos}[c+d x]^{5/6} (e\, \text{Sec}[c+d x])^{4/3}\right)$$

- **Problem 280: Result more than twice size of optimal antiderivative.**

$$\int \frac{(e\, \text{Sec}[c+d x])^{2/3}}{\sqrt{a+a\, \text{Sec}[c+d x]}}\, dx$$

Optimal (type 6, 78 leaves, 4 steps):

$$-\frac{3\, \text{AppellF1}\left[\frac{2}{3},\frac{1}{2},1,\frac{5}{3},\text{Sec}[c+d x],-\text{Sec}[c+d x]\right] (e\, \text{Sec}[c+d x])^{2/3}\, \text{Tan}[c+d x]}{2\, d \sqrt{1-\text{Sec}[c+d x]} \sqrt{a+a\, \text{Sec}[c+d x]}}$$

Result (type 6, 1975 leaves):

$$\left(9\times 2^{5/6}\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] (e\, \text{Sec}[c+d x])^{2/3} (1+\text{Sec}[c+d x])^{1/6}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right) \Big/ \left(d \left(\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right)^{1/3} \sqrt{a (1+\text{Sec}[c+d x])} \left(9\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\left(-2\, \text{AppellF1}\left[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) \left(\left(9\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right)^{2/3} (1+\text{Sec}[c+d x])^{1/6}\right) \Big/ \left(2^{1/6} \left(9\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\left(-2\, \text{AppellF1}\left[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)\right) - \left(3\times 2^{5/6}\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] (1+\text{Sec}[c+d x])^{1/6}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) \Big/ \left(\left(\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right)^{1/3} \left(9\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\left(-2\, \text{AppellF1}\left[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)\right) + \left(9\times 2^{5/6} (1+\text{Sec}[c+d x])^{1/6}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right] \left(-\frac{1}{9}\, \text{AppellF1}\left[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{18}\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big]\Big)\Big)\Big/$$

$$\Big(\Big(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\Big)^{1/3}\Big(9\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\Big(-2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)-$$

$$\Big(9\times 2^{5/6}\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right](1+\text{Sec}[c+d x])^{1/6}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\Big(\Big(\Big(-2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+9\Big(-\frac{1}{9}\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{18}\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)+$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big(-\frac{1}{5}\text{AppellF1}\left[\frac{5}{2},\frac{7}{6},\frac{4}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{7}{10}\text{AppellF1}\left[\frac{5}{2},\frac{13}{6},\frac{1}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$2\Big(-\frac{4}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{6},\frac{7}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{1}{10}\text{AppellF1}\left[\frac{5}{2},\frac{7}{6},\frac{4}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\Big(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\Big)^{1/3}\Big(9\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\Big(-2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+$$

$$d x)\Big]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2\Big)+$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}[c+d x]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\text{Tan}[c+d x]\Big)\Big/$$

$$\Big(2^{1/6}\Big(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\Big)^{1/3}(1+\text{Sec}[c+d x])^{5/6}$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\Big(-2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{6},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)\Big)\Big)$$

- **Problem 281: Result more than twice size of optimal antiderivative.**

$$\int \frac{(e \operatorname{Sec}[c+d x])^{1/3}}{\sqrt{a+a \operatorname{Sec}[c+d x]}} \, dx$$

Optimal (type 6, 76 leaves, 4 steps):

$$-\frac{3 \operatorname{AppellF1}\left[\frac{1}{3}, \frac{1}{2}, 1, \frac{4}{3}, \operatorname{Sec}[c+d x], -\operatorname{Sec}[c+d x]\right] (e \operatorname{Sec}[c+d x])^{1/3} \operatorname{Tan}[c+d x]}{d \sqrt{1-\operatorname{Sec}[c+d x]} \sqrt{a+a \operatorname{Sec}[c+d x]}}$$

Result (type 6, 749 leaves):

$$\left(720\, e \operatorname{AppellF1}\left[\frac{1}{2}, -\frac{1}{6}, \frac{2}{3}, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] (1+\operatorname{Cos}[c+d x])^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right] \left(9 \operatorname{AppellF1}\left[\frac{1}{2}, -\frac{1}{6}, \frac{2}{3}, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] - \left(4 \operatorname{AppellF1}\left[\frac{3}{2}, -\frac{1}{6}, \frac{5}{3}, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + \operatorname{AppellF1}\left[\frac{3}{2}, \frac{5}{6}, \frac{2}{3}, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right) \Big/ \left(d\, (e \operatorname{Sec}[c+d x])^{2/3} \sqrt{a (1+\operatorname{Sec}[c+d x])} \left(4320 \operatorname{AppellF1}\left[\frac{1}{2}, -\frac{1}{6}, \frac{2}{3}, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]^2 \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^6 (-1+4 \operatorname{Cos}[c+d x]) + 160 \left(4 \operatorname{AppellF1}\left[\frac{3}{2}, -\frac{1}{6}, \frac{5}{3}, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + \operatorname{AppellF1}\left[\frac{3}{2}, \frac{5}{6}, \frac{2}{3}, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)^2 \operatorname{Cos}[c+d x] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4 + 12 \operatorname{AppellF1}\left[\frac{1}{2}, -\frac{1}{6}, \frac{2}{3}, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^2 \left(20 \operatorname{AppellF1}\left[\frac{3}{2}, -\frac{1}{6}, \frac{5}{3}, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] (7+14 \operatorname{Cos}[c+d x]+5 \operatorname{Cos}[2 (c+d x)]-2 \operatorname{Cos}[3 (c+d x)]) + 5 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{5}{6}, \frac{2}{3}, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] (7+14 \operatorname{Cos}[c+d x]+5 \operatorname{Cos}[2 (c+d x)]-2 \operatorname{Cos}[3 (c+d x)]) - 24 \left(40 \operatorname{AppellF1}\left[\frac{5}{2}, -\frac{1}{6}, \frac{8}{3}, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + 8 \operatorname{AppellF1}\left[\frac{5}{2}, \frac{5}{6}, \frac{5}{3}, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] - 5 \operatorname{AppellF1}\left[\frac{5}{2}, \frac{11}{6}, \frac{2}{3}, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Cos}[c+d x] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 282: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(e \operatorname{Sec}[c+d x])^{1/3} \sqrt{a+a \operatorname{Sec}[c+d x]}} \, dx$$

Optimal (type 6, 76 leaves, 4 steps):

$$\frac{3\,\text{AppellF1}\left[-\frac{1}{3},\frac{1}{2},1,\frac{2}{3},\text{Sec}[c+d\,x],-\text{Sec}[c+d\,x]\right]\text{Tan}[c+d\,x]}{d\sqrt{1-\text{Sec}[c+d\,x]}\,(e\,\text{Sec}[c+d\,x])^{1/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 6, 5151 leaves): Display of huge result suppressed!

Problem 283: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{(e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 6, 78 leaves, 4 steps):

$$\frac{3\,\text{AppellF1}\left[-\frac{2}{3},\frac{1}{2},1,\frac{1}{3},\text{Sec}[c+d\,x],-\text{Sec}[c+d\,x]\right]\text{Tan}[c+d\,x]}{2\,d\sqrt{1-\text{Sec}[c+d\,x]}\,(e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 6, 2819 leaves):

$$\frac{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]^2\left(-\frac{3}{2}\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{2}\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)}{d\,(e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a\,(1+\text{Sec}[c+d\,x])}}+$$

$$\left(\left(\left(-\frac{3}{4\,\text{Sec}[c+d\,x]^{1/6}}+\frac{1}{4}\text{Sec}[c+d\,x]^{5/6}\right)\text{Sec}[c+d\,x]^{7/6}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{5/6}\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\text{Cos}[c+d\,x]^{5/6}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{6},\frac{3}{2},2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2+\right.$$

$$\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\left(-4\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+5\,\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},\frac{2}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\Big/$$

$$\left(d\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{2/3}(e\,\text{Sec}[c+d\,x])^{2/3}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(\frac{1}{2}\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{1/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{5/6}\right.\right.$$

$$\left(-\text{Cos}[c+d\,x]^{5/6}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{6},\frac{3}{2},2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2+\right.$$

$$\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\left(-4\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+5\,\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},\frac{2}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{3\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{2/3}}2\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{5/6}\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-\text{Cos}[c+d x]^{5/6}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{6},\frac{3}{2},\right.\right.$$

$$\left.2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2+\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(-4\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+5\,\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},\frac{2}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$\frac{1}{\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{2/3}}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{5/6}\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-\frac{1}{2}\text{Cos}[c+d x]^{5/6}\text{Csc}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{6},\frac{3}{2},2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{1}{\left(1-2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right)^{5/6}}\right)+$$

$$\frac{5\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{6},\frac{3}{2},2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Sin}[c+d x]}{6\,\text{Cos}[c+d x]^{1/6}}-$$

$$\text{Cos}[c+d x]^{5/6}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{6},\frac{3}{2},2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(-4\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+5\,\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},\frac{2}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(10\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-\frac{2}{5}\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2}\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},\frac{2}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(15\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(-4\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+5\,\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},\frac{2}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(10\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},\frac{2}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(\left(-4\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},\frac{5}{3},\frac{7}{2},\right.\right.\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big] + 5\,\text{AppellF1}\Big[\frac{5}{2}, \frac{11}{6}, \frac{2}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\Big)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] + 15\,\Big(-\frac{2}{5}\,\text{AppellF1}\Big[\frac{5}{2}, \frac{5}{6}, \frac{5}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right] + \frac{1}{2}\,\text{AppellF1}\Big[\frac{5}{2}, \frac{11}{6}, \frac{2}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big) +$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \Big(-4\,\Big(-\frac{25}{21}\,\text{AppellF1}\Big[\frac{7}{2}, \frac{5}{6}, \frac{8}{3}, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] +$$

$$\frac{25}{42}\,\text{AppellF1}\Big[\frac{7}{2}, \frac{11}{6}, \frac{5}{3}, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big) +$$

$$5\,\Big(-\frac{10}{21}\,\text{AppellF1}\Big[\frac{7}{2}, \frac{11}{6}, \frac{5}{3}, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] +$$

$$\frac{55}{42}\,\text{AppellF1}\Big[\frac{7}{2}, \frac{17}{6}, \frac{2}{3}, \frac{9}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big)\Big) \Big/$$

$$\Big(15\,\text{AppellF1}\Big[\frac{3}{2}, \frac{5}{6}, \frac{2}{3}, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big] + \Big(-4\,\text{AppellF1}\Big[\frac{5}{2}, \frac{5}{6}, \frac{5}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big] + 5\,\text{AppellF1}\Big[\frac{5}{2}, \frac{11}{6}, \frac{2}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2\Big) +$$

$$\frac{1}{6\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{2/3}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^{1/6}}\,5\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big(-\text{Cos}[c+d x]^{5/6}\,\text{Hypergeometric2F1}\Big[\frac{1}{2}, \frac{5}{6}, \frac{3}{2},$$

$$2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 + \Big(10\,\text{AppellF1}\Big[\frac{3}{2}, \frac{5}{6}, \frac{2}{3}, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big) \Big/$$

$$\Big(15\,\text{AppellF1}\Big[\frac{3}{2}, \frac{5}{6}, \frac{2}{3}, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big] + \Big(-4\,\text{AppellF1}\Big[\frac{5}{2}, \frac{5}{6}, \frac{5}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big] + 5\,\text{AppellF1}\Big[\frac{5}{2}, \frac{11}{6}, \frac{2}{3}, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)$$

$$\Big(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right] + \text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\,\text{Tan}[c+d x]\Big)\Big)\Big)$$

- **Problem 284: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{4/3}\,(a+a\,\text{Sec}[c+d x])^{1/3}\,dx$$

Optimal (type 6, 78 leaves, 3 steps):

$$\frac{2^{5/6}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{1}{6},\frac{3}{2},1-\text{Sec}[c+d\,x],\frac{1}{2}(1-\text{Sec}[c+d\,x])\right](a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{d\,(1+\text{Sec}[c+d\,x])^{5/6}}$$

Result (type 6, 1982 leaves):

$$\frac{3\,\text{Sec}[c+d\,x]^{1/3}\,((1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x])^{1/3}\,(a\,(1+\text{Sec}[c+d\,x]))^{1/3}\,\text{Sin}[c+d\,x]}{2\,d\,(1+\text{Sec}[c+d\,x])^{1/3}}+$$

$$\Bigg(3\,(a\,(1+\text{Sec}[c+d\,x]))^{1/3}\left(-\frac{(1+\text{Sec}[c+d\,x])^{1/3}}{\text{Sec}[c+d\,x]^{2/3}}+\frac{1}{2}\,\text{Sec}[c+d\,x]^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}\right)$$
$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-1+\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\right.$$
$$\left(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{HypergeometricPFQ}\left[\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\Bigg/$$

$$\left(2^{2/3}\,d\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{2/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}(1+\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left(\left(3\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{1/3}\left(-1+\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\right.\right.\right.\right.\right.$$
$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$
$$\left.\left.\left.\text{HypergeometricPFQ}\left[\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\left(2\times 2^{2/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}\right)-$$
$$\left(2^{1/3}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-1+\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\right.\right.$$
$$\left(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$
$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{HypergeometricPFQ}\left[\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\Big/$$
$$\left(\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{2/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}\right)+\frac{1}{2^{2/3}\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{2/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}}$$

$$3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\left(3\left(-\frac{2}{9}\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right.\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{9}\,\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big)\Big)\Big/$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\,\Big(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big(-2\,\Big(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]\Big)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+9$$

$$\Big(-\frac{2}{9}\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$\frac{1}{9}\,\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)-2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\Big(2\,\Big(-\text{AppellF1}\left[\frac{5}{2},-\frac{1}{3},\frac{8}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$\frac{1}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},\frac{5}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)+\frac{3}{2}\,\text{Csc}\Big[$$

$$\frac{1}{2}(c+d\,x)\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\left(-\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]+\frac{1}{\left(1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right)^{2/3}}\right)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\,\Big(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)^2\Big)-$$

$$\Big(\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big(-1+\Big(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\Big/$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},\frac{2}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\,\Big(2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{3},\frac{5}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{HypergeometricPFQ}\left[\left\{\left\{\frac{2}{3},\frac{3}{4}\right\},\left\{\frac{7}{4}\right\},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right\}\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Bigg)\Bigg/$$
$$\left(2^{2/3}\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{2/3}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{4/3}\right)\Bigg)\Bigg)$$

- **Problem 285: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{4/3}\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,dx$$

Optimal (type 6, 79 leaves, 3 steps):

$$\frac{2\times 2^{1/6}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},-\frac{1}{6},\frac{3}{2},1-\text{Sec}[c+d\,x],\frac{1}{2}(1-\text{Sec}[c+d\,x])\right](a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{d\,(1+\text{Sec}[c+d\,x])^{7/6}}$$

Result (type 6, 3726 leaves):

$$\frac{\text{Sec}[c+d\,x]^{1/3}\,((1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x])^{2/3}\,(a\,(1+\text{Sec}[c+d\,x]))^{2/3}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{d\,(1+\text{Sec}[c+d\,x])^{2/3}}+$$
$$\Bigg(15\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right](a\,(1+\text{Sec}[c+d\,x]))^{2/3}$$
$$\Bigg(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]-2\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]$$
$$\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2+4\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\Bigg)^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg/$$
$$\Bigg(d\,\text{Sec}[c+d\,x]^{2/3}\Bigg(9\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]-$$
$$2\left(\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]-2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\right)$$
$$\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\Bigg)\Bigg(405\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]^2\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$90\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]-180\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]$$
$$\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]-$$
$$90\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]$$

$$\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2+180\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2+$$

$$10\times 2^{2/3}\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]^2\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^3-$$

$$40\times 2^{2/3}\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^3+40\times 2^{2/3}\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]^2$$

$$\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^3-72\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},\frac{7}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^3+$$

$$72\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},\frac{4}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^3-180\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{AppellF1}\left[\frac{5}{2},\frac{8}{3},\frac{1}{3},\frac{7}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^3+$$

$$270\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]^2\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$60\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},\frac{4}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+120\times 2^{2/3}\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},\frac{1}{3},\frac{3}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},\frac{1}{3},\frac{5}{2},\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)-$$

$$\left(\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{4/3}\text{Sec}[c+d x]^{1/3}\,(a\,(1+\text{Sec}[c+d x]))^{2/3}\left(\frac{\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]}{\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}}-\right.\right.$$

$$\left.\left.\frac{\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]}{\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}}\right)\right)\Big/$$

$$\Bigg(2^{1/3}\, d \Bigg(-\frac{1}{2^{1/3}}\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{1/3}\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg(\frac{\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]}{\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}}-$$

$$\frac{\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]}{\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}}\Bigg)-$$

$$\frac{1}{2^{1/3}}3\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{1/3}\Bigg(\Bigg(\frac{\left(\frac{1}{3}-\frac{i}{3}\right)\text{AppellF1}\left[\frac{1}{3},-\frac{1}{3},\frac{2}{3},\frac{4}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{\left(\frac{1}{3}+\frac{i}{3}\right)\text{AppellF1}\left[\frac{1}{3},\frac{2}{3},-\frac{1}{3},\frac{4}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\Bigg)\Bigg/$$

$$\Bigg(\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\Bigg)-\Bigg(\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\right.$$

$$\left.-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\right)\Bigg)\Bigg/$$

$$\Bigg(3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{4/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\Bigg)-\Bigg(\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\right.$$

$$\left.-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\right)\Bigg)\Bigg/\Bigg(3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}$$

$$\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{4/3}\Bigg)-\Bigg(-\frac{\left(\frac{1}{3}+\frac{i}{3}\right)\text{AppellF1}\left[\frac{1}{3},-\frac{1}{3},\frac{2}{3},\frac{4}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$

$$\left(\frac{\left(\frac{1}{3}-\frac{i}{3}\right)\text{AppellF1}\left[\frac{1}{3},\frac{2}{3},-\frac{1}{3},\frac{4}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\right)\Bigg/$$

$$\left(\left(\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\right)+\left(\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\right.\right.$$

$$\left.\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}\right)\right)\Bigg/$$

$$\left(3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{4/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\right)+\left(\text{AppellF1}\left[-\frac{2}{3},-\frac{1}{3},-\frac{1}{3},\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\right.$$

$$\left.\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}\right)\right)\Bigg/$$

$$\left.\left.\left(3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{4/3}\right)\right)\right)$$

- **Problem 287: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^{4/3}}{\text{Sec}[c+d x]^{1/3}}\,dx$$

Optimal (type 6, 80 leaves, 3 steps):

$$\frac{1}{d\,(1+\text{Sec}[c+d x])^{5/6}}2\times 2^{5/6}\,a\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3},-\frac{5}{6},\frac{3}{2},1-\text{Sec}[c+d x],\frac{1}{2}(1-\text{Sec}[c+d x])\right](a+a\,\text{Sec}[c+d x])^{1/3}\,\text{Tan}[c+d x]$$

Result (type 6, 2325 leaves):

$$-\left(\left(3\,(a\,(1+\text{Sec}[c+d x]))^{4/3}\left(\frac{(1+\text{Sec}[c+d x])^{1/3}}{\text{Sec}[c+d x]^{1/3}}+\text{Sec}[c+d x]^{2/3}\,(1+\text{Sec}[c+d x])^{1/3}\right)\right.\right.$$

$$\left(-8\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}}-\right.$$

$$\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}$$

$$\left.\left.\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)\right)\Big/\left(4\times 2^{2/3}\,d\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{1/3}(1+\text{Sec}[c+d x])^{4/3}\right.$$

$$\left(\left(\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-8\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}}-\right.\right.\right.$$

$$\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)\right)\Big/\left(4\times 2^{2/3}\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{1/3}\right)-\frac{1}{4\times 2^{2/3}\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{1/3}}\,3\left(-4\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2+\right.$$

$$\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(-\left(\left(\frac{4}{3}-\frac{4 i}{3}\right)\text{AppellF1}\left[-\frac{1}{3},-\frac{2}{3},\frac{1}{3},\frac{2}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\right.\right.$$

$$\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2-\left(\left(\frac{4}{3}+\frac{4 i}{3}\right)\text{AppellF1}\left[-\frac{1}{3},\frac{1}{3},-\frac{2}{3},\frac{2}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\right.$$

$$\left.\left.\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)\right)\Big/\left(\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\right)+$$

$$\left(\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\right)-\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)-$$

$$\left(2\,\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}-\right.\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\right)\right)\Big/\left(3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{5/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\right)-$$

$$\left(2\,\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},-\frac{1+i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},-\frac{1-i}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.$$

$$\left.\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\right)\right)\Big/$$

$$\left(3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{5/3}\right)-\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\left(\frac{\left(\frac{4}{3}+\frac{4i}{3}\right)\text{AppellF1}\left[-\frac{1}{3},-\frac{2}{3},\frac{1}{3},\frac{2}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\right.$$

$$\left.\frac{\left(\frac{4}{3}-\frac{4i}{3}\right)\text{AppellF1}\left[-\frac{1}{3},\frac{1}{3},-\frac{2}{3},\frac{2}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}\right)-\frac{1}{3\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}}$$

$$\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}\right)-\frac{1}{3\left(\frac{i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{2/3}}$$

$$\text{AppellF1}\left[-\frac{4}{3},-\frac{2}{3},-\frac{2}{3},-\frac{1}{3},\frac{1-i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]},\frac{1+i}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right]\left(\frac{-i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]}\right)^{1/3}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 288: Unable to integrate problem.

$$\int \text{Sec}[e+f x]^n (a+a\,\text{Sec}[e+f x])^4\,dx$$

Optimal (type 5, 304 leaves, 8 steps):

$$\frac{a^4\left(30+21 n+4 n^2\right)\text{Sec}[e+f x]^{1+n}\,\text{Sin}[e+f x]}{f(1+n)(2+n)(3+n)}+$$

$$\frac{\text{Sec}[e+f x]^{1+n}\left(a^2+a^2\,\text{Sec}[e+f x]\right)^2\text{Sin}[e+f x]}{f(3+n)}+\frac{2(4+n)\,\text{Sec}[e+f x]^{1+n}\left(a^4+a^4\,\text{Sec}[e+f x]\right)\text{Sin}[e+f x]}{f(2+n)(3+n)}-$$

$$\frac{a^4\left(3+24 n+8 n^2\right)\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Cos}[e+f x]^2\right]\text{Sec}[e+f x]^{-1+n}\,\text{Sin}[e+f x]}{f(1-n)(1+n)(3+n)\sqrt{\text{Sin}[e+f x]^2}}+$$

$$\frac{4 a^4(3+2 n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{n}{2},\frac{2-n}{2},\text{Cos}[e+f x]^2\right]\text{Sec}[e+f x]^n\,\text{Sin}[e+f x]}{f n(2+n)\sqrt{\text{Sin}[e+f x]^2}}$$

Result (type 8, 23 leaves):

$$\int \text{Sec}[e+f x]^n (a+a\,\text{Sec}[e+f x])^4\,dx$$

Problem 289: Unable to integrate problem.

$$\int \text{Sec}[e+f x]^n (a+a\,\text{Sec}[e+f x])^3\,dx$$

Optimal (type 5, 230 leaves, 7 steps):

$$\frac{a^3 (5+2n) \operatorname{Sec}[e+fx]^{1+n} \operatorname{Sin}[e+fx]}{f(1+n)(2+n)} + \frac{\operatorname{Sec}[e+fx]^{1+n} \left(a^3 + a^3 \operatorname{Sec}[e+fx]\right) \operatorname{Sin}[e+fx]}{f(2+n)} - \frac{a^3 (1+4n) \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1-n}{2}, \frac{3-n}{2}, \operatorname{Cos}[e+fx]^2\right] \operatorname{Sec}[e+fx]^{-1+n} \operatorname{Sin}[e+fx]}{f\left(1-n^2\right)\sqrt{\operatorname{Sin}[e+fx]^2}} + \frac{a^3 (7+4n) \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{n}{2}, \frac{2-n}{2}, \operatorname{Cos}[e+fx]^2\right] \operatorname{Sec}[e+fx]^{n} \operatorname{Sin}[e+fx]}{f\,n\,(2+n)\sqrt{\operatorname{Sin}[e+fx]^2}}$$

Result (type 8, 23 leaves) :

$$\int \operatorname{Sec}[e+fx]^n \left(a + a \operatorname{Sec}[e+fx]\right)^3 \, dx$$

- **Problem 290: Unable to integrate problem.**

$$\int \operatorname{Sec}[e+fx]^n \left(a + a \operatorname{Sec}[e+fx]\right)^2 \, dx$$

Optimal (type 5, 172 leaves, 6 steps) :

$$\frac{a^2 \operatorname{Sec}[e+fx]^{1+n} \operatorname{Sin}[e+fx]}{f(1+n)} - \frac{a^2 (1+2n) \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1-n}{2}, \frac{3-n}{2}, \operatorname{Cos}[e+fx]^2\right] \operatorname{Sec}[e+fx]^{-1+n} \operatorname{Sin}[e+fx]}{f\left(1-n^2\right)\sqrt{\operatorname{Sin}[e+fx]^2}} + \frac{2 a^2 \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{n}{2}, \frac{2-n}{2}, \operatorname{Cos}[e+fx]^2\right] \operatorname{Sec}[e+fx]^{n} \operatorname{Sin}[e+fx]}{f\,n\sqrt{\operatorname{Sin}[e+fx]^2}}$$

Result (type 8, 23 leaves) :

$$\int \operatorname{Sec}[e+fx]^n \left(a + a \operatorname{Sec}[e+fx]\right)^2 \, dx$$

- **Problem 291: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[e+fx]^n \left(a + a \operatorname{Sec}[e+fx]\right) \, dx$$

Optimal (type 5, 132 leaves, 5 steps) :

$$-\frac{a \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1-n}{2}, \frac{3-n}{2}, \operatorname{Cos}[e+fx]^2\right] \operatorname{Sec}[e+fx]^{-1+n} \operatorname{Sin}[e+fx]}{f(1-n)\sqrt{\operatorname{Sin}[e+fx]^2}} + \frac{a \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{n}{2}, \frac{2-n}{2}, \operatorname{Cos}[e+fx]^2\right] \operatorname{Sec}[e+fx]^{n} \operatorname{Sin}[e+fx]}{f\,n\sqrt{\operatorname{Sin}[e+fx]^2}}$$

Result (type 6, 3990 leaves) :

$$-\left(\left(a\,\text{Sec}[e+f x]^{2n}\,(1+\text{Sec}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.\right.$$

$$\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\right)\middle/\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\right.\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\middle/\left(\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\left(n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.\left.(1+n)\,\text{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)\Big/$$

$$\left(f\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2}\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]^n\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right.\right.$$

$$\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\right)\middle/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\middle/\left(\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\left(n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.(1+n)\,\text{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-\frac{1}{2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)}$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]^n\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\right)\middle/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\mathrm{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\Big(\mathrm{AppellF1}\Big[\frac{1}{2},1+n,-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+\frac{2}{3}\Big(n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)-\frac{1}{-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$n\,\mathrm{Sec}[e+f x]^{1+n}\,\mathrm{Sin}[e+f x]\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big(\Big(3\,\mathrm{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Cos}[e+f x]\Big)\Big/$$

$$\Big(3\,\mathrm{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Big((-1+n)\,\mathrm{AppellF1}\Big[\frac{3}{2},n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\mathrm{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\Big(\mathrm{AppellF1}\Big[\frac{1}{2},1+n,-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+\frac{2}{3}\Big(n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)-\frac{1}{-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\mathrm{Sec}[e+f x]^n\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big(-\Big(3\,\mathrm{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sin}[e+f x]\Big)\Big/$$

$$\Big(3\,\mathrm{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Big((-1+n)\,\mathrm{AppellF1}\Big[\frac{3}{2},n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\Big(3\,\mathrm{Cos}[e+f x]\Big(-\frac{1}{3}(1-n)\,\mathrm{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{1}{3}n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big/$$

$$\Big(3\,\mathrm{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Big((-1+n)\,\mathrm{AppellF1}\Big[\frac{3}{2},n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+n\,\mathrm{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\left(\frac{1}{3} n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{3}(1+n) \text{AppellF1}\left[\frac{3}{2}, 2+n, -n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) \Big/$$

$$\left(\text{AppellF1}\left[\frac{1}{2}, 1+n, -n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \frac{2}{3}\left(n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (1+n) \text{AppellF1}\left[\frac{3}{2}, 2+n, -n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) -$$

$$\left(3 \text{AppellF1}\left[\frac{1}{2}, n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}[e+f x] \left(2\left((-1+n) \text{AppellF1}\left[\frac{3}{2}, n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + 3\left(-\frac{1}{3}(1-n) \text{AppellF1}\left[\frac{3}{2}, n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{3} n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) + 2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2 \left((-1+n)\left(-\frac{3}{5}(2-n) \text{AppellF1}\left[\frac{5}{2}, n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{3}{5} n \text{AppellF1}\left[\frac{5}{2}, 1+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) + n\left(-\frac{3}{5}(1-n) \text{AppellF1}\left[\frac{5}{2}, 1+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{3}{5}(1+n) \text{AppellF1}\left[\frac{5}{2}, 2+n, 1-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right) \Big/$$

$$\left(3 \text{AppellF1}\left[\frac{1}{2}, n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+n) \text{AppellF1}\left[\frac{3}{2}, n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2 -$$

$$\left(\text{AppellF1}\left[\frac{1}{2}, 1+n, -n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \left(\frac{1}{3} n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{3}(1+n) \text{AppellF1}\left[\frac{3}{2}, 2+n, -n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +\right.\right.$$

$$\frac{2}{3}\left(n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]+\frac{2}{3}\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2$$
$$\left(n\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},1+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]+\frac{3}{5}(1+n)\,\text{AppellF1}\left[\frac{5}{2},2+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)+\right.$$
$$(1+n)\left(\frac{3}{5}n\,\text{AppellF1}\left[\frac{5}{2},2+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]+\right.$$
$$\left.\left.\frac{3}{5}(2+n)\,\text{AppellF1}\left[\frac{5}{2},3+n,-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)\right)\Bigg)\Bigg)\Bigg)\Bigg/$$
$$\left(\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\frac{2}{3}\left(n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 292: Unable to integrate problem.**

$$\int\frac{\text{Sec}[e+f\,x]^n}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 5, 174 leaves, 6 steps):

$$\frac{\text{Sec}[e+f\,x]^n\,\text{Sin}[e+f\,x]}{f\,(a+a\,\text{Sec}[e+f\,x])}+\frac{(1-n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2-n}{2},\frac{4-n}{2},\text{Cos}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^{-2+n}\,\text{Sin}[e+f\,x]}{a\,f\,(2-n)\,\sqrt{\text{Sin}[e+f\,x]^2}}-$$
$$\frac{\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Cos}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^{-1+n}\,\text{Sin}[e+f\,x]}{a\,f\,\sqrt{\text{Sin}[e+f\,x]^2}}$$

Result (type 8, 23 leaves):

$$\int\frac{\text{Sec}[e+f\,x]^n}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

- **Problem 293: Unable to integrate problem.**

$$\int\frac{\text{Sec}[e+f\,x]^n}{(a+a\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 5, 217 leaves, 7 steps):

$$-\frac{2(2-n)\,\text{Sec}[e+f x]^{1+n}\,\text{Sin}[e+f x]}{3 a^2 f\,(1+\text{Sec}[e+f x])}-\frac{\text{Sec}[e+f x]^{1+n}\,\text{Sin}[e+f x]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}-\frac{(3-2 n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Cos}[e+f x]^2\right]\text{Sec}[e+f x]^{-1+n}\,\text{Sin}[e+f x]}{3 a^2 f\sqrt{\text{Sin}[e+f x]^2}}+\frac{2(2-n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{n}{2},\frac{2-n}{2},\text{Cos}[e+f x]^2\right]\text{Sec}[e+f x]^{n}\,\text{Sin}[e+f x]}{3 a^2 f\sqrt{\text{Sin}[e+f x]^2}}$$

Result (type 8, 23 leaves):

$$\int\frac{\text{Sec}[e+f x]^n}{(a+a\,\text{Sec}[e+f x])^2}\,dx$$

- **Problem 294: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\text{Sec}[e+f x]^n\,(1+\text{Sec}[e+f x])^{5/2}\,dx$$

Optimal (type 5, 162 leaves, 4 steps):

$$\frac{2(7+4 n)\,\text{Sec}[e+f x]^{1+n}\,\text{Sin}[e+f x]}{f\,(1+2 n)\,(3+2 n)\sqrt{1+\text{Sec}[e+f x]}}+\frac{2\,\text{Sec}[e+f x]^{1+n}\sqrt{1+\text{Sec}[e+f x]}\,\text{Sin}[e+f x]}{f\,(3+2 n)}+\frac{2\left(3+24 n+16 n^2\right)\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1-\text{Sec}[e+f x]\right]\text{Tan}[e+f x]}{f\,(1+2 n)\,(3+2 n)\sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 5, 433 leaves):

$$-\frac{1}{f\,\text{Sec}[e+f x]^{5/2}}\,i\,2^{-\frac{5}{2}+n}\,e^{-i\left(\frac{1}{2}+n\right)(e+f x)}\left(\frac{e^{i(e+f x)}}{1+e^{2 i(e+f x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2 i(e+f x)}\right)^{\frac{1}{2}+n}\left(\frac{10\,e^{i(2+n)(e+f x)}\,\text{Hypergeometric2F1}\left[1+\frac{n}{2},\frac{5}{2}+n,2+\frac{n}{2},-e^{2 i(e+f x)}\right]}{2+n}+\frac{5\,e^{i(4+n)(e+f x)}\,\text{Hypergeometric2F1}\left[2+\frac{n}{2},\frac{5}{2}+n,3+\frac{n}{2},-e^{2 i(e+f x)}\right]}{4+n}+\frac{e^{i n(e+f x)}\,\text{Hypergeometric2F1}\left[\frac{n}{2},\frac{5}{2}+n,1+\frac{n}{2},-e^{2 i(e+f x)}\right]}{n}+\frac{5\,e^{i(1+n)(e+f x)}\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{5}{2}+n,\frac{3+n}{2},-e^{2 i(e+f x)}\right]}{1+n}+\frac{10\,e^{i(3+n)(e+f x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{3+n}{2},\frac{5+n}{2},-e^{2 i(e+f x)}\right]}{3+n}+\frac{e^{i(5+n)(e+f x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{5+n}{2},\frac{7+n}{2},-e^{2 i(e+f x)}\right]}{5+n}\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^5(1+\text{Sec}[e+f x])^{5/2}$$

Problem 295: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[e+f x]^n (1+\mathrm{Sec}[e+f x])^{3/2} \, dx$$

Optimal (type 5, 98 leaves, 4 steps):

$$\frac{2 \,\mathrm{Sec}[e+f x]^{1+n} \,\mathrm{Sin}[e+f x]}{f (1+2 n) \sqrt{1+\mathrm{Sec}[e+f x]}}+\frac{2 (1+4 n) \,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, 1-n, \frac{3}{2}, 1-\mathrm{Sec}[e+f x]\right] \mathrm{Tan}[e+f x]}{f (1+2 n) \sqrt{1+\mathrm{Sec}[e+f x]}}$$

Result (type 5, 6367 leaves): Display of huge result suppressed!

Problem 296: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[e+f x]^n \sqrt{1+\mathrm{Sec}[e+f x]} \, dx$$

Optimal (type 5, 45 leaves, 2 steps):

$$\frac{2 \,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, 1-n, \frac{3}{2}, 1-\mathrm{Sec}[e+f x]\right] \mathrm{Tan}[e+f x]}{f \sqrt{1+\mathrm{Sec}[e+f x]}}$$

Result (type 5, 211 leaves):

$$-\frac{1}{f n (1+n)} i \, 2^{-\frac{1}{2}+n} e^{\frac{1}{2} i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^{-\frac{1}{2}+n} \left(e^{-i (e+f x)} \left(1+e^{2 i (e+f x)}\right)\right)^{\frac{1}{2}-n} \mathrm{Cos}[e+f x]^{\frac{1}{2}+n}$$
$$\left((1+n) \,\mathrm{Hypergeometric2F1}\left[\frac{n}{2}, \frac{1}{2}+n, \frac{2+n}{2}, -e^{2 i (e+f x)}\right]+e^{i (e+f x)} n \,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1+n}{2}, \frac{3+n}{2}, -e^{2 i (e+f x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{1}{2} (e+f x)\right] \mathrm{Sec}[e+f x]^n \sqrt{1+\mathrm{Sec}[e+f x]}$$

Problem 297: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Sec}[e+f x]^n}{\sqrt{1+\mathrm{Sec}[e+f x]}} \, dx$$

Optimal (type 6, 59 leaves, 3 steps):

$$\frac{\mathrm{AppellF1}\left[\frac{1}{2}, 1-n, 1, \frac{3}{2}, 1-\mathrm{Sec}[e+f x], \frac{1}{2} (1-\mathrm{Sec}[e+f x])\right] \mathrm{Tan}[e+f x]}{f \sqrt{1+\mathrm{Sec}[e+f x]}}$$

Result (type 6, 2938 leaves):

$$\left(3 \sqrt{2} \,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right.$$
$$\left.\left(\mathrm{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^n \mathrm{Sec}[e+f x]^{-\frac{1}{2}+\frac{1}{2} (-1+2 n)} \left(\mathrm{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^n \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]\right) \Big/$$

$$\Big(f\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)$$

$$\Big(\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Cos}[e+fx]\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^{1+n}$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Sec}[e+fx]\Big)^n\sqrt{1+\text{Sec}[e+fx]}\Big)\Big/\Big(\sqrt{2}\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)\Big)-$$

$$\Big(3\sqrt{2}\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^n\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Sec}[e+fx]\Big)^n$$

$$\sqrt{1+\text{Sec}[e+fx]}\,\text{Sin}[e+fx]\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)+$$

$$\Big(3\sqrt{2}\,n\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Cos}[e+fx]\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^n$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Sec}[e+fx]\Big)^n\sqrt{1+\text{Sec}[e+fx]}\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)+$$

$$\Big(3\sqrt{2}\,\text{Cos}[e+fx]\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^n\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Sec}[e+fx]\Big)^n\sqrt{1+\text{Sec}[e+fx]}\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]$$

$$\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+$$

$$\frac{1}{3}\Big(-\frac{1}{2}+n\Big)\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\ \frac{1}{2}+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)-$$

$$\Big(3\sqrt{2}\ \text{AppellF1}\Big[\frac{1}{2},\ -\frac{1}{2}+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Cos}[e+f x]\ \Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Sec}[e+f x]\Big)^n\ \sqrt{1+\text{Sec}[e+f x]}\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]$$

$$\Big(\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\ -\frac{1}{2}+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\ \frac{1}{2}+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$3\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\Big[\frac{3}{2},\ -\frac{1}{2}+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{3}\Big(-\frac{1}{2}+n\Big)$$

$$\text{AppellF1}\Big[\frac{3}{2},\ \frac{1}{2}+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big(2(-1+n)\Big(-\frac{3}{5}(2-n)\,\text{AppellF1}\Big[\frac{5}{2},\ -\frac{1}{2}+n,\ 3-n,\ \frac{7}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\Big(-\frac{1}{2}+n\Big)\ \text{AppellF1}\Big[\frac{5}{2},\ \frac{1}{2}+n,\ 2-n,\ \frac{7}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)+$$

$$(-1+2 n)\Big(-\frac{3}{5}(1-n)\,\text{AppellF1}\Big[\frac{5}{2},\ \frac{1}{2}+n,\ 2-n,\ \frac{7}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\Big(\frac{1}{2}+n\Big)\ \text{AppellF1}\Big[\frac{5}{2},\ \frac{3}{2}+n,\ 1-n,\ \frac{7}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\ -\frac{1}{2}+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\ -\frac{1}{2}+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\ \frac{1}{2}+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2+$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\ -\frac{1}{2}+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\ \Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\ \text{Sec}[e+f x]\Big)^n\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\ \text{Tan}[e+f x]\Big)\Big/$$

$$\Big(\sqrt{2}\ \sqrt{1+\text{Sec}[e+f x]}\ \Big(3\,\text{AppellF1}\Big[\frac{1}{2},\ -\frac{1}{2}+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\ -\frac{1}{2}+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\ \frac{1}{2}+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)+$$

$$\left(3\sqrt{2}\; n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$
$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+n}\sqrt{1+\text{Sec}[e+f x]}\;\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$
$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)$$

- **Problem 298: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f x]^n}{(1+\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 6, 62 leaves, 3 steps):

$$\frac{\text{AppellF1}\left[\frac{1}{2},1-n,2,\frac{3}{2},1-\text{Sec}[e+f x],\frac{1}{2}(1-\text{Sec}[e+f x])\right]\text{Tan}[e+f x]}{2 f\sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 6, 2990 leaves):

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$
$$\left.\text{Sec}[e+f x]^{\frac{1}{2}+\frac{1}{2}(-3+2n)}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$
$$\left(f(1+\text{Sec}[e+f x])^{3/2}\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$
$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$
$$\left(\left(12\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}\right.\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{\frac{3}{2}+n} \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2 \left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{3}{2}+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (-3+2n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) +$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}[e+f x] \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{\frac{3}{2}+n} \left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{3}{2}+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (-3+2n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) -$$

$$\Bigg(6\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n \left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{\frac{3}{2}+n}$$

$$\text{Sin}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right] \left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg) \Big/ \Bigg(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{3}{2}+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) +$$

$$\Bigg(6\,n\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}[e+f x] \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{\frac{3}{2}+n} \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2 \left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{3}{2}+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (-3+2n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) +$$

$$\Bigg(6\,\text{Cos}[e+f x]\left(\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]$$

$$\Bigg(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{3}{2}+n,2-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]+$$

$$\frac{1}{3}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{1}{2}+n,1-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]\Bigg)$$

$$\left(-1+\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Bigg/\Bigg(3\,\text{AppellF1}\left[\tfrac{1}{2},-\tfrac{3}{2}+n,1-n,\tfrac{3}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]+$$

$$\Bigg(2(-1+n)\,\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{3}{2}+n,2-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]+$$

$$(-3+2n)\,\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{1}{2}+n,1-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\Bigg(6\,\text{AppellF1}\left[\tfrac{1}{2},-\tfrac{3}{2}+n,1-n,\tfrac{3}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^2$$

$$\Bigg(\Bigg(2(-1+n)\,\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{3}{2}+n,2-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]+$$

$$(-3+2n)\,\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{1}{2}+n,1-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]+$$

$$3\Bigg(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{3}{2}+n,2-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]+\frac{1}{3}\left(-\frac{3}{2}+n\right)$$

$$\text{AppellF1}\left[\tfrac{3}{2},-\tfrac{1}{2}+n,1-n,\tfrac{5}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]\Bigg)+\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2$$

$$\Bigg(2(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\tfrac{5}{2},-\tfrac{3}{2}+n,3-n,\tfrac{7}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]+\right.$$

$$\left.\frac{3}{5}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\tfrac{5}{2},-\tfrac{1}{2}+n,2-n,\tfrac{7}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]\right)+$$

$$(-3+2n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\tfrac{5}{2},-\tfrac{1}{2}+n,2-n,\tfrac{7}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]+\right.$$

$$\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\tfrac{5}{2},\tfrac{1}{2}+n,1-n,\tfrac{7}{2},\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\text{Tan}\left[\tfrac{1}{2}(e+f x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$

$$\left(6\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{1}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Bigg)$$

- **Problem 299: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+fx])^n\,(1+\text{Sec}[e+fx])^{3/2}\,dx$$

Optimal (type 5, 117 leaves, 4 steps):

$$\frac{2(-\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f(1+2n)\sqrt{1+\text{Sec}[e+fx]}}-\frac{(1+4n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},n,1+n,\text{Sec}[e+fx]\right](-\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f\,n\,(1+2n)\sqrt{1-\text{Sec}[e+fx]}\sqrt{1+\text{Sec}[e+fx]}}$$

Result (type 5, 6381 leaves): Display of huge result suppressed!

- **Problem 300: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+fx])^n\sqrt{1+\text{Sec}[e+fx]}\,dx$$

Optimal (type 5, 64 leaves, 2 steps):

$$-\frac{\text{Hypergeometric2F1}\left[\frac{1}{2},n,1+n,\text{Sec}[e+fx]\right](-\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f\,n\sqrt{1-\text{Sec}[e+fx]}\sqrt{1+\text{Sec}[e+fx]}}$$

Result (type 5, 213 leaves):

$$-\frac{1}{f\,n\,(1+n)}\,i\,2^{-\frac{1}{2}+n}\,e^{\frac{1}{2}i(e+f x)}\left(1+e^{2i(e+f x)}\right)^{-\frac{1}{2}+n}\left(e^{-i(e+f x)}\left(1+e^{2i(e+f x)}\right)\right)^{\frac{1}{2}-n}\text{Cos}[e+f x]^{\frac{1}{2}+n}$$
$$\left((1+n)\,\text{Hypergeometric2F1}\left[\frac{n}{2},\frac{1}{2}+n,\frac{2+n}{2},-e^{2i(e+f x)}\right]+e^{i(e+f x)}\,n\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\frac{1+n}{2},\frac{3+n}{2},-e^{2i(e+f x)}\right]\right)$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right](-\text{Sec}[e+f x])^n\sqrt{1+\text{Sec}[e+f x]}$$

Problem 301: Result more than twice size of optimal antiderivative.

$$\int\frac{(-\text{Sec}[e+f x])^n}{\sqrt{1+\text{Sec}[e+f x]}}\,dx$$

Optimal (type 6, 73 leaves, 2 steps):

$$-\frac{\text{AppellF1}\left[n,\frac{1}{2},1,1+n,\text{Sec}[e+f x],-\text{Sec}[e+f x]\right](-\text{Sec}[e+f x])^n\,\text{Tan}[e+f x]}{f\,n\sqrt{1-\text{Sec}[e+f x]}\,\sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 6, 2951 leaves):

$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$
$$\left.\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n(-\text{Sec}[e+f x])^n\,\text{Sec}[e+f x]^{-\frac{1}{2}-n+\frac{1}{2}(-1+2n)}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$
$$\left(f\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$
$$\left(\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}\right.\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\right)\Big/\left(\sqrt{2}\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$
$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$
$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\right.$$
$$\left.\sqrt{1+\text{Sec}[e+f x]}\,\text{Sin}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$

$$\left(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$

$$\left(3\sqrt{2}\,\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{1}{3}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}\left(-\frac{1}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(2\,(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\frac{3}{5}\Big(-\frac{1}{2}+n\Big)\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)+$$

$$(-1+2 n)\,\Big(-\frac{3}{5}(1-n)\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\Big(\frac{1}{2}+n\Big)\,\text{AppellF1}\Big[\frac{5}{2},\frac{3}{2}+n,1-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2+$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^n\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\,\text{Tan}[e+f x]\Big)\Big/$$

$$\Big(\sqrt{2}\,\sqrt{1+\text{Sec}[e+f x]}\,\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)+$$

$$\Big(3\sqrt{2}\,n\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Cos}[e+f x]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^{-1+n}\,\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]$$

$$\Big(-\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]\,\text{Sec}[e+f x]\,\text{Sin}\Big[\frac{1}{2}(e+f x)\Big]+\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$(-1+2 n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)\Big)$$

- **Problem 302: Result more than twice size of optimal antiderivative.**

$$\int\frac{(-\text{Sec}[e+f x])^n}{(1+\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 6, 73 leaves, 2 steps):

$$-\frac{\text{AppellF1}\left[n,\frac{1}{2},2,1+n,\text{Sec}[e+f x],-\text{Sec}[e+f x]\right](-\text{Sec}[e+f x])^n\,\text{Tan}[e+f x]}{f\,n\,\sqrt{1-\text{Sec}[e+f x]}\,\sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 6, 3003 leaves):

$$\Bigg(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n$$

$$(-\text{Sec}[e+f x])^n\,\text{Sec}[e+f x]^{\frac{1}{2}-n+\frac{1}{2}(-3+2n)}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Bigg/$$

$$\Bigg(f\,(1+\text{Sec}[e+f x])^{3/2}\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$

$$\Bigg(\Bigg(\Bigg(12\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\right.$$

$$\left.\text{Sin}[e+fx]\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+$$

$$\left(6\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+$$

$$\left(6\,\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\frac{1}{3}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$

$$\left(\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}\left(-\frac{3}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(2\,(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{3}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\frac{3}{5}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$(-3+2n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\left.\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)^2+$$

$$\left(6\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{1}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)$$

- **Problem 303: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (d\,\mathrm{Sec}[e+f\,x])^n\,(1+\mathrm{Sec}[e+f\,x])^{3/2}\,dx$$

Optimal (type 5, 117 leaves, 4 steps):

$$\frac{2\,(d\,\mathrm{Sec}[e+f\,x])^n\,\mathrm{Tan}[e+f\,x]}{f\,(1+2\,n)\,\sqrt{1+\mathrm{Sec}[e+f\,x]}}-\frac{(1+4\,n)\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\,n,\,1+n,\,\mathrm{Sec}[e+f\,x]\right]\,(d\,\mathrm{Sec}[e+f\,x])^n\,\mathrm{Tan}[e+f\,x]}{f\,n\,(1+2\,n)\,\sqrt{1-\mathrm{Sec}[e+f\,x]}\,\sqrt{1+\mathrm{Sec}[e+f\,x]}}$$

Result (type 5, 6381 leaves): Display of huge result suppressed!

Problem 304: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (d\,\mathrm{Sec}[e+f\,x])^n\,\sqrt{1+\mathrm{Sec}[e+f\,x]}\,dx$$

Optimal (type 5, 64 leaves, 2 steps):

$$-\frac{\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\,n,\,1+n,\,\mathrm{Sec}[e+f\,x]\right]\,(d\,\mathrm{Sec}[e+f\,x])^n\,\mathrm{Tan}[e+f\,x]}{f\,n\,\sqrt{1-\mathrm{Sec}[e+f\,x]}\,\sqrt{1+\mathrm{Sec}[e+f\,x]}}$$

Result (type 5, 213 leaves):

$$-\frac{1}{f\,n\,(1+n)}\,i\,2^{-\frac{1}{2}+n}\,e^{\frac{1}{2}\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^{-\frac{1}{2}+n}\,\left(e^{-i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)\right)^{\frac{1}{2}-n}\,\mathrm{Cos}[e+f\,x]^{\frac{1}{2}+n}$$
$$\left((1+n)\,\mathrm{Hypergeometric2F1}\left[\frac{n}{2},\,\frac{1}{2}+n,\,\frac{2+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]+e^{i\,(e+f\,x)}\,n\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}+n,\,\frac{1+n}{2},\,\frac{3+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,(d\,\mathrm{Sec}[e+f\,x])^n\,\sqrt{1+\mathrm{Sec}[e+f\,x]}$$

Problem 305: Result more than twice size of optimal antiderivative.

$$\int \frac{(d\,\mathrm{Sec}[e+f\,x])^n}{\sqrt{1+\mathrm{Sec}[e+f\,x]}}\,dx$$

Optimal (type 6, 73 leaves, 2 steps):

$$-\frac{\mathrm{AppellF1}\left[n,\,\frac{1}{2},\,1,\,1+n,\,\mathrm{Sec}[e+f\,x],\,-\mathrm{Sec}[e+f\,x]\right]\,(d\,\mathrm{Sec}[e+f\,x])^n\,\mathrm{Tan}[e+f\,x]}{f\,n\,\sqrt{1-\mathrm{Sec}[e+f\,x]}\,\sqrt{1+\mathrm{Sec}[e+f\,x]}}$$

Result (type 6, 2951 leaves):

$$\left(3\,\sqrt{2}\,\mathrm{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right.$$
$$\left.\left(\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^n\,\mathrm{Sec}[e+f\,x]^{-\frac{1}{2}-n+\frac{1}{2}\,(-1+2\,n)}\,(d\,\mathrm{Sec}[e+f\,x])^n\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\mathrm{Sec}[e+f\,x]\right)^n\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/$$
$$\left(f\,\left(3\,\mathrm{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\left(2\,(-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},\,-\frac{1}{2}+n,\,2-n,\,\frac{5}{2},\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.\right.\right.$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] + (-1+2n)\,\mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)$$

$$\Bigg(\bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Cos}[e+f x]\,\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}$$

$$\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^n\sqrt{1+\mathrm{Sec}[e+f x]}\bigg)\Big/\bigg(\sqrt{2}\,\Big(3\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$\Big(2(-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(-1+2n)\,\mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\bigg) -$$

$$\bigg(3\sqrt{2}\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^n$$

$$\sqrt{1+\mathrm{Sec}[e+f x]}\,\mathrm{Sin}[e+f x]\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\bigg)\Big/\bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$\Big(2(-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(-1+2n)\,\mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\bigg) +$$

$$\bigg(3\sqrt{2}\,n\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Cos}[e+f x]\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n$$

$$\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^n\sqrt{1+\mathrm{Sec}[e+f x]}\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\bigg)\Big/$$

$$\bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \Big(2(-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] + (-1+2n)\,\mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\bigg) +$$

$$\bigg(3\sqrt{2}\,\mathrm{Cos}[e+f x]\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^n\sqrt{1+\mathrm{Sec}[e+f x]}\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\Big(-\frac{1}{3}(1-n)\,\mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3}\left(-\frac{1}{2}+n\right)\mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\bigg)\Big/$$

$$\bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \Big(2(-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] + (-1+2n)\,\mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\bigg) -$$

$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\sqrt{1+\text{Sec}[e+fx]}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(\left(\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.\right.$$

$$\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\left(-\frac{1}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\left(2(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$

$$\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$(-1+2n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{3}{5}\left(\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\text{Tan}\left[\frac{1}{2}(e+fx)\right]\text{Tan}[e+fx]\right)\Big/$$

$$\left(\sqrt{2}\sqrt{1+\text{Sec}[e+fx]}\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\left(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{-1+n} \sqrt{1+\text{Sec}[e+f x]}\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]$$
$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right] \text{Sec}[e+f x] \text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x] \text{Tan}[e+f x]\right)\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)$$

- **Problem 306: Result more than twice size of optimal antiderivative.**

$$\int \frac{(d\,\text{Sec}[e+f x])^n}{(1+\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 6, 73 leaves, 2 steps) :

$$-\frac{\text{AppellF1}\left[n,\frac{1}{2},2,1+n,\text{Sec}[e+f x],-\text{Sec}[e+f x]\right](d\,\text{Sec}[e+f x])^n\,\text{Tan}[e+f x]}{f\,n\sqrt{1-\text{Sec}[e+f x]}\,\sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 6, 3003 leaves) :

$$\Bigg(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n$$
$$\text{Sec}[e+f x]^{\frac{1}{2}-n+\frac{1}{2}(-3+2n)}(d\,\text{Sec}[e+f x])^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Bigg/$$
$$\Bigg(f(1+\text{Sec}[e+f x])^{3/2}\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$
$$\Bigg(\Bigg(12\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}$$
$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)\Bigg/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(-3+2n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)+$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Cos}[e+f x]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^{1+n}$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^{\frac{3}{2}+n}\,\Big(-1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(-3+2n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)-$$

$$\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n\,\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^{\frac{3}{2}+n}$$

$$\text{Sin}[e+f x]\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\,\Big(-1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$(-3+2n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)+$$

$$\Big(6\,n\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Cos}[e+f x]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^{\frac{3}{2}+n}\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\,\Big(-1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(-3+2n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)+$$

$$\Big(6\,\text{Cos}[e+f x]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n\,\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^{\frac{3}{2}+n}\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]$$

$$\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{1}{3}\left(-\frac{3}{2}+n\right) \text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)$$

$$\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/ \Big(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$\Big(2(-1+n) \text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(-3+2 n) \text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-$$

$$\Big(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}[e+f x] \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{\frac{3}{2}+n} \text{Tan}\left[\frac{1}{2}(e+f x)\right] \left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2$$

$$\Big(\Big(2(-1+n) \text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(-3+2 n) \text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\Big(-\frac{1}{3}(1-n) \text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}\left(-\frac{3}{2}+n\right)$$

$$\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Big(2(-1+n)\Big(-\frac{3}{5}(2-n) \text{AppellF1}\left[\frac{5}{2},-\frac{3}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}\left(-\frac{3}{2}+n\right) \text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+$$

$$(-3+2 n)\Big(-\frac{3}{5}(1-n) \text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}\left(-\frac{1}{2}+n\right) \text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big)\Big)\Big) \Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\Big(2(-1+n) \text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2 n) \text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)^2+$$

$$\left(6\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$
$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{1}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$
$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\text{Tan}[e+fx]\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)$$

- **Problem 307: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+fx]^n\,(a+a\,\text{Sec}[e+fx])^{5/2}\,dx$$

Optimal (type 5, 177 leaves, 4 steps):

$$\frac{2a^3(7+4n)\text{Sec}[e+fx]^{1+n}\text{Sin}[e+fx]}{f(1+2n)(3+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}+\frac{2a^2\text{Sec}[e+fx]^{1+n}\sqrt{a+a\,\text{Sec}[e+fx]}\,\text{Sin}[e+fx]}{f(3+2n)}+$$
$$\frac{2a^3\left(3+24n+16n^2\right)\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1-\text{Sec}[e+fx]\right]\text{Tan}[e+fx]}{f(1+2n)(3+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 5, 435 leaves):

$$-\frac{1}{f\,\mathrm{Sec}[e+f x]^{5/2}}\,i\,2^{-\frac{5}{2}+n}\,e^{-i\left(\frac{1}{2}+n\right)(e+f x)}\left(\frac{e^{i(e+f x)}}{1+e^{2 i(e+f x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2 i(e+f x)}\right)^{\frac{1}{2}+n}$$
$$\left(\frac{10\,e^{i(2+n)(e+f x)}\,\mathrm{Hypergeometric2F1}\left[1+\frac{n}{2},\frac{5}{2}+n,2+\frac{n}{2},-e^{2 i(e+f x)}\right]}{2+n}+\frac{5\,e^{i(4+n)(e+f x)}\,\mathrm{Hypergeometric2F1}\left[2+\frac{n}{2},\frac{5}{2}+n,3+\frac{n}{2},-e^{2 i(e+f x)}\right]}{4+n}+\right.$$
$$\frac{e^{i n(e+f x)}\,\mathrm{Hypergeometric2F1}\left[\frac{n}{2},\frac{5}{2}+n,1+\frac{n}{2},-e^{2 i(e+f x)}\right]}{n}+\frac{5\,e^{i(1+n)(e+f x)}\,\mathrm{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{5}{2}+n,\frac{3+n}{2},-e^{2 i(e+f x)}\right]}{1+n}+$$
$$\frac{10\,e^{i(3+n)(e+f x)}\,\mathrm{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{3+n}{2},\frac{5+n}{2},-e^{2 i(e+f x)}\right]}{3+n}+$$
$$\left.\frac{e^{i(5+n)(e+f x)}\,\mathrm{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{5+n}{2},\frac{7+n}{2},-e^{2 i(e+f x)}\right]}{5+n}\right)\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^5\,(a\,(1+\mathrm{Sec}[e+f x]))^{5/2}$$

- **Problem 308: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[e+f x]^n\,(a+a\,\mathrm{Sec}[e+f x])^{3/2}\,dx$$

Optimal (type 5, 108 leaves, 4 steps):

$$\frac{2\,a^2\,\mathrm{Sec}[e+f x]^{1+n}\,\mathrm{Sin}[e+f x]}{f\,(1+2 n)\,\sqrt{a+a\,\mathrm{Sec}[e+f x]}}+\frac{2\,a^2\,(1+4 n)\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1-\mathrm{Sec}[e+f x]\right]\mathrm{Tan}[e+f x]}{f\,(1+2 n)\,\sqrt{a+a\,\mathrm{Sec}[e+f x]}}$$

Result (type 5, 6369 leaves): Display of huge result suppressed!

- **Problem 309: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[e+f x]^n\,\sqrt{a+a\,\mathrm{Sec}[e+f x]}\,dx$$

Optimal (type 5, 48 leaves, 2 steps):

$$\frac{2\,a\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1-\mathrm{Sec}[e+f x]\right]\mathrm{Tan}[e+f x]}{f\,\sqrt{a+a\,\mathrm{Sec}[e+f x]}}$$

Result (type 5, 213 leaves):

$$-\frac{1}{f\,n\,(1+n)}\,i\,2^{-\frac{1}{2}+n}\,e^{\frac{1}{2} i(e+f x)}\left(1+e^{2 i(e+f x)}\right)^{-\frac{1}{2}+n}\left(e^{-i(e+f x)}\left(1+e^{2 i(e+f x)}\right)\right)^{\frac{1}{2}-n}\mathrm{Cos}[e+f x]^{\frac{1}{2}+n}$$
$$\left((1+n)\,\mathrm{Hypergeometric2F1}\left[\frac{n}{2},\frac{1}{2}+n,\frac{2+n}{2},-e^{2 i(e+f x)}\right]+e^{i(e+f x)}\,n\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}+n,\frac{1+n}{2},\frac{3+n}{2},-e^{2 i(e+f x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]\mathrm{Sec}[e+f x]^n\,\sqrt{a\,(1+\mathrm{Sec}[e+f x])}$$

Problem 310: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]^n}{\sqrt{a+a\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 6, 61 leaves, 4 steps):

$$\frac{\text{AppellF1}\left[\frac{1}{2},1-n,1,\frac{3}{2},1-\text{Sec}[e+f x],\frac{1}{2}(1-\text{Sec}[e+f x])\right]\text{Tan}[e+f x]}{f\sqrt{a+a\,\text{Sec}[e+f x]}}$$

Result (type 6, 2964 leaves):

$$\Big(3\sqrt{2}\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$
$$\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n\,\text{Sec}[e+f x]^{-\frac{1}{2}+\frac{1}{2}(-1+2n)}\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\text{Sec}[e+f x]\Big)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big/$$
$$\Big(f\sqrt{a(1+\text{Sec}[e+f x])}\,\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$
$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$
$$(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)$$
$$\Big(\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\text{Cos}[e+f x]\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^{1+n}$$
$$\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\text{Sec}[e+f x]\Big)^n\sqrt{1+\text{Sec}[e+f x]}\Big)\Big/\Big(\sqrt{2}\,\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$
$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$
$$(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)-$$
$$\Big(3\sqrt{2}\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big(\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^n\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\text{Sec}[e+f x]\Big)^n$$
$$\sqrt{1+\text{Sec}[e+f x]}\,\text{Sin}[e+f x]\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$
$$\Big(2(-1+n)\,\text{AppellF1}\Big[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$
$$(-1+2n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)+$$

$$\left(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\sqrt{2}\,\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{1}{3}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}\left(-\frac{1}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(2(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$(-1+2n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\frac{3}{5}\left(\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\Bigg(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-1+2n)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)^2+$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\text{Tan}\left[\frac{1}{2}(e+fx)\right]\text{Tan}[e+fx]\Bigg)\Bigg/$$

$$\Bigg(\sqrt{2}\,\sqrt{1+\text{Sec}[e+fx]}\;\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$\Bigg(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(-1+2n)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+n}\sqrt{1+\text{Sec}[e+fx]}\;\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$\Bigg(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(-1+2n)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)\Bigg)$$

- **Problem 311: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+fx]^n}{(a+a\,\text{Sec}[e+fx])^{3/2}}\,dx$$

Optimal (type 6, 67 leaves, 4 steps):

$$\frac{\text{AppellF1}\left[\frac{1}{2},1-n,2,\frac{3}{2},1-\text{Sec}[e+fx],\frac{1}{2}(1-\text{Sec}[e+fx])\right]\text{Tan}[e+fx]}{2\,a\,f\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 6, 2992 leaves):

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$
$$\left.\text{Sec}[e+fx]^{\frac{1}{2}+\frac{1}{2}(-3+2n)}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/$$
$$\left(f\,(a\,(1+\text{Sec}[e+fx]))^{3/2}\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$
$$\left(\left(12\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{1+n}\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{1+n}\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$
$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\right.$$
$$\left.\text{Sin}[e+fx]\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\left(6\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\left(6\,\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\frac{1}{3}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-$$

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2$$

$$\left(\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\left(-\frac{3}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\left(2(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{3}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$

$$\left.\frac{3}{5}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$(-3+2n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\left.\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$

$$\left(6\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{1}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)$$

- **Problem 312: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+fx])^n\,(a+a\,\text{Sec}[e+fx])^{3/2}\,dx$$

Optimal (type 5, 130 leaves, 5 steps):

$$\left(2\,a^2\,(1+4\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,1-n,\,\frac{3}{2},\,1-\text{Sec}[e+f\,x]\right]\,(-\text{Sec}[e+f\,x])^n\,\text{Sec}[e+f\,x]^{1-n}\,\text{Sin}[e+f\,x]\right)\Big/\left(f\,(1+2\,n)\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\right)+$$
$$\frac{2\,a^2\,(-\text{Sec}[e+f\,x])^n\,\text{Tan}[e+f\,x]}{f\,(1+2\,n)\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 5, 6383 leaves) : Display of huge result suppressed!

- **Problem 313: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+f\,x])^n\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 5, 70 leaves, 3 steps) :

$$\frac{2\,a\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,1-n,\,\frac{3}{2},\,1-\text{Sec}[e+f\,x]\right]\,(-\text{Sec}[e+f\,x])^n\,\text{Sec}[e+f\,x]^{1-n}\,\text{Sin}[e+f\,x]}{f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 5, 215 leaves) :

$$-\frac{1}{f\,n\,(1+n)}\,i\,2^{-\frac{1}{2}+n}\,e^{\frac{1}{2}\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^{-\frac{1}{2}+n}\,\left(e^{-i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)\right)^{\frac{1}{2}-n}\,\text{Cos}[e+f\,x]^{\frac{1}{2}+n}$$
$$\left((1+n)\,\text{Hypergeometric2F1}\left[\frac{n}{2},\,\frac{1}{2}+n,\,\frac{2+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]+e^{i\,(e+f\,x)}\,n\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\,\frac{1+n}{2},\,\frac{3+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,(-\text{Sec}[e+f\,x])^n\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}$$

- **Problem 314: Result more than twice size of optimal antiderivative.**

$$\int\frac{(-\text{Sec}[e+f\,x])^n}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 6, 75 leaves, 3 steps) :

$$-\frac{\text{AppellF1}\left[n,\,\frac{1}{2},\,1,\,1+n,\,\text{Sec}[e+f\,x],\,-\text{Sec}[e+f\,x]\right]\,(-\text{Sec}[e+f\,x])^n\,\text{Tan}[e+f\,x]}{f\,n\,\sqrt{1-\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 6, 2977 leaves) :

$$\left(3\,\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\left(\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^n\right.$$
$$(-\text{Sec}[e+f\,x])^n\,\text{Sec}[e+f\,x]^{-\frac{1}{2}-n+\frac{1}{2}\,(-1+2\,n)}\,\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]\right)^n\,\sqrt{1+\text{Sec}[e+f\,x]}\,\left.\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/$$
$$\left(f\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\right.\right.$$
$$\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{1}{2}+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\right.$$

$$(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)$$

$$\Bigg(\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\sqrt{1+\text{Sec}[e+fx]}\Bigg)\Bigg/\Bigg(\sqrt{2}\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)-$$

$$\Bigg(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n$$

$$\sqrt{1+\text{Sec}[e+fx]}\,\text{Sin}[e+fx]\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg/\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)+$$

$$\Bigg(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\sqrt{1+\text{Sec}[e+fx]}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)+$$

$$\Bigg(3\sqrt{2}\,\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\sqrt{1+\text{Sec}[e+fx]}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\Bigg(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{1}{3}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\Bigg(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)-$$

$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\sqrt{1+\text{Sec}[e+fx]}\;\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\left(-\frac{1}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\left(2(-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$

$$\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$(-1+2n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{3}{5}\left(\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^n\text{Tan}\left[\frac{1}{2}(e+fx)\right]\text{Tan}[e+fx]\right)\Big/$$

$$\left(\sqrt{2}\sqrt{1+\text{Sec}[e+fx]}\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\left(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2 \text{Sec}[e+fx]\right)^{-1+n} \sqrt{1+\text{Sec}[e+fx]}\ \text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right] \text{Sec}[e+fx]\ \text{Sin}\left[\frac{1}{2}(e+fx)\right] + \text{Cos}\left[\frac{1}{2}(e+fx)\right]^2 \text{Sec}[e+fx]\ \text{Tan}[e+fx]\right)\Bigg)\Bigg) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + \right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + \right.$$

$$\left.\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Bigg)\Bigg)$$

- **Problem 315: Result more than twice size of optimal antiderivative.**

$$\int \frac{(-\text{Sec}[e+fx])^n}{(a+a\,\text{Sec}[e+fx])^{3/2}}\, dx$$

Optimal (type 6, 78 leaves, 3 steps):

$$-\frac{\text{AppellF1}\left[n, \frac{1}{2}, 2, 1+n, \text{Sec}[e+fx], -\text{Sec}[e+fx]\right] (-\text{Sec}[e+fx])^n\, \text{Tan}[e+fx]}{a\,f\,n\,\sqrt{1-\text{Sec}[e+fx]}\ \sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 6, 3005 leaves):

$$\left(6\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left.(-\text{Sec}[e+fx])^n\, \text{Sec}[e+fx]^{\frac{1}{2}-n+\frac{1}{2}(-3+2n)} \left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2 \text{Sec}[e+fx]\right)^{\frac{3}{2}+n} \text{Tan}\left[\frac{1}{2}(e+fx)\right] \left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right) \Big/$$

$$\left(f\,(a\,(1+\text{Sec}[e+fx]))^{3/2} \left(3\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + \right.\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{3}{2}+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + \right.$$

$$\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$

$$\left(\left(12\,\text{AppellF1}\left[\frac{1}{2}, -\frac{3}{2}+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] \text{Cos}[e+fx] \left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{1+n}\right.\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2 \text{Sec}[e+fx]\right)^{\frac{3}{2}+n} \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2 \left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\right.$$

$$\left.\text{Sin}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(6\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(6\,\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\frac{1}{3}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)$$

$$\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Bigg/\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$\Bigg(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)-$$

$$\Bigg(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$

$$\Bigg(\Bigg(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$3\Bigg(-\frac{1}{3}(1-n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\left(-\frac{3}{2}+n\right)$$

$$\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\Bigg(2(-1+n)\Bigg(-\frac{3}{5}(2-n)\text{AppellF1}\left[\frac{5}{2},-\frac{3}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{3}{5}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+$$

$$(-3+2n)\Bigg(-\frac{3}{5}(1-n)\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\Bigg(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)^2+$$

$$\left(6\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{1}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\text{Tan}[e+fx]\right)\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$

- **Problem 316: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(d\,\text{Sec}[e+fx])^n(a+a\,\text{Sec}[e+fx])^{3/2}\,dx$$

Optimal (type 5, 130 leaves, 5 steps):

$$\left(2a^2(1+4n)\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1-\text{Sec}[e+fx]\right]\text{Sec}[e+fx]^{1-n}(d\,\text{Sec}[e+fx])^n\text{Sin}[e+fx]\right)\Big/\left(f(1+2n)\sqrt{a+a\,\text{Sec}[e+fx]}\right)+\frac{2a^2(d\,\text{Sec}[e+fx])^n\text{Tan}[e+fx]}{f(1+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 5, 6383 leaves): Display of huge result suppressed!

- **Problem 317: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(d\,\text{Sec}[e+fx])^n\sqrt{a+a\,\text{Sec}[e+fx]}\,dx$$

Optimal (type 5, 70 leaves, 3 steps):

$$\frac{2a\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1-\text{Sec}[e+fx]\right]\text{Sec}[e+fx]^{1-n}(d\,\text{Sec}[e+fx])^n\text{Sin}[e+fx]}{f\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 5, 215 leaves):

$$-\frac{1}{f\, n\, (1+n)} i\, 2^{-\frac{1}{2}+n} e^{\frac{1}{2} i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^{-\frac{1}{2}+n} \left(e^{-i (e+f x)} \left(1+e^{2 i (e+f x)}\right)\right)^{\frac{1}{2}-n} \mathrm{Cos}[e+f x]^{\frac{1}{2}+n}$$
$$\left((1+n)\, \mathrm{Hypergeometric2F1}\left[\frac{n}{2}, \frac{1}{2}+n, \frac{2+n}{2}, -e^{2 i (e+f x)}\right] + e^{i (e+f x)} n\, \mathrm{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1+n}{2}, \frac{3+n}{2}, -e^{2 i (e+f x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{1}{2} (e+f x)\right] (d\, \mathrm{Sec}[e+f x])^n \sqrt{a (1+\mathrm{Sec}[e+f x])}$$

Problem 318: Result more than twice size of optimal antiderivative.

$$\int \frac{(d\, \mathrm{Sec}[e+f x])^n}{\sqrt{a+a\, \mathrm{Sec}[e+f x]}} \, dx$$

Optimal (type 6, 75 leaves, 3 steps):

$$-\frac{\mathrm{AppellF1}\left[n, \frac{1}{2}, 1, 1+n, \mathrm{Sec}[e+f x], -\mathrm{Sec}[e+f x]\right] (d\, \mathrm{Sec}[e+f x])^n \mathrm{Tan}[e+f x]}{f\, n \sqrt{1-\mathrm{Sec}[e+f x]} \sqrt{a+a\, \mathrm{Sec}[e+f x]}}$$

Result (type 6, 2977 leaves):

$$\left(3 \sqrt{2}\, \mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\mathrm{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^n\right.$$
$$\left.\mathrm{Sec}[e+f x]^{-\frac{1}{2}-n+\frac{1}{2} (-1+2 n)} (d\, \mathrm{Sec}[e+f x])^n \left(\mathrm{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^n \sqrt{1+\mathrm{Sec}[e+f x]}\, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]\right) \Big/$$
$$\left(f \sqrt{a (1+\mathrm{Sec}[e+f x])} \left(3\, \mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + \right.\right.$$
$$\left(2 (-1+n)\, \mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + \right.$$
$$\left.\left.(-1+2 n)\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)$$
$$\left(\left(\left(3\, \mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \mathrm{Cos}[e+f x] \left(\mathrm{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^{1+n}\right.\right.\right.$$
$$\left.\left(\mathrm{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^n \sqrt{1+\mathrm{Sec}[e+f x]}\right) \Big/ \left(\sqrt{2} \left(3\, \mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + \right.\right.$$
$$\left(2 (-1+n)\, \mathrm{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}+n, 2-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + \right.$$
$$\left.\left.\left.(-1+2 n)\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{2}+n, 1-n, \frac{5}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)\right) -$$
$$\left(3 \sqrt{2}\, \mathrm{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}+n, 1-n, \frac{3}{2}, \mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\mathrm{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\mathrm{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^n \left(\mathrm{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^n\right.$$

$$\sqrt{1+\text{Sec}[e+f x]}\ \text{Sin}[e+f x]\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg/\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\sqrt{2}\,\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{1}{3}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Bigg/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(3\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^n\sqrt{1+\text{Sec}[e+f x]}\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(\left(2(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(-1+2n)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}\left(-\frac{1}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Big(2\,(-1+n)\,\Big(-\frac{3}{5}\,(2-n)\,\text{AppellF1}\left[\frac{5}{2},\,-\frac{1}{2}+n,\,3-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+$$

$$\frac{3}{5}\,\left(-\frac{1}{2}+n\right)\,\text{AppellF1}\left[\frac{5}{2},\,\frac{1}{2}+n,\,2-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Big)+$$

$$(-1+2\,n)\,\Big(-\frac{3}{5}\,(1-n)\,\text{AppellF1}\left[\frac{5}{2},\,\frac{1}{2}+n,\,2-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+$$

$$\frac{3}{5}\,\left(\frac{1}{2}+n\right)\,\text{AppellF1}\left[\frac{5}{2},\,\frac{3}{2}+n,\,1-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\Big(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{1}{2}+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(-1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big)^2+$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\left(\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]\right)^n\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Tan}[e+f\,x]\Big)\Big/$$

$$\Big(\sqrt{2}\,\sqrt{1+\text{Sec}[e+f\,x]}\,\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$\Big(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{1}{2}+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$(-1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big)\Big)+$$

$$\Big(3\,\sqrt{2}\,n\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}[e+f\,x]\,\left(\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]\right)^{-1+n}\,\sqrt{1+\text{Sec}[e+f\,x]}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]\right)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{1}{2}+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$\Big(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{1}{2}+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$(-1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big)\Big)\Big)$$

- **Problem 319: Result more than twice size of optimal antiderivative.**

$$\int \frac{(d\,\text{Sec}[e+f\,x])^n}{(a+a\,\text{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 6, 78 leaves, 3 steps):

$$-\frac{\text{AppellF1}\left[n,\frac{1}{2},2,1+n,\text{Sec}[e+f\,x],-\text{Sec}[e+f\,x]\right]\,(d\,\text{Sec}[e+f\,x])^n\,\text{Tan}[e+f\,x]}{a\,f\,n\,\sqrt{1-\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 6, 3005 leaves):

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^n\right.$$
$$\left.\text{Sec}[e+f\,x]^{\frac{1}{2}-n+\frac{1}{2}(-3+2\,n)}\,(d\,\text{Sec}[e+f\,x])^n\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\right)\Big/$$
$$\left(f\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.\right.$$
$$\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.$$
$$\left.\left.(-3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)$$
$$\left(\left(12\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}[e+f\,x]\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{1+n}\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(-3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)+$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}[e+f\,x]\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{1+n}\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\right)^{\frac{3}{2}+n}\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\left(2\,(-1+n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.$$

$$-\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2] + (-3+2 n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{1}{2}+n, 1-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]) \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2) -$$

$$(6\, \mathrm{AppellF1}\left[\tfrac{1}{2}, -\tfrac{3}{2}+n, 1-n, \tfrac{3}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] \left(\mathrm{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^n \left(\mathrm{Cos}\left[\tfrac{1}{2}(e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^{\frac{3}{2}+n}$$

$$\mathrm{Sin}[e+f x]\, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right] \left(-1+\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^2) \Big/ (3\, \mathrm{AppellF1}\left[\tfrac{1}{2}, -\tfrac{3}{2}+n, 1-n, \tfrac{3}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] +$$

$$(2(-1+n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{3}{2}+n, 2-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] +$$

$$(-3+2 n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{1}{2}+n, 1-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]) \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2) +$$

$$(6 n\, \mathrm{AppellF1}\left[\tfrac{1}{2}, -\tfrac{3}{2}+n, 1-n, \tfrac{3}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] \mathrm{Cos}[e+f x] \left(\mathrm{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^n$$

$$\left(\mathrm{Cos}\left[\tfrac{1}{2}(e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^{\frac{3}{2}+n} \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2 \left(-1+\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^2) \Big/$$

$$(3\, \mathrm{AppellF1}\left[\tfrac{1}{2}, -\tfrac{3}{2}+n, 1-n, \tfrac{3}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] + (2(-1+n)\, \mathrm{AppellF1}[\tfrac{3}{2}, -\tfrac{3}{2}+n, 2-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2] + (-3+2 n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{1}{2}+n, 1-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]) \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2) +$$

$$(6\, \mathrm{Cos}[e+f x] \left(\mathrm{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^n \left(\mathrm{Cos}\left[\tfrac{1}{2}(e+f x)\right]^2 \mathrm{Sec}[e+f x]\right)^{\frac{3}{2}+n} \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]$$

$$(-\tfrac{1}{3}(1-n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{3}{2}+n, 2-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] \mathrm{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2 \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right] +$$

$$\tfrac{1}{3}\left(-\tfrac{3}{2}+n\right) \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{1}{2}+n, 1-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] \mathrm{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2 \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right])$$

$$\left(-1+\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^2) \Big/ (3\, \mathrm{AppellF1}\left[\tfrac{1}{2}, -\tfrac{3}{2}+n, 1-n, \tfrac{3}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] +$$

$$(2(-1+n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{3}{2}+n, 2-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] +$$

$$(-3+2 n)\, \mathrm{AppellF1}\left[\tfrac{3}{2}, -\tfrac{1}{2}+n, 1-n, \tfrac{5}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right]) \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2) -$$

$$(6\, \mathrm{AppellF1}\left[\tfrac{1}{2}, -\tfrac{3}{2}+n, 1-n, \tfrac{3}{2}, \mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2, -\mathrm{Tan}\left[\tfrac{1}{2}(e+f x)\right]^2\right] \mathrm{Cos}[e+f x] \left(\mathrm{Sec}\left[\tfrac{1}{2}(e+f x)\right]^2\right)^n$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{3}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$

$$\left(\left(\left(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.\right.$$

$$\left.(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\left(-\frac{3}{2}+n\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\left(2(-1+n)\left(-\frac{3}{5}(2-n)\text{AppellF1}\left[\frac{5}{2},-\frac{3}{2}+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$

$$\left.\frac{3}{5}\left(-\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$(-3+2n)\left(-\frac{3}{5}(1-n)\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\left.\left.\left.\frac{3}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(-3+2n)\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$

$$\left(6\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}[e+fx]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{1}{2}+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-\frac{3}{2}+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left(2(-1+n)\text{AppellF1}\left[\frac{3}{2},-\frac{3}{2}+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$(-3+2n)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)\Bigg)$$

- **Problem 320: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+fx])^n\,(a-a\,\text{Sec}[e+fx])^{5/2}\,dx$$

Optimal (type 5, 178 leaves, 4 steps):

$$\frac{2a^3\left(3+24n+16n^2\right)\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1+\text{Sec}[e+fx]\right]\text{Tan}[e+fx]}{f(1+2n)(3+2n)\sqrt{a-a\,\text{Sec}[e+fx]}}+$$
$$\frac{2a^3(7+4n)(-\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f(1+2n)(3+2n)\sqrt{a-a\,\text{Sec}[e+fx]}}+\frac{2a^2(-\text{Sec}[e+fx])^n\sqrt{a-a\,\text{Sec}[e+fx]}\,\text{Tan}[e+fx]}{f(3+2n)}$$

Result (type 5, 455 leaves):

$$\frac{1}{f}2^{-\frac{5}{2}+n}e^{\frac{1}{2}i(e+f(1-2n)x)}\left(\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}}\right)^{-\frac{1}{2}+n}\left(1+e^{2i(e+fx)}\right)^{-\frac{1}{2}+n}\text{Csc}\left[\frac{1}{2}(e+fx)\right]^5$$
$$\left(\frac{e^{ifnx}\,\text{Hypergeometric2F1}\left[\frac{n}{2},\frac{5}{2}+n,\frac{2+n}{2},-e^{2i(e+fx)}\right]}{n}-\frac{5e^{i(e+f(1+n)x)}\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{5}{2}+n,\frac{3+n}{2},-e^{2i(e+fx)}\right]}{1+n}+\right.$$
$$\frac{10e^{i(2e+f(2+n)x)}\,\text{Hypergeometric2F1}\left[\frac{2+n}{2},\frac{5}{2}+n,\frac{4+n}{2},-e^{2i(e+fx)}\right]}{2+n}-\frac{10e^{i(3e+f(3+n)x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{3+n}{2},\frac{5+n}{2},-e^{2i(e+fx)}\right]}{3+n}+$$
$$\left.\frac{5e^{i(4e+f(4+n)x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{4+n}{2},\frac{6+n}{2},-e^{2i(e+fx)}\right]}{4+n}-\frac{e^{i(5e+f(5+n)x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{5+n}{2},\frac{7+n}{2},-e^{2i(e+fx)}\right]}{5+n}\right)$$
$$(-\text{Sec}[e+fx])^n\,\text{Sec}[e+fx]^{-\frac{5}{2}-n}\,(a-a\,\text{Sec}[e+fx])^{5/2}$$

- **Problem 321: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+fx])^n\,(a-a\,\text{Sec}[e+fx])^{3/2}\,dx$$

Optimal (type 5, 108 leaves, 4 steps):

$$\frac{2a^2(1+4n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1+\text{Sec}[e+fx]\right]\text{Tan}[e+fx]}{f(1+2n)\sqrt{a-a\,\text{Sec}[e+fx]}}+\frac{2a^2(-\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f(1+2n)\sqrt{a-a\,\text{Sec}[e+fx]}}$$

Result (type 5, 377 leaves):

$$\frac{1}{f\,n\,(1+n)\,(2+n)\,(3+n)}2^{-\frac{3}{2}+n}\,e^{\frac{1}{2}\,i\,(e+f\,(1-2\,n)\,x)}\left(\frac{e^{i\,(e+f\,x)}}{1+e^{2\,i\,(e+f\,x)}}\right)^{-\frac{1}{2}+n}\left(1+e^{2\,i\,(e+f\,x)}\right)^{-\frac{1}{2}+n}$$
$$\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3\left(-e^{i\,f\,n\,x}\,\left(6+11\,n+6\,n^2+n^3\right)\,\text{Hypergeometric2F1}\left[\frac{n}{2},\,\frac{3}{2}+n,\,\frac{2+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]+\right.$$
$$3\,e^{i\,(e+f\,(1+n)\,x)}\,n\,\left(6+5\,n+n^2\right)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,\frac{3}{2}+n,\,\frac{3+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]+$$
$$e^{2\,i\,e}\,n\,(1+n)\,\left(-3\,e^{i\,f\,(2+n)\,x}\,(3+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\,\frac{2+n}{2},\,\frac{4+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]+\right.$$
$$\left.\left.e^{i\,(e+f\,(3+n)\,x)}\,(2+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\,\frac{3+n}{2},\,\frac{5+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]\right)\right)\,(-\text{Sec}[e+f\,x])^n\,\text{Sec}[e+f\,x]^{-\frac{3}{2}-n}\,(a-a\,\text{Sec}[e+f\,x])^{3/2}$$

- **Problem 322: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(-\text{Sec}[e+f\,x])^n\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\;dx$$

Optimal (type 5, 47 leaves, 2 steps):

$$\frac{2\,a\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,1-n,\,\frac{3}{2},\,1+\text{Sec}[e+f\,x]\right]\,\text{Tan}[e+f\,x]}{f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}$$

Result (type 5, 236 leaves):

$$\frac{1}{f\,n\,(1+n)}2^{-\frac{1}{2}+n}\,e^{-\frac{1}{2}\,i\,(e+f\,(1+2\,n)\,x)}\left(\frac{e^{i\,(e+f\,x)}}{1+e^{2\,i\,(e+f\,x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2\,i\,(e+f\,x)}\right)^{\frac{1}{2}+n}\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]$$
$$\left(e^{i\,f\,n\,x}\,(1+n)\,\text{Hypergeometric2F1}\left[\frac{n}{2},\,\frac{1}{2}+n,\,\frac{2+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]-e^{i\,(e+f\,(1+n)\,x)}\,n\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\,\frac{1+n}{2},\,\frac{3+n}{2},\,-e^{2\,i\,(e+f\,x)}\right]\right)$$
$$(-\text{Sec}[e+f\,x])^n\,\text{Sec}[e+f\,x]^{-\frac{1}{2}-n}\,\sqrt{a-a\,\text{Sec}[e+f\,x]}$$

- **Problem 323: Unable to integrate problem.**

$$\int\frac{(-\text{Sec}[e+f\,x])^n}{\sqrt{a-a\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 6, 58 leaves, 4 steps):

$$\frac{\text{AppellF1}\left[\frac{1}{2},\,1-n,\,1,\,\frac{3}{2},\,1+\text{Sec}[e+f\,x],\,\frac{1}{2}\,(1+\text{Sec}[e+f\,x])\right]\,\text{Tan}[e+f\,x]}{f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}$$

Result (type 8, 28 leaves):

$$\int\frac{(-\text{Sec}[e+f\,x])^n}{\sqrt{a-a\,\text{Sec}[e+f\,x]}}\,dx$$

- **Problem 324: Unable to integrate problem.**

$$\int \frac{(-\text{Sec}[e+f x])^n}{(a-a\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 6, 64 leaves, 4 steps):

$$\frac{\text{AppellF1}\left[\frac{1}{2},1-n,2,\frac{3}{2},1+\text{Sec}[e+f x],\frac{1}{2}(1+\text{Sec}[e+f x])\right]\text{Tan}[e+f x]}{2 a f\sqrt{a-a\,\text{Sec}[e+f x]}}$$

Result (type 8, 28 leaves):

$$\int \frac{(-\text{Sec}[e+f x])^n}{(a-a\,\text{Sec}[e+f x])^{3/2}}\,dx$$

- **Problem 325: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f x]^n\,(a-a\,\text{Sec}[e+f x])^{3/2}\,dx$$

Optimal (type 5, 130 leaves, 5 steps):

$$\frac{2 a^2\,\text{Sec}[e+f x]^{1+n}\,\text{Sin}[e+f x]}{f(1+2n)\sqrt{a-a\,\text{Sec}[e+f x]}}+$$
$$\left(2 a^2 (1+4n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1+\text{Sec}[e+f x]\right](-\text{Sec}[e+f x])^{-n}\,\text{Sec}[e+f x]^{1+n}\,\text{Sin}[e+f x]\right)\Big/\left(f(1+2n)\sqrt{a-a\,\text{Sec}[e+f x]}\right)$$

Result (type 5, 366 leaves):

$$\frac{1}{f n (1+n)(2+n)(3+n)\,\text{Sec}[e+f x]^{3/2}}\,2^{-\frac{3}{2}+n}\,e^{\frac{1}{2} i (e+f(1-2n)x)}\left(\frac{e^{i(e+f x)}}{1+e^{2 i (e+f x)}}\right)^{-\frac{1}{2}+n}$$
$$\left(1+e^{2 i (e+f x)}\right)^{-\frac{1}{2}+n}\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\left(-e^{i f n x}\left(6+11n+6n^2+n^3\right)\text{Hypergeometric2F1}\left[\frac{n}{2},\frac{3}{2}+n,\frac{2+n}{2},-e^{2 i (e+f x)}\right]+\right.$$
$$3 e^{i(e+f(1+n)x)}\,n\left(6+5n+n^2\right)\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{3}{2}+n,\frac{3+n}{2},-e^{2 i (e+f x)}\right]+$$
$$e^{2 i e}\,n(1+n)\left(-3 e^{i f(2+n)x}(3+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{2+n}{2},\frac{4+n}{2},-e^{2 i (e+f x)}\right]+\right.$$
$$\left.\left.e^{i(e+f(3+n)x)}(2+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{3+n}{2},\frac{5+n}{2},-e^{2 i (e+f x)}\right]\right)\right)(a-a\,\text{Sec}[e+f x])^{3/2}$$

- **Problem 326: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f x]^n\sqrt{a-a\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 5, 69 leaves, 3 steps):

$$\frac{2\,a\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1+\text{Sec}[e+f\,x]\right]\,(-\text{Sec}[e+f\,x])^{-n}\,\text{Sec}[e+f\,x]^{1+n}\,\text{Sin}[e+f\,x]}{f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}$$

Result (type 5, 222 leaves) :

$$\frac{1}{f\,n\,(1+n)\,\sqrt{\text{Sec}[e+f\,x]}}2^{-\frac{1}{2}+n}\,e^{-\frac{1}{2}\,i\,(e+f\,(1+2\,n)\,x)}\,\left(\frac{e^{i\,(e+f\,x)}}{1+e^{2\,i\,(e+f\,x)}}\right)^{\frac{1}{2}+n}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^{\frac{1}{2}+n}\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]$$
$$\left(e^{i\,f\,n\,x}\,(1+n)\,\text{Hypergeometric2F1}\left[\frac{n}{2},\frac{1}{2}+n,\frac{2+n}{2},-e^{2\,i\,(e+f\,x)}\right]-e^{i\,(e+f\,(1+n)\,x)}\,n\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\frac{1+n}{2},\frac{3+n}{2},-e^{2\,i\,(e+f\,x)}\right]\right)$$
$$\sqrt{a-a\,\text{Sec}[e+f\,x]}$$

Problem 327: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (d\,\text{Sec}[e+f\,x])^n\,(a-a\,\text{Sec}[e+f\,x])^{3/2}\,dx$$

Optimal (type 5, 130 leaves, 5 steps) :

$$\frac{2\,a^2\,(d\,\text{Sec}[e+f\,x])^n\,\text{Tan}[e+f\,x]}{f\,(1+2\,n)\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}+$$
$$\left(2\,a^2\,(1+4\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-n,\frac{3}{2},1+\text{Sec}[e+f\,x]\right]\,(-\text{Sec}[e+f\,x])^{-n}\,(d\,\text{Sec}[e+f\,x])^n\,\text{Tan}[e+f\,x]\right)\Big/$$
$$\left(f\,(1+2\,n)\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\right)$$

Result (type 5, 377 leaves) :

$$\frac{1}{f\,n\,(1+n)\,(2+n)\,(3+n)}2^{-\frac{3}{2}+n}\,e^{\frac{1}{2}\,i\,(e+f\,(1-2\,n)\,x)}\,\left(\frac{e^{i\,(e+f\,x)}}{1+e^{2\,i\,(e+f\,x)}}\right)^{-\frac{1}{2}+n}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^{-\frac{1}{2}+n}$$
$$\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,\left(-e^{i\,f\,n\,x}\,\left(6+11\,n+6\,n^2+n^3\right)\,\text{Hypergeometric2F1}\left[\frac{n}{2},\frac{3}{2}+n,\frac{2+n}{2},-e^{2\,i\,(e+f\,x)}\right]+\right.$$
$$3\,e^{i\,(e+f\,(1+n)\,x)}\,n\,\left(6+5\,n+n^2\right)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{3}{2}+n,\frac{3+n}{2},-e^{2\,i\,(e+f\,x)}\right]+$$
$$e^{2\,i\,e}\,n\,(1+n)\,\left(-3\,e^{i\,f\,(2+n)\,x}\,(3+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{2+n}{2},\frac{4+n}{2},-e^{2\,i\,(e+f\,x)}\right]+\right.$$
$$\left.\left.e^{i\,(e+f\,(3+n)\,x)}\,(2+n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{3+n}{2},\frac{5+n}{2},-e^{2\,i\,(e+f\,x)}\right]\right)\right)\,\text{Sec}[e+f\,x]^{-\frac{3}{2}-n}\,(d\,\text{Sec}[e+f\,x])^n\,(a-a\,\text{Sec}[e+f\,x])^{3/2}$$

Problem 328: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (d\,\text{Sec}[e+f\,x])^n\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 5, 69 leaves, 3 steps) :

$$\frac{2\, a\, \text{Hypergeometric2F1}\left[\frac{1}{2}, 1-n, \frac{3}{2}, 1+\text{Sec}[e+f x]\right] (-\text{Sec}[e+f x])^{-n} (d\, \text{Sec}[e+f x])^n \text{Tan}[e+f x]}{f \sqrt{a-a\, \text{Sec}[e+f x]}}$$

Result (type 5, 236 leaves):

$$\frac{1}{f\, n\, (1+n)} 2^{-\frac{1}{2}+n} e^{-\frac{1}{2} i (e+f (1+2 n) x)} \left(\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}\right)^{\frac{1}{2}+n} \left(1+e^{2 i (e+f x)}\right)^{\frac{1}{2}+n} \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right] \left(e^{i f n x} (1+n)\, \text{Hypergeometric2F1}\left[\frac{n}{2}, \frac{1}{2}+n, \frac{2+n}{2}, -e^{2 i (e+f x)}\right] - e^{i (e+f (1+n) x)} n\, \text{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1+n}{2}, \frac{3+n}{2}, -e^{2 i (e+f x)}\right]\right) \text{Sec}[e+f x]^{-\frac{1}{2}-n} (d\, \text{Sec}[e+f x])^n \sqrt{a-a\, \text{Sec}[e+f x]}$$

Problem 329: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^n (1+\text{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 72 leaves, 2 steps):

$$\frac{2^{\frac{1}{2}+m} \text{AppellF1}\left[\frac{1}{2}, 1-n, \frac{1}{2}-m, \frac{3}{2}, 1-\text{Sec}[e+f x], \frac{1}{2} (1-\text{Sec}[e+f x])\right] \text{Tan}[e+f x]}{f \sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 6, 2246 leaves):

$$\left(3 \times 2^{1+m} \text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^{-1+n} \text{Sec}[e+f x]^n \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n} (1+\text{Sec}[e+f x])^m \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right) \Big/$$
$$\left(f \left(3\, \text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + 2 \left((-1+n)\, \text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + (m+n)\, \text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)\right.$$
$$\left(\left(3 \times 2^m \text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^n \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n}\right) \Big/ \right.$$
$$\left(3\, \text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + 2 \left((-1+n)\, \text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + (m+n)\, \text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right) +$$
$$\left(3 \times 2^{1+m} (-1+n)\, \text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^{-1+n}\right.$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Sec}[e+fx]\Big)^{m+n}\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$(m+n)\,\text{AppellF1}\Big[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)+$$

$$\Big(3\times 2^{1+m}\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^{-1+n}\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Sec}[e+fx]\Big)^{m+n}\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]$$

$$\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\Big[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+$$

$$\frac{1}{3}(m+n)\,\text{AppellF1}\Big[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+(m+n)\,\text{AppellF1}\Big[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)-$$

$$\Big(3\times 2^{1+m}\,\text{AppellF1}\Big[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^{-1+n}\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Sec}[e+fx]\Big)^{m+n}$$

$$\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big(2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$(m+n)\,\text{AppellF1}\Big[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+$$

$$3\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\Big[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+\frac{1}{3}(m+n)$$

$$\text{AppellF1}\Big[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)+2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2$$

$$\Big((-1+n)\Big(-\frac{3}{5}(2-n)\,\text{AppellF1}\Big[\frac{5}{2},m+n,3-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+$$

$$\frac{3}{5}(m+n)\,\text{AppellF1}\Big[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)+$$

$$(m+n)\Big(-\frac{3}{5}(1-n)\,\text{AppellF1}\Big[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+$$

$$\frac{3}{5}(1+m+n)\,\text{AppellF1}\Big[\frac{5}{2},2+m+n,1-n,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] + (m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)^2 +$$

$$\Big(3\times 2^{1+m}(m+n)\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{-1+m+n} \text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right] + \text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\,\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)$$

- **Problem 330: Result more than twice size of optimal antiderivative.**

$$\int (1-\text{Sec}[e+f x])^m\,\text{Sec}[e+f x]^n\,dx$$

Optimal (type 6, 89 leaves, 2 steps):

$$\left(\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2}+m, 1-n, \frac{1}{2}, \frac{3}{2}+m, 1-\text{Sec}[e+f x], \frac{1}{2}(1-\text{Sec}[e+f x])\right](1-\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]\right)\Big/\left(f\,(1+2m)\,\sqrt{1+\text{Sec}[e+f x]}\right)$$

Result (type 6, 2751 leaves):

$$\Bigg(2\,(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m, m+n, 1-n, \frac{3}{2}+m, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-\frac{1}{2}+m+n}(1-\text{Sec}[e+f x])^m\,\text{Sec}[e+f x]^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}}\right)^{1+2m}\Bigg)\Big/$$

$$\Bigg(f\,(1+2m)\,\Big((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m, m+n, 1-n, \frac{3}{2}+m, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)$$

$$\Bigg(\Bigg(2(3+2m)\left(-\frac{1}{2}+m+n\right)\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}\Bigg)\Big/$$

$$\left((1+2m)\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\Bigg(2(3+2m)\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}\Bigg(-\frac{1}{\frac{3}{2}+m}$$

$$\left(\frac{1}{2}+m\right)(1-n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}+m}$$

$$\left(\frac{1}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Big/$$

$$\left((1+2m)\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)\Big)+$$

$$\Bigg(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{2m}\left(\frac{1}{2}\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}-\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)\Bigg)\Big/$$

$$\Big((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)-$$

$$\Bigg(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}$$

$$\Bigg(2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+\right.$$

$$\left.m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+(3+2m)\left(-\frac{1}{\frac{3}{2}+m}\left(\frac{1}{2}+m\right)(1-n)\,\text{AppellF1}\right[$$

$$\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}+m}$$

$$\left(\frac{1}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg((-1+n)\Bigg(-\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(2-n)\,\text{AppellF1}\left[\frac{5}{2}+m,m+n,3-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{5}{2}+m,1+m+n,2-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+(m+n)\Bigg(-\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(1-n)\,\text{AppellF1}\left[\frac{5}{2}+m,1+m+n,\right.$$

$$\left.2-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(1+m+n)$$

$$\text{AppellF1}\left[\frac{5}{2}+m,2+m+n,1-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg((1+2m)\Bigg((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)$$

$$\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)^2\Bigg)+$$

$$\Bigg(2(3+2m)(m+n)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Big/$$

$$\Bigg((1+2m)\Bigg((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)$$

- **Problem 331: Result more than twice size of optimal antiderivative.**

$$\int\text{Sec}[e+f x]^n\,(a+a\,\text{Sec}[e+f x])^m\,dx$$

Optimal (type 6, 88 leaves, 3 steps):

$$\frac{1}{f}2^{\frac{1}{2}+m}\,\text{AppellF1}\left[\frac{1}{2},1-n,\frac{1}{2}-m,\frac{3}{2},1-\text{Sec}[e+f x],\frac{1}{2}(1-\text{Sec}[e+f x])\right](1+\text{Sec}[e+f x])^{-\frac{1}{2}-m}(a+a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]$$

Result (type 6, 2248 leaves):

$$\Bigg(3\times2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\text{Sec}[e+f x]^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}(a\,(1+\text{Sec}[e+f x]))^m\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Big/$$
$$\Bigg(f\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$
$$\Bigg(\Bigg(3\times2^m\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\Bigg)\Big/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] + (m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) +$$

$$\Big(3\times 2^{1+m}(-1+n)\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big/\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) +$$

$$\Big(3\times 2^{1+m}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3}(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] + (m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) -$$

$$\Big(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big(2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$3\Big(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{3}(m+n)$$

$$\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) + 2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Big((-1+n)\Big(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2}, m+n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{3}{5}(m+n)\,\text{AppellF1}\left[\frac{5}{2}, 1+m+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) +$$

$$(m+n)\Big(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2}, 1+m+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{3}{5}(1+m+n)\,\text{AppellF1}\left[\frac{5}{2},2+m+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2+$$

$$\Bigg(3\times 2^{1+m}(m+n)\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)$$

Problem 332: Unable to integrate problem.

$$\int \text{Sec}[e+f x]^n\,(a-a\,\text{Sec}[e+f x])^m\,dx$$

Optimal (type 6, 90 leaves, 3 steps):

$$\left(\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2}+m,1-n,\frac{1}{2},\frac{3}{2}+m,1-\text{Sec}[e+f x],\frac{1}{2}(1-\text{Sec}[e+f x])\right](a-a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]\right)\Big/\left(f\,(1+2m)\sqrt{1+\text{Sec}[e+f x]}\right)$$

Result (type 8, 24 leaves):

$$\int \text{Sec}[e+f x]^n\,(a-a\,\text{Sec}[e+f x])^m\,dx$$

Problem 333: Result more than twice size of optimal antiderivative.

$$\int (-\text{Sec}[e+f x])^n\,(1+\text{Sec}[e+f x])^m\,dx$$

Optimal (type 6, 85 leaves, 2 steps):

$$\left(\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2}+m,1-n,\frac{1}{2},\frac{3}{2}+m,1+\text{Sec}[e+f x],\frac{1}{2}(1+\text{Sec}[e+f x])\right](1+\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]\right)\Big/\left(f\,(1+2m)\sqrt{1-\text{Sec}[e+f x]}\right)$$

Result (type 6, 2248 leaves):

$$\Big(3\times 2^{1+m}\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\Big(\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^{-1+n}\,(-\text{Sec}[e+f\,x])^n\,\Big(\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}[e+f\,x]\Big)^{m+n}\,(1+\text{Sec}[e+f\,x])^m\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big/$$

$$\Big(f\,\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$2\,\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\,m+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$(m+n)\,\text{AppellF1}\Big[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)$$

$$\Big(\Big(3\times 2^{m}\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\Big(\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^{n}\,\Big(\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}[e+f\,x]\Big)^{m+n}\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+2\,\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\,m+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+(m+n)\,\text{AppellF1}\Big[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)+$$

$$\Big(3\times 2^{1+m}\,(-1+n)\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\Big(\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^{-1+n}$$

$$\Big(\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}[e+f\,x]\Big)^{m+n}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$2\,\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\,m+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$(m+n)\,\text{AppellF1}\Big[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)+$$

$$\Big(3\times 2^{1+m}\,\Big(\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^{-1+n}\,\Big(\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}[e+f\,x]\Big)^{m+n}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]$$

$$\Big(-\frac{1}{3}\,(1-n)\,\text{AppellF1}\Big[\frac{3}{2},\,m+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+$$

$$\frac{1}{3}\,(m+n)\,\text{AppellF1}\Big[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+2\,\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\,m+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+(m+n)\,\text{AppellF1}\Big[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)-$$

$$\Bigg(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg(2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\Bigg(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}(m+n)$$

$$\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Bigg((-1+n)\Bigg(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},m+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}(m+n)\,\text{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+$$

$$(m+n)\Bigg(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}(1+m+n)\,\text{AppellF1}\left[\frac{5}{2},2+m+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2+$$

$$\Bigg(3\times 2^{1+m}(m+n)\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)$$

- **Problem 334: Result more than twice size of optimal antiderivative.**

$$\int (1-\text{Sec}[e+f x])^m (-\text{Sec}[e+f x])^n \, dx$$

Optimal (type 6, 70 leaves, 2 steps):

$$\frac{2^{\frac{1}{2}+m} \text{AppellF1}\left[\frac{1}{2}, 1-n, \frac{1}{2}-m, \frac{3}{2}, 1+\text{Sec}[e+f x], \frac{1}{2} (1+\text{Sec}[e+f x])\right] \text{Tan}[e+f x]}{f \sqrt{1-\text{Sec}[e+f x]}}$$

Result (type 6, 2753 leaves):

$$\left(2 (3+2 m) \text{AppellF1}\left[\frac{1}{2}+m, m+n, 1-n, \frac{3}{2}+m, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right.$$

$$\left.\left(\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^{-\frac{1}{2}+m+n} (1-\text{Sec}[e+f x])^m (-\text{Sec}[e+f x])^n \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n} \left(\frac{\text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2}}\right)^{1+2 m}\right) \Big/$$

$$\left(f (1+2 m) \left((3+2 m) \text{AppellF1}\left[\frac{1}{2}+m, m+n, 1-n, \frac{3}{2}+m, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + \right.\right.$$

$$2 \left((-1+n) \text{AppellF1}\left[\frac{3}{2}+m, m+n, 2-n, \frac{5}{2}+m, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] + \right.$$

$$\left.\left.\left.(m+n) \text{AppellF1}\left[\frac{3}{2}+m, 1+m+n, 1-n, \frac{5}{2}+m, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)$$

$$\left(\left(2 (3+2 m) \left(-\frac{1}{2}+m+n\right) \text{AppellF1}\left[\frac{1}{2}+m, m+n, 1-n, \frac{3}{2}+m, \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right)^{-\frac{1}{2}+m+n}\right.\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n} \text{Tan}\left[\frac{1}{2} (e+f x)\right] \left(\frac{\text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2}}\right)^{1+2 m}\right) \Big/$$

$$\left((1+2m)\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\left(2(3+2m)\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}\left(-\frac{1}{\frac{3}{2}+m}\left(\frac{1}{2}+m\right)(1-n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}+m}\left(\frac{1}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\Big/$$

$$\left((1+2m)\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\left(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{2m}\left(\frac{1}{2}\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}-\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)\right)\Big/$$

$$\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)-$$

$$\Bigg(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}$$

$$\left(2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+\right.\right.\right.$$

$$\left.m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+(3+2m)\left(-\frac{1}{\frac{3}{2}+m}\left(\frac{1}{2}+m\right)(1-n)\,\text{AppellF1}\right[$$

$$\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{3}{2}+m}$$

$$\left.\left(\frac{1}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\left((-1+n)\left(-\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(2-n)\,\text{AppellF1}\left[\frac{5}{2}+m,m+n,3-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{5}{2}+m,1+m+n,2-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+(m+n)\left(-\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(1-n)\,\text{AppellF1}\left[\frac{5}{2}+m,1+m+n,\right.\right.$$

$$2-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)(1+m+n)$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{5}{2}+m,2+m+n,1-n,\frac{7}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$

$$\left((1+2m)\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\right.$$
$$\left.\left.\left.\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)+$$

$$\left(2(3+2m)(m+n)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{1+2m}$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left((1+2m)\left((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\right)$$

■ **Problem 335: Result more than twice size of optimal antiderivative.**

$$\int (-\text{Sec}[e+f x])^n (a+a\,\text{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 87 leaves, 3 steps):

$$\left(\sqrt{2}\ \text{AppellF1}\left[\frac{1}{2}+m,\ 1-n,\ \frac{1}{2},\ \frac{3}{2}+m,\ 1+\text{Sec}[e+f x],\ \frac{1}{2}(1+\text{Sec}[e+f x])\right](a+a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]\right)\Big/\left(f(1+2m)\sqrt{1-\text{Sec}[e+f x]}\right)$$

Result (type 6, 2250 leaves):

$$\left(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\ m+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$
$$\left.\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}(-\text{Sec}[e+f x])^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}(a(1+\text{Sec}[e+f x]))^m\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$
$$\left(f\left(3\,\text{AppellF1}\left[\frac{1}{2},\ m+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$
$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\ m+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2},\ 1+m+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$
$$\left(\left(\left(3\times 2^m\,\text{AppellF1}\left[\frac{1}{2},\ m+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\right)\Big/\right.\right.$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\ m+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\ m+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},\ 1+m+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$
$$\left(3\times 2^{1+m}(-1+n)\,\text{AppellF1}\left[\frac{1}{2},\ m+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\ m+n,\ 1-n,\ \frac{3}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\ m+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2},\ 1+m+n,\ 1-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$
$$\left(3\times 2^{1+m}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$
$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},\ m+n,\ 2-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\frac{1}{3}(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\Bigg(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg(2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\Bigg(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}(m+n)$$

$$\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Bigg((-1+n)\Bigg(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},m+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}(m+n)\,\text{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+$$

$$(m+n)\Bigg(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}(1+m+n)\,\text{AppellF1}\left[\frac{5}{2},2+m+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2+$$

$$\Bigg(3\times 2^{1+m}(m+n)\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)$$

Problem 336: Unable to integrate problem.

$$\int(-\text{Sec}[e+fx])^n\,(a-a\,\text{Sec}[e+fx])^m\,dx$$

Optimal (type 6, 87 leaves, 3 steps):

$$\frac{1}{f}2^{\frac{1}{2}+m}\,\text{AppellF1}\left[\frac{1}{2},1-n,\frac{1}{2}-m,\frac{3}{2},1+\text{Sec}[e+fx],\frac{1}{2}(1+\text{Sec}[e+fx])\right](1-\text{Sec}[e+fx])^{-\frac{1}{2}-m}\,(a-a\,\text{Sec}[e+fx])^m\,\text{Tan}[e+fx]$$

Result (type 8, 26 leaves):

$$\int(-\text{Sec}[e+fx])^n\,(a-a\,\text{Sec}[e+fx])^m\,dx$$

Problem 337: Result more than twice size of optimal antiderivative.

$$\int(d\,\text{Sec}[e+fx])^n\,(1+\text{Sec}[e+fx])^m\,dx$$

Optimal (type 6, 79 leaves, 2 steps):

$$-\frac{\text{AppellF1}\left[n,\frac{1}{2},\frac{1}{2}-m,1+n,\text{Sec}[e+fx],-\text{Sec}[e+fx]\right](d\,\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f\,n\,\sqrt{1-\text{Sec}[e+fx]}\,\sqrt{1+\text{Sec}[e+fx]}}$$

Result (type 6, 2248 leaves):

$$\Bigg(3\times2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1+n}(d\,\text{Sec}[e+fx])^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}(1+\text{Sec}[e+fx])^m\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg/$$
$$\Bigg(f\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)$$
$$\Bigg(\Bigg(3\times2^m\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\mathrm{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\times 2^{1+m}(-1+n)\,\mathrm{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\right.$$

$$\left.\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^{m+n}\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/\left(3\,\mathrm{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$2\left((-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(m+n)\,\mathrm{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\times 2^{1+m}\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^{m+n}\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\mathrm{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{1}{3}(m+n)\,\mathrm{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\mathrm{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\mathrm{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(3\times 2^{1+m}\,\mathrm{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]\right)^{m+n}\right.$$

$$\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\left(2\left((-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(m+n)\,\mathrm{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n)\,\mathrm{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}(m+n)\right.$$

$$\left.\mathrm{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+2\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left((-1+n)\left(-\frac{3}{5}(2-n)\,\mathrm{AppellF1}\left[\frac{5}{2},m+n,3-n,\frac{7}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\frac{3}{5}(m+n)\,\mathrm{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$(m+n)\left(-\frac{3}{5}(1-n)\,\mathrm{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\frac{3}{5}(1+m+n)\,\text{AppellF1}\left[\frac{5}{2},2+m+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2+$$

$$\Bigg(3\times 2^{1+m}(m+n)\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)$$

- **Problem 338: Result more than twice size of optimal antiderivative.**

$$\int(1-\text{Sec}[e+f x])^m(d\,\text{Sec}[e+f x])^n\,dx$$

Optimal (type 6, 79 leaves, 2 steps):

$$-\frac{\text{AppellF1}\left[n,\frac{1}{2}-m,\frac{1}{2},1+n,\text{Sec}[e+f x],-\text{Sec}[e+f x]\right](d\,\text{Sec}[e+f x])^n\,\text{Tan}[e+f x]}{f\,n\sqrt{1-\text{Sec}[e+f x]}\sqrt{1+\text{Sec}[e+f x]}}$$

Result (type 6, 2753 leaves):

$$\Bigg(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-\frac{1}{2}+m+n}(1-\text{Sec}[e+f x])^m(d\,\text{Sec}[e+f x])^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}}\right)^{1+2m}\Bigg/$$

$$\Bigg(f\,(1+2m)\,\Big((3+2m)\,\text{AppellF1}\Big[\frac{1}{2}+m,\,m+n,\,1-n,\,\frac{3}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2}+m,\,m+n,\,2-n,\,\frac{5}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$(m+n)\,\text{AppellF1}\Big[\frac{3}{2}+m,\,1+m+n,\,1-n,\,\frac{5}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)$$

$$\Bigg(\Bigg(2\,(3+2m)\,\Big(-\frac{1}{2}+m+n\Big)\,\text{AppellF1}\Big[\frac{1}{2}+m,\,m+n,\,1-n,\,\frac{3}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^{-\frac{1}{2}+m+n}$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Sec}[e+fx]\Big)^{m+n}\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]\left(\frac{\text{Tan}\big[\frac{1}{2}(e+fx)\big]}{\sqrt{\text{Sec}\big[\frac{1}{2}(e+fx)\big]^2}}\right)^{1+2m}\Bigg)\Bigg/$$

$$\Big((1+2m)\,\Big((3+2m)\,\text{AppellF1}\Big[\frac{1}{2}+m,\,m+n,\,1-n,\,\frac{3}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2}+m,\,m+n,\,2-n,\,\frac{5}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]+$$

$$(m+n)\,\text{AppellF1}\Big[\frac{3}{2}+m,\,1+m+n,\,1-n,\,\frac{5}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)\Big)+$$

$$\Bigg(2\,(3+2m)\,\Big(\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\Big)^{-\frac{1}{2}+m+n}\,\Big(\text{Cos}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Sec}[e+fx]\Big)^{m+n}\left(\frac{\text{Tan}\big[\frac{1}{2}(e+fx)\big]}{\sqrt{\text{Sec}\big[\frac{1}{2}(e+fx)\big]^2}}\right)^{1+2m}\Bigg(-\frac{1}{\frac{3}{2}+m}$$

$$\Big(\frac{1}{2}+m\Big)\,(1-n)\,\text{AppellF1}\Big[\frac{3}{2}+m,\,m+n,\,2-n,\,\frac{5}{2}+m,\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+fx)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+fx)\Big]+\frac{1}{\frac{3}{2}+m}$$

$$\left(\frac{1}{2}+m\right)(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Big/$$

$$\Bigg((1+2m)\Bigg((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)^{2m}\left(\frac{1}{2}\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}-\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}}\right)\Bigg)\Big/$$

$$\Bigg((3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)-$$

$$\Bigg(2(3+2m)\,\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]\right)^{m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2}}\right)^{1+2\,m}$$

$$\Bigg(2\,\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,\,m+n,\,2-n,\,\frac{5}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,\,1+m+n,\,1-n,\,\frac{5}{2}+\right.$$

$$\left.m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+(3+2\,m)\,\Bigg(-\frac{1}{\frac{3}{2}+m}\left(\frac{1}{2}+m\right)\,(1-n)\,\text{AppellF1}\Big[$$

$$\frac{3}{2}+m,\,m+n,\,2-n,\,\frac{5}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{\frac{3}{2}+m}$$

$$\left(\frac{1}{2}+m\right)\,(m+n)\,\text{AppellF1}\left[\frac{3}{2}+m,\,1+m+n,\,1-n,\,\frac{5}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)+$$

$$2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\Bigg((-1+n)\,\Bigg(-\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)\,(2-n)\,\text{AppellF1}\left[\frac{5}{2}+m,\,m+n,\,3-n,\,\frac{7}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)\,(m+n)\,\text{AppellF1}\Big[\frac{5}{2}+m,\,1+m+n,\,2-n,\,\frac{7}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)+(m+n)\,\Bigg(-\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)\,(1-n)\,\text{AppellF1}\Big[\frac{5}{2}+m,\,1+m+n,$$

$$2-n,\,\frac{7}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{\frac{5}{2}+m}\left(\frac{3}{2}+m\right)\,(1+m+n)$$

$$\text{AppellF1}\left[\frac{5}{2}+m,\,2+m+n,\,1-n,\,\frac{7}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg((1+2\,m)\,\Bigg((3+2\,m)\,\text{AppellF1}\left[\frac{1}{2}+m,\,m+n,\,1-n,\,\frac{3}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$2\,\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2}+m,\,m+n,\,2-n,\,\frac{5}{2}+m,\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(m+n)$$

$$\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2\Bigg)+$$

$$\Bigg(2(3+2m)(m+n)\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-\frac{1}{2}+m+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m+n}\left(\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}}\right)^{1+2m}$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Big/$$

$$\Bigg((1+2m)\Bigg((3+2m)\text{AppellF1}\left[\frac{1}{2}+m,m+n,1-n,\frac{3}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Bigg((-1+n)\text{AppellF1}\left[\frac{3}{2}+m,m+n,2-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(m+n)\text{AppellF1}\left[\frac{3}{2}+m,1+m+n,1-n,\frac{5}{2}+m,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)$$

- **Problem 339: Result more than twice size of optimal antiderivative.**

$$\int(d\,\text{Sec}[e+f x])^n(a+a\,\text{Sec}[e+f x])^m\,dx$$

Optimal (type 6, 95 leaves, 3 steps):

$$-\frac{1}{f n\sqrt{1-\text{Sec}[e+f x]}}\text{AppellF1}\left[n,\frac{1}{2},\frac{1}{2}-m,1+n,\text{Sec}[e+f x],-\text{Sec}[e+f x]\right](d\,\text{Sec}[e+f x])^n(1+\text{Sec}[e+f x])^{-\frac{1}{2}-m}(a+a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]$$

Result (type 6, 2250 leaves):

$$\left(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$

$$\left.\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}(d\,\text{Sec}[e+f x])^n\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}(a(1+\text{Sec}[e+f x]))^m\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

$$\left(f\left(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$

$$\left(\left(3\times 2^{m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\times 2^{1+m}(-1+n)\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\times 2^{1+m}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{1}{3}(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1+n}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+n}\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$
$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}(m+n)\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$
$$\left((-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},m+n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$
$$\left.\frac{3}{5}(m+n)\,\text{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$
$$(m+n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},1+m+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$
$$\left.\left.\left.\left.\left.\frac{3}{5}(1+m+n)\,\text{AppellF1}\left[\frac{5}{2},2+m+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$
$$\left(3\times 2^{1+m}(m+n)\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1+n}\right.$$
$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+m+n}\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$
$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\right)$$

Problem 340: Unable to integrate problem.

$$\int (d \operatorname{Sec}[e+f x])^n (a-a \operatorname{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 96 leaves, 3 steps):

$$-\frac{1}{f n \sqrt{1+\operatorname{Sec}[e+f x]}} \operatorname{AppellF1}\left[n, \frac{1}{2}-m, \frac{1}{2}, 1+n, \operatorname{Sec}[e+f x], -\operatorname{Sec}[e+f x]\right] (1-\operatorname{Sec}[e+f x])^{-\frac{1}{2}-m} (d \operatorname{Sec}[e+f x])^n (a-a \operatorname{Sec}[e+f x])^m \operatorname{Tan}[e+f x]$$

Result (type 8, 26 leaves):

$$\int (d \operatorname{Sec}[e+f x])^n (a-a \operatorname{Sec}[e+f x])^m \, dx$$

Problem 345: Result more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 83 leaves, 3 steps):

$$\frac{\sqrt{2} \operatorname{AppellF1}\left[\frac{1}{2}+m, \frac{1}{2}, 1, \frac{3}{2}+m, \frac{1}{2} (1+\operatorname{Sec}[e+f x]), 1+\operatorname{Sec}[e+f x]\right] (a+a \operatorname{Sec}[e+f x])^m \operatorname{Tan}[e+f x]}{f (1+2 m) \sqrt{1-\operatorname{Sec}[e+f x]}}$$

Result (type 6, 1653 leaves):

$$\left(3 \times 2^m \operatorname{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \left(\operatorname{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Sec}[e+f x]\right)^m (a (1+\operatorname{Sec}[e+f x]))^m \operatorname{Sin}[e+f x]\right) \Big/$$

$$\left(f \left(3 \operatorname{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - 2 \left(\operatorname{AppellF1}\left[\frac{3}{2}, m, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - \right.\right.$$

$$\left.\left. m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)$$

$$\left(\left(3 \times 2^m \operatorname{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \operatorname{Cos}[e+f x] \left(\operatorname{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Sec}[e+f x]\right)^m\right) \Big/\right.$$

$$\left(3 \operatorname{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - 2 \left(\operatorname{AppellF1}\left[\frac{3}{2}, m, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - \right.$$

$$\left. m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right) +$$

$$\left(3 \times 2^m \left(\operatorname{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Sec}[e+f x]\right)^m \operatorname{Sin}[e+f x] \left(-\frac{1}{3} \operatorname{AppellF1}\left[\frac{3}{2}, m, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \operatorname{Sec}\left[\frac{1}{2} (e+f x)\right]^2\right.\right.$$

$$\left.\left. \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right] + \frac{1}{3} m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] \operatorname{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right) \Big/$$

$$\left(3 \operatorname{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - 2 \left(\operatorname{AppellF1}\left[\frac{3}{2}, m, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right] - \right.\right.$$

$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\Bigg(3\times 2^m\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\text{Sin}[e+f x]$$

$$\Bigg(-2\,\Bigg(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$

$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\,\Bigg(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)-$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},m,3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}m\,\text{AppellF1}\left[\frac{5}{2},1+m,2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]-$$

$$m\,\Bigg(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},1+m,2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2},2+m,1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\,\Bigg(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$

$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2+$$

$$\Bigg(3\times 2^m\,m\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m}\text{Sin}[e+f x]$$

$$\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\,\Bigg(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$

$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)$$

- **Problem 346: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f x]\,(a+a\,\text{Sec}[e+f x])^m\,dx$$

Optimal (type 6, 84 leaves, 3 steps):

$$-\left(\sqrt{2}\ \text{AppellF1}\left[\frac{1}{2}+m,\frac{1}{2},2,\frac{3}{2}+m,\frac{1}{2}(1+\text{Sec}[e+f x]),1+\text{Sec}[e+f x]\right](a+a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]\right)\Big/\left(f(1+2m)\sqrt{1-\text{Sec}[e+f x]}\right)$$

Result (type 6, 3781 leaves):

$$\Big(2^{1+m}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^3\text{Cos}[e+f x]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m(a(1+\text{Sec}[e+f x]))^m$$
$$\text{Sin}\left[\frac{1}{2}(e+f x)\right]\Big(-\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\Big(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-$$
$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$
$$\Big(2\,\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\Big/\Big(\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$\frac{2}{3}\Big(-2\,\text{AppellF1}\left[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)\Big)\Big/$$
$$\Big(f\Big(2^m\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^4\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\Big(-\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big/\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\Big(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+\right.\right.$$
$$\left.\left.f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$
$$\Big(2\,\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\Big/\Big(\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\Big(-2\,\text{AppellF1}\left[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,2,\frac{5}{2},\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)-3\times 2^m\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m$$
$$\text{Sin}\left[\frac{1}{2}(e+f x)\right]^2\Big(-\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\Big(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\left(2\,\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\Big/\left(\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\frac{2}{3}\left(-2\,\text{AppellF1}\left[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+2^{1+m}\,\text{Cos}\left[\frac{1}{2}(e+fx)\right]^3\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m$$

$$\text{Sin}\left[\frac{1}{2}(e+fx)\right]\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$

$$\left(3\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.\right.$$

$$\left.\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+$$

$$\left(2\left(-\frac{2}{3}\text{AppellF1}\left[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\Big/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\frac{2}{3}\left(-2\,\text{AppellF1}\left[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]+3\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)-$$

$$2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\,\Big(-\frac{6}{5}\,\text{AppellF1}\Big[\frac{5}{2},m,3,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\,m\,\text{AppellF1}\Big[\frac{5}{2},1+m,2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]-$$

$$m\,\Big(-\frac{3}{5}\,\text{AppellF1}\Big[\frac{5}{2},1+m,2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\,(1+m)\,\text{AppellF1}\Big[\frac{5}{2},2+m,1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-2\,\Big(\text{AppellF1}\Big[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]-m\,\text{AppellF1}\Big[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2-$$

$$\Big(2\,\text{AppellF1}\Big[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\Big(-\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{3}\,m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{2}{3}\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{2}{3}\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\,\Big(-2\,\Big(-\frac{9}{5}\,\text{AppellF1}\Big[\frac{5}{2},m,4,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\,m\,\text{AppellF1}\Big[\frac{5}{2},1+m,3,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)+$$

$$m\,\Big(-\frac{6}{5}\,\text{AppellF1}\Big[\frac{5}{2},1+m,3,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}\,(1+m)\,\text{AppellF1}\Big[\frac{5}{2},2+m,2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+\frac{2}{3}\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2\Big)+$$

$$2^{1+m}\,m\,\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^3\,\Big(\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Sec}[e+f x]\Big)^{-1+m}\,\text{Sin}\Big[\frac{1}{2}(e+f x)\Big]$$

$$\Big(-\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+\left(2\,\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\Big/\left(\text{AppellF1}\left[\frac{1}{2},m,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\frac{2}{3}\left(-2\,\text{AppellF1}\left[\frac{3}{2},m,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\Big)\Big)$$

- **Problem 347: Result more than twice size of optimal antiderivative.**

$$\int (d\,\text{Sec}[e+fx])^{3/2}\,(a+a\,\text{Sec}[e+fx])^m\,dx$$

Optimal (type 6, 98 leaves, 3 steps):

$$-\frac{1}{3f\sqrt{1-\text{Sec}[e+fx]}}2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},\frac{1}{2}-m,\frac{5}{2},\text{Sec}[e+fx],-\text{Sec}[e+fx]\right](d\,\text{Sec}[e+fx])^{3/2}(1+\text{Sec}[e+fx])^{-\frac{1}{2}-m}(a+a\,\text{Sec}[e+fx])^m\,\text{Tan}[e+fx]$$

Result (type 6, 2529 leaves):

$$-\Bigg(\Bigg(\left(3\times2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\sqrt{\text{Sec}[e+fx]}\,(d\,\text{Sec}[e+fx])^{3/2}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m(a(1+\text{Sec}[e+fx]))^m\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/\left(f\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(3+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)$$

$$\Bigg(\Bigg(\left(3\times2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\sqrt{\text{Sec}[e+fx]}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^m\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(3+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(3\times 2^m\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\sqrt{\text{Sec}[e+f x]}\right.$$

$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(3+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(3\times 2^m\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}[e+f x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\right.$$

$$\left.\text{Sin}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(3+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-\left(3\times 2^{1+m}\sqrt{\text{Sec}[e+f x]}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(\frac{1}{6}\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{1}{3}\left(\frac{3}{2}+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(3+2m)\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\sqrt{\text{Sec}[e+f x]}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^m\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(3+2m)\right.\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(\frac{1}{6}\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\right.$$

$$\left.\left(\frac{3}{2}+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\left(-\frac{3}{10}\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+m,\frac{3}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\frac{3}{5}\left(\frac{3}{2}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{5}{2}+m,\frac{1}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+(3+2m)$$

$$\left(\frac{3}{10}\text{AppellF1}\left[\frac{5}{2},\frac{5}{2}+m,\frac{1}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{3}{5}\left(\frac{5}{2}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{7}{2}+m,-\frac{1}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.\left.(3+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)-$$

$$\left(3\times 2^{1+m}\,m\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\sqrt{\text{Sec}[e+fx]}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+m}\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+m,-\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(3+2m)\right.$$

$$\left.\left.\left.\left.\left.\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+m,-\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\right)\right)\right)$$

- **Problem 348: Result more than twice size of optimal antiderivative.**

$$\int\sqrt{d\,\text{Sec}[e+fx]}\,(a+a\,\text{Sec}[e+fx])^m\,dx$$

Optimal (type 6, 96 leaves, 3 steps) :

$$-\frac{1}{f\sqrt{1-\text{Sec}[e+f x]}} 2\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2}-m,\frac{3}{2},\text{Sec}[e+f x],-\text{Sec}[e+f x]\right]\sqrt{d\,\text{Sec}[e+f x]}\,(1+\text{Sec}[e+f x])^{-\frac{1}{2}-m}(a+a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]$$

Result (type 6, 2225 leaves) :

$$\left(2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$
$$\left.\sqrt{d\,\text{Sec}[e+f x]}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{1}{2}+m}(a(1+\text{Sec}[e+f x]))^m\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$
$$\left(f\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-\frac{1}{3}\left(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-(1+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)$$
$$\left(\left(\left(2^m\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{1}{2}+m}\right)\Big/\right.\right.$$
$$\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-\frac{1}{3}\left(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-(1+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$
$$\left(2^m\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{1}{2}+m}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/$$
$$\left(\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-\right.\right.$$
$$\frac{1}{3}\left(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-(1+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\right.\right.$$
$$\left.\left.\left.\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+\left(2^{1+m}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{\frac{1}{2}+m}\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$
$$\left(-\frac{1}{6}\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}\left(\frac{1}{2}+m\right)\right.$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg/\Bigg(\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}$$

$$\Bigg(\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\frac{1}{3}\Bigg(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-(1+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)-$$

$$\Bigg(2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{\frac{1}{2}+m}\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\Bigg(-\frac{1}{6}\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{1}{3}\left(\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-$$

$$\frac{1}{3}\Bigg(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-$$

$$(1+2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-$$

$$\frac{1}{3}\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg(-\frac{9}{10}\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+m,\frac{5}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{3}{5}\left(\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+m,\frac{3}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-$$

$$(1+2m)\Bigg(-\frac{3}{10}\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+m,\frac{3}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{3}{5}\left(\frac{3}{2}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{5}{2}+m,\frac{1}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}\Bigg(\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-$$

$$\frac{1}{3}\Bigg(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-(1+2m)$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)^2\Bigg)+$$

$$\left(2^{1+m}\left(\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-\frac{1}{2}+m}\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\text{Tan}[e+fx]\right)\right)\Big/$$
$$\left(\sqrt{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}\left(\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}+m,\frac{1}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.\right.$$
$$\frac{1}{3}\left(\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]-\right.$$
$$\left.\left.\left.(1+2m)\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+m,\frac{1}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\right)$$

- **Problem 349: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[e+fx])^m}{\sqrt{d\,\text{Sec}[e+fx]}}\,dx$$

Optimal (type 6, 96 leaves, 3 steps):

$$\left(2\,\text{AppellF1}\left[-\frac{1}{2},\frac{1}{2},\frac{1}{2}-m,\frac{1}{2},\text{Sec}[e+fx],-\text{Sec}[e+fx]\right](1+\text{Sec}[e+fx])^{-\frac{1}{2}-m}(a+a\,\text{Sec}[e+fx])^m\,\text{Tan}[e+fx]\right)\Big/$$
$$\left(f\sqrt{1-\text{Sec}[e+fx]}\sqrt{d\,\text{Sec}[e+fx]}\right)$$

Result (type 6, 2424 leaves):

$$-\left(\left(\left(3\times2^{1+m}\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\sqrt{\text{Sec}[e+fx]}\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-\frac{1}{2}+m}\right.\right.\right.$$
$$(1+\text{Sec}[e+fx])^{-m}(a(1+\text{Sec}[e+fx]))^m\left(\text{Cos}[2(e+fx)]\left(\frac{(1+\text{Sec}[e+fx])^m}{2\sqrt{\text{Sec}[e+fx]}}-\frac{1}{2}i\sqrt{\text{Sec}[e+fx]}(1+\text{Sec}[e+fx])^m\text{Sin}[e+fx]\right)+\right.$$
$$\frac{\frac{1}{2}(1+\text{Sec}[e+fx])^m+\frac{1}{2}i(1+\text{Sec}[e+fx])^m\text{Sin}[2(e+fx)]}{\sqrt{\text{Sec}[e+fx]}}+$$
$$\left.\left.\sqrt{\text{Sec}[e+fx]}\,\text{Sin}[e+fx]\left(-\frac{1}{2}i(1+\text{Sec}[e+fx])^m+\frac{1}{2}(1+\text{Sec}[e+fx])^m\text{Sin}[2(e+fx)]\right)\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/$$

$$\left(f\left(\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{3/2}\sqrt{d\,\mathrm{Sec}[e+fx]}\left(-3\,\mathrm{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(3\,\mathrm{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$\left.\left.(1-2m)\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$

$$\left(-\left(3\times 2^m\,\mathrm{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Sec}[e+fx]\right)^{-\frac{1}{2}+m}\right)\Big/\left(\sqrt{\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2}\right.\right.$$

$$\left(-3\,\mathrm{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\left(3\,\mathrm{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.$$

$$\left.\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(1-2m)\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\left(9\times 2^m\,\mathrm{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Sec}[e+fx]\right)^{-\frac{1}{2}+m}\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Big/$$

$$\left(\left(\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{3/2}\left(-3\,\mathrm{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(3\,\mathrm{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(1-2m)\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)-\left(3\times 2^{1+m}\left(\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Sec}[e+fx]\right)^{-\frac{1}{2}+m}\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\right.$$

$$\left(-\frac{1}{2}\,\mathrm{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\left.\frac{1}{3}\left(-\frac{1}{2}+m\right)\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\Big/$$

$$\left(\left(\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{3/2}\left(-3\,\mathrm{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left(3\,\mathrm{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(1-2m)\right.$$

$$\left.\left.\left.\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-\frac{1}{2}+m}$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\,((3\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1-2m)$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]-$$

$$3\,(-\frac{1}{2}\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}$$

$$\left(-\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right])+$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\,(3\,(-\frac{3}{2}\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}+m,\frac{7}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}\left(-\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+m,\frac{5}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right])+$$

$$(1-2m)\,(-\frac{9}{10}\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}+m,\frac{5}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5}\left(\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+m,\frac{3}{2},\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]))))\Big/$$

$$\left(\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{3/2}(-3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$(3\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$\left.(1-2m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2)^2\right)-$$

$$(3\times 2^{1+m}\left(-\frac{1}{2}+m\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-\frac{3}{2}+m}$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right))\Big/$$

$$(\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{3/2}(-3\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}+m,\frac{3}{2},\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(3\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}+m,\frac{5}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1-2m)$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}+m,\frac{3}{2},\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)\Big)\Big)\Big)$$

- **Problem 350: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[e+f x])^m}{(d\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 6, 98 leaves, 3 steps):

$$\left(2\,\text{AppellF1}\left[-\frac{3}{2},\frac{1}{2},\frac{1}{2}-m,-\frac{1}{2},\text{Sec}[e+f x],-\text{Sec}[e+f x]\right](1+\text{Sec}[e+f x])^{-\frac{1}{2}-m}(a+a\,\text{Sec}[e+f x])^m\,\text{Tan}[e+f x]\right)\Big/\left(3\,f\,\sqrt{1-\text{Sec}[e+f x]}\,(d\,\text{Sec}[e+f x])^{3/2}\right)$$

Result (type 6, 5127 leaves): Display of huge result suppressed!

- **Problem 351: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{7/2}\,(a+a\,\text{Sec}[c+d x])\,dx$$

Optimal (type 4, 111 leaves, 7 steps):

$$\frac{6\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5\,d}+\frac{10\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21\,d}+\frac{10\,a\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{21\,d}+\frac{2\,a\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5\,d}+\frac{2\,a\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{7\,d}$$

Result (type 5, 490 leaves):

$$a\left(\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(-\frac{3\,\text{Cot}[c]}{5 d}+\frac{23\,\text{Cos}[d x]\,\text{Sin}[c]}{84 d}+\right.\right.$$

$$\left.\frac{\text{Cos}[2 d x]\,\text{Sin}[2 c]}{10 d}+\frac{\text{Cos}[3 d x]\,\text{Sin}[3 c]}{28 d}+\frac{23\,\text{Cos}[c]\,\text{Sin}[d x]}{84 d}+\frac{\text{Cos}[2 c]\,\text{Sin}[2 d x]}{10 d}+\frac{\text{Cos}[3 c]\,\text{Sin}[3 d x]}{28 d}\right)-$$

$$\frac{1}{21 d\sqrt{1+\text{Cot}[c]^2}}5\,(1+\text{Cos}[c+d x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{10 d}3\,(1+\text{Cos}[c+d x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 352: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])\,dx$$

Optimal (type 4, 87 leaves, 6 steps) :

$$\frac{6\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{2\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{2\,a\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 d}+\frac{2\,a\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5 d}$$

Result (type 5, 458 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{3\,\text{Cot}[c]}{5\,d}+\frac{\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}\right)-\right.$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{10\,d}3\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 353: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 61 leaves, 5 steps):

$$\frac{2\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{2\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 424 leaves):

$$a\left(\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(-\frac{\text{Cot}[c]}{d}+\frac{\text{Cos}[d x]\,\text{Sin}[c]}{3 d}+\frac{\text{Cos}[c]\,\text{Sin}[d x]}{3 d}\right)-\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}\right.$$

$$(1+\text{Cos}[c+d x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2 d}(1+\text{Cos}[c+d x])$$

$$\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 354: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Sec}[c+d x])\,dx$$

Optimal (type 4, 35 leaves, 4 steps):

$$\frac{2\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{2\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{d}$$

Result (type 5, 155 leaves):

$$\frac{1}{2\,d} a \sqrt{\text{Cos}[c+d\,x]}\ (1+\text{Cos}[c+d\,x])\ \text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2$$

$$\left(-2\sqrt{\text{Cos}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2}\ \sqrt{\text{Csc}[c]^2}\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right.$$

$$\left.\text{Sin}[c]+\text{Tan}[d\,x+\text{ArcTan}[\text{Tan}[c]]]-\frac{\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Tan}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}{\sqrt{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2}}\right)$$

- **Problem 355: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{a+a\,\text{Sec}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 57 leaves, 5 steps):

$$-\frac{2\,a\,\text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),\,2\right]}{d}+\frac{2\,a\,\text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),\,2\right]}{d}+\frac{2\,a\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 413 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\right)-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}\right.$$

$$(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2\,d}(1+\text{Cos}[c+d\,x])$$

$$\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 356: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{a+a\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 83 leaves, 6 steps) :

$$-\frac{2\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{2\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 444 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(\text{Sin}[c]+3\,\text{Sin}[d\,x])}{3\,d}\right)-\right.$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2\,d}(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 357: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{a+a\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 111 leaves, 7 steps) :

$$-\frac{6\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{6\,a\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 477 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\;(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{3\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,\text{Sin}[c]+5\,\text{Sin}[d\,x])}{15\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,\text{Sin}[c]+9\,\text{Sin}[d\,x])}{15\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\;\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{10\,d}3\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 358: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{a+a\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 135 leaves, 8 steps):

$$-\frac{6\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{5\,d}+\frac{10\,a\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{21\,d}+\frac{2\,a\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,a\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{10\,a\,\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{6\,a\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 505 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{3\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{7\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(5\,\text{Sin}[c]+7\,\text{Sin}[d\,x])}{35\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(21\,\text{Sin}[c]+25\,\text{Sin}[d\,x])}{105\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(25\,\text{Sin}[c]+63\,\text{Sin}[d\,x])}{105\,d}\right)-\frac{1}{21\,d\,\sqrt{1+\text{Cot}[c]^2}}5\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{10\,d}3\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 359: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 147 leaves, 10 steps):

$$\frac{32\,a^2\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{20\,a^2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{20\,a^2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{32\,a^2\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{45\,d}+\frac{4\,a^2\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}+\frac{2\,a^2\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 548 leaves):

$$\text{Cos}[c+d x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(-\frac{8\,\text{Cot}[c]}{15 d}+\frac{23\,\text{Cos}[d x]\,\text{Sin}[c]}{84 d}+\frac{37\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{360 d}+\frac{\text{Cos}[3 d x]\,\text{Sin}[3 c]}{28 d}+\right.$$
$$\left.\frac{\text{Cos}[4 d x]\,\text{Sin}[4 c]}{144 d}+\frac{23\,\text{Cos}[c]\,\text{Sin}[d x]}{84 d}+\frac{37\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{360 d}+\frac{\text{Cos}[3 c]\,\text{Sin}[3 d x]}{28 d}+\frac{\text{Cos}[4 c]\,\text{Sin}[4 d x]}{144 d}\right)-$$
$$\frac{1}{21 d \sqrt{1+\text{Cot}[c]^2}} 5\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$(a+a\,\text{Sec}[c+d x])^2\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{15 d} 4\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$
$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 360: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{7/2} (a+a\,\text{Sec}[c+d x])^2\, dx$$

Optimal (type 4, 121 leaves, 9 steps):

$$\frac{12 a^2\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{8 a^2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{7 d}+$$
$$\frac{8 a^2\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{7 d}+\frac{4 a^2\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5 d}+\frac{2 a^2\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{7 d}$$

Result (type 5, 516 leaves):

$$\text{Cos}[c+d x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(-\frac{3\,\text{Cot}[c]}{5 d}+\frac{17\,\text{Cos}[d x]\,\text{Sin}[c]}{56 d}+\frac{\text{Cos}[2 d x]\,\text{Sin}[2 c]}{10 d}+\frac{\text{Cos}[3 d x]\,\text{Sin}[3 c]}{56 d}+\frac{17\,\text{Cos}[c]\,\text{Sin}[d x]}{56 d}+\frac{\text{Cos}[2 c]\,\text{Sin}[2 d x]}{10 d}+\frac{\text{Cos}[3 c]\,\text{Sin}[3 d x]}{56 d}\right)-\frac{1}{7 d\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{10 d}3\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 361: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{5/2} (a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 4, 95 leaves, 8 steps):

$$\frac{16 a^2\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{4 a^2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{4 a^2\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 d}+\frac{2 a^2\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5 d}$$

Result (type 5, 484 leaves):

$$\text{Cos}[c+d x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(-\frac{4\,\text{Cot}[c]}{5 d}+\frac{\text{Cos}[d x]\,\text{Sin}[c]}{3 d}+\frac{\text{Cos}[2 d x]\,\text{Sin}[2 c]}{20 d}+\frac{\text{Cos}[c]\,\text{Sin}[d x]}{3 d}+\frac{\text{Cos}[2 c]\,\text{Sin}[2 d x]}{20 d}\right)-$$

$$\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{5 d}2\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$

$$(a+a\,\text{Sec}[c+d x])^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 362: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{3/2} (a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 4, 67 leaves, 7 steps) :

$$\frac{4 a^2\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{8 a^2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{2 a^2\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 5, 450 leaves) :

$$\text{Cos}[c+d x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(-\frac{\text{Cot}[c]}{d}+\frac{\text{Cos}[d x]\,\text{Sin}[c]}{6 d}+\frac{\text{Cos}[c]\,\text{Sin}[d x]}{6 d}\right)-\frac{1}{3 d \sqrt{1+\text{Cot}[c]^2}}$$

$$2\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2 d}\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 364: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^2}{\sqrt{\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 91 leaves, 8 steps):

$$-\frac{4 a^2\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{8 a^2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{2 a^2\,\text{Sin}[c+d x]}{3 d\,\text{Cos}[c+d x]^{3/2}}+\frac{4 a^2\,\text{Sin}[c+d x]}{d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 470 leaves):

$$\text{Cos}[c+d\,x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\left(\frac{\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{6\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(\text{Sin}[c]+6\,\text{Sin}[d\,x])}{6\,d}\right)-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}2\,\text{Cos}[c+d\,x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2\,d}\text{Cos}[c+d\,x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$(a+a\,\text{Sec}[c+d\,x])^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 365: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^2}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 121 leaves, 9 steps):

$$-\frac{16\,a^2\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^2\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{16\,a^2\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 503 leaves):

$$\text{Cos}[c+d x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(\frac{4\,\text{Csc}[c]\,\text{Sec}[c]}{5 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,\text{Sin}[d x]}{10 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(3\,\text{Sin}[c]+10\,\text{Sin}[d x])}{30 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(5\,\text{Sin}[c]+12\,\text{Sin}[d x])}{15 d}\right)-\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}$$

$$\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{5 d}2\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 366: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^2}{\text{Cos}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 147 leaves, 10 steps):

$$-\frac{12 a^2\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{8 a^2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{7 d}+\frac{2 a^2\,\text{Sin}[c+d x]}{7 d\,\text{Cos}[c+d x]^{7/2}}+\frac{4 a^2\,\text{Sin}[c+d x]}{5 d\,\text{Cos}[c+d x]^{5/2}}+\frac{8 a^2\,\text{Sin}[c+d x]}{7 d\,\text{Cos}[c+d x]^{3/2}}+\frac{12 a^2\,\text{Sin}[c+d x]}{5 d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 531 leaves):

$$\text{Cos}[c+d x]^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(\frac{3\,\text{Csc}[c]\,\text{Sec}[c]}{5 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{14 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(7\,\text{Sin}[c]+10\,\text{Sin}[d x])}{35 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5\,\text{Sin}[c]+14\,\text{Sin}[d x])}{70 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(10\,\text{Sin}[c]+21\,\text{Sin}[d x])}{35 d}\right)-\frac{1}{7 d\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{10 d}3\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 367: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{9/2} (a+a\,\text{Sec}[c+d x])^3\, dx$$

Optimal (type 4, 147 leaves, 17 steps):

$$\frac{68 a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{15 d}+\frac{44 a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21 d}+\frac{44 a^3\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{21 d}+\frac{68 a^3\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{45 d}+\frac{6 a^3\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{7 d}+\frac{2 a^3\,\text{Cos}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{9 d}$$

Result (type 5, 548 leaves):

$$\text{Cos}[c+d\,x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\left(-\frac{17\,\text{Cot}[c]}{30\,d}+\frac{97\,\text{Cos}[d\,x]\,\text{Sin}[c]}{336\,d}+\frac{73\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{720\,d}+\frac{3\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{112\,d}+\frac{\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{288\,d}+\frac{97\,\text{Cos}[c]\,\text{Sin}[d\,x]}{336\,d}+\frac{73\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{720\,d}+\frac{3\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{112\,d}+\frac{\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{288\,d}\right)-$$

$$\frac{1}{42\,d\,\sqrt{1+\text{Cot}[c]^2}}11\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{60\,d}17\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 368: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 4, 121 leaves, 15 steps) :

$$\frac{28\,a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{5\,d}+\frac{52\,a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{21\,d}+\frac{52\,a^3\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{6\,a^3\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a^3\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 516 leaves) :

$$\text{Cos}[c+d x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(-\frac{7\,\text{Cot}[c]}{10\,d}+\frac{107\,\text{Cos}[d x]\,\text{Sin}[c]}{336\,d}+\frac{3\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{40\,d}+\frac{\text{Cos}[3 d x]\,\text{Sin}[3 c]}{112\,d}+\frac{107\,\text{Cos}[c]\,\text{Sin}[d x]}{336\,d}+\frac{3\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{40\,d}+\frac{\text{Cos}[3 c]\,\text{Sin}[3 d x]}{112\,d}\right)-\frac{1}{42\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$13\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{20\,d}7\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 369: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{5/2} (a+a\,\text{Sec}[c+d x])^3\,dx$$

Optimal (type 4, 91 leaves, 13 steps) :

$$\frac{36\,a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5\,d}+\frac{4\,a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{2\,a^3\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{d}+\frac{2\,a^3\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5\,d}$$

Result (type 5, 484 leaves) :

$$\text{Cos}[c+d\,x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 (a+a\,\text{Sec}[c+d\,x])^3 \left(-\frac{9\,\text{Cot}[c]}{10\,d}+\frac{\text{Cos}[d\,x]\,\text{Sin}[c]}{4\,d}+\frac{\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{40\,d}+\frac{\text{Cos}[c]\,\text{Sin}[d\,x]}{4\,d}+\frac{\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{40\,d}\right)-$$

$$\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{20\,d}9\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 (a+a\,\text{Sec}[c+d\,x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 370: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 4, 91 leaves, 13 steps):

$$\frac{4\,a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{20\,a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,a^3\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a^3\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 481 leaves):

$$\text{Cos}[c+d x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(-\frac{(1+3\,\text{Cos}[2 c])\,\text{Csc}[c]\,\text{Sec}[c]}{8 d}+\frac{\text{Cos}[d x]\,\text{Sin}[c]}{12 d}+\frac{\text{Cos}[c]\,\text{Sin}[d x]}{12 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{4 d}\right)-\frac{1}{6 d\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{4 d}\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 371: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Sec}[c+d x])^3\,dx$$

Optimal (type 4, 91 leaves, 13 steps):

$$-\frac{4 a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{20 a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{2 a^3\,\text{Sin}[c+d x]}{3 d\,\text{Cos}[c+d x]^{3/2}}+\frac{6 a^3\,\text{Sin}[c+d x]}{d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 479 leaves):

$$\text{Cos}[c+d x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(-\frac{(-5+\text{Cos}[2 c])\,\text{Csc}[c]\,\text{Sec}[c]}{8 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{12 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(\text{Sin}[c]+9\,\text{Sin}[d x])}{12 d}\right)-\frac{1}{6 d\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{4 d}\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 372: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^3}{\sqrt{\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 117 leaves, 15 steps):

$$-\frac{36 a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{4 a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{2 a^3\,\text{Sin}[c+d x]}{5 d\,\text{Cos}[c+d x]^{5/2}}+\frac{2 a^3\,\text{Sin}[c+d x]}{d\,\text{Cos}[c+d x]^{3/2}}+\frac{36 a^3\,\text{Sin}[c+d x]}{5 d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 501 leaves):

$$\text{Cos}[c+d x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(\frac{9\,\text{Csc}[c]\,\text{Sec}[c]}{10\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,\text{Sin}[d x]}{20\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(\text{Sin}[c]+5\,\text{Sin}[d x])}{20\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(5\,\text{Sin}[c]+18\,\text{Sin}[d x])}{20\,d}\right)-$$

$$\frac{1}{2\,d\sqrt{1+\text{Cot}[c]^2}}\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$(a+a\,\text{Sec}[c+d x])^3\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{20\,d}9\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 373: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^3}{\text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 147 leaves, 17 steps):

$$-\frac{28\,a^3\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5\,d}+\frac{52\,a^3\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21\,d}+$$

$$\frac{2\,a^3\,\text{Sin}[c+d x]}{7\,d\,\text{Cos}[c+d x]^{7/2}}+\frac{6\,a^3\,\text{Sin}[c+d x]}{5\,d\,\text{Cos}[c+d x]^{5/2}}+\frac{52\,a^3\,\text{Sin}[c+d x]}{21\,d\,\text{Cos}[c+d x]^{3/2}}+\frac{28\,a^3\,\text{Sin}[c+d x]}{5\,d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 531 leaves):

$$\text{Cos}[c+d x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(\frac{7\,\text{Csc}[c]\,\text{Sec}[c]}{10 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{28 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5\,\text{Sin}[c]+21\,\text{Sin}[d x])}{140 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(63\,\text{Sin}[c]+130\,\text{Sin}[d x])}{420 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(65\,\text{Sin}[c]+147\,\text{Sin}[d x])}{210 d}\right)-\frac{1}{42 d\sqrt{1+\text{Cot}[c]^2}}$$

$$13\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{20 d}7\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 374: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d x]^{5/2}}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 4, 128 leaves, 9 steps):

$$\frac{21\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 a d}-\frac{5\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a d}-\frac{5\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 a d}+\frac{7\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{5 a d}-\frac{\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Sec}[c+d x])}$$

Result (type 5, 314 leaves):

$$\frac{1}{15\,a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\left(2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(63\left(1+e^{2\,i\,(c+d\,x)}\right)+63\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+25\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)+1\Big/\left(d\,\sqrt{\text{Cos}[c+d\,x]}\right)\left(-96\,\text{Cot}[c]-30\,\text{Csc}[c]-20\,\text{Cos}[d\,x]\,\text{Sin}[c]+6\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]-30\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{d\,x}{2}\right]-20\,\text{Cos}[c]\,\text{Sin}[d\,x]+6\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]\right)\right)$$

- **Problem 375: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 100 leaves, 8 steps):

$$-\frac{3\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}+\frac{5\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,a\,d}+\frac{5\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}-\frac{\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 292 leaves):

$$\frac{1}{3\,a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\left(2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(9\left(1+e^{2\,i\,(c+d\,x)}\right)+9\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)+\frac{12\,\text{Cot}[c]+6\,\text{Csc}[c]+4\,\text{Cos}[d\,x]\,\text{Sin}[c]+6\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{d\,x}{2}\right]+4\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}\right)$$

- **Problem 376: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 72 leaves, 7 steps):

$$\frac{3\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}-\frac{\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}-\frac{\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 270 leaves):

$$\frac{1}{a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\left(2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(3\left(1+e^{2\,i\,(c+d\,x)}\right)+3\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)-\frac{2\left(2\,\text{Cot}[c]+\text{Csc}[c]+\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d\,\sqrt{\text{Cos}[c+d\,x]}}\right)$$

- **Problem 377: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 70 leaves, 7 steps):

$$-\frac{\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}+\frac{\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}+\frac{\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 262 leaves):

$$\frac{1}{a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\left(2\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)+\frac{2\left(\text{Csc}[c]+\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d\,\sqrt{\text{Cos}[c+d\,x]}}\right)$$

- **Problem 378: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 70 leaves, 7 steps):

$$\frac{\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}+\frac{\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}-\frac{\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 263 leaves):

$$\frac{1}{a\,(1+\operatorname{Sec}[c+d\,x])}\operatorname{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(\left(2\,\mathrm{i}\,\sqrt{2}\,e^{-\mathrm{i}\,(c+d\,x)}\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}+\left(-1+e^{2\,\mathrm{i}\,c}\right)\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathrm{i}\,(c+d\,x)}\right]-e^{\mathrm{i}\,(c+d\,x)}\left(-1+e^{2\,\mathrm{i}\,c}\right)\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,\mathrm{i}\,(c+d\,x)}\right]\right)\operatorname{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,\mathrm{i}\,c}\right)\sqrt{e^{-\mathrm{i}\,(c+d\,x)}\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)}\right)-\frac{2\left(\operatorname{Csc}[c]+\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\operatorname{Sin}\left[\frac{d\,x}{2}\right]\right)}{d\,\sqrt{\operatorname{Cos}[c+d\,x]}}\right)$$

- **Problem 379: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\operatorname{Cos}[c+d\,x]^{5/2}\,(a+a\operatorname{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 96 leaves, 8 steps):

$$-\frac{3\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{3\operatorname{Sin}[c+d\,x]}{a\,d\,\sqrt{\operatorname{Cos}[c+d\,x]}}-\frac{\operatorname{Sin}[c+d\,x]}{d\operatorname{Cos}[c+d\,x]^{3/2}\,(a+a\operatorname{Sec}[c+d\,x])}$$

Result (type 5, 303 leaves):

$$\frac{1}{a\,(1+\operatorname{Sec}[c+d\,x])}\operatorname{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(\frac{\left(2\operatorname{Cos}\left[\frac{1}{2}\,(c-d\,x)\right]+\operatorname{Cos}\left[\frac{1}{2}\,(3\,c+d\,x)\right]+3\operatorname{Cos}\left[\frac{1}{2}\,(c+3\,d\,x)\right]\right)\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]}{2\,d\operatorname{Cos}[c+d\,x]^{3/2}}-\left(2\,\mathrm{i}\,\sqrt{2}\,e^{-\mathrm{i}\,(c+d\,x)}\left(3\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)+3\left(-1+e^{2\,\mathrm{i}\,c}\right)\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathrm{i}\,(c+d\,x)}\right]-e^{\mathrm{i}\,(c+d\,x)}\left(-1+e^{2\,\mathrm{i}\,c}\right)\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,\mathrm{i}\,(c+d\,x)}\right]\right)\operatorname{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,\mathrm{i}\,c}\right)\sqrt{e^{-\mathrm{i}\,(c+d\,x)}\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)}\right)\right)$$

- **Problem 380: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\operatorname{Cos}[c+d\,x]^{7/2}\,(a+a\operatorname{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 124 leaves, 9 steps):

$$\frac{3\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{5\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}+\frac{5\operatorname{Sin}[c+d\,x]}{3\,a\,d\operatorname{Cos}[c+d\,x]^{3/2}}-\frac{3\operatorname{Sin}[c+d\,x]}{a\,d\,\sqrt{\operatorname{Cos}[c+d\,x]}}-\frac{\operatorname{Sin}[c+d\,x]}{d\operatorname{Cos}[c+d\,x]^{5/2}\,(a+a\operatorname{Sec}[c+d\,x])}$$

Result (type 5, 338 leaves):

$$\frac{1}{3\,a\,(1+\mathrm{Sec}[c+d\,x])}\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2$$
$$\left(-1\Big/\left(4\,d\,\mathrm{Cos}[c+d\,x]^{5/2}\right)\left(10\,\mathrm{Cos}\left[\frac{1}{2}(c-d\,x)\right]+8\,\mathrm{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+4\,\mathrm{Cos}\left[\frac{1}{2}(c+3\,d\,x)\right]+5\,\mathrm{Cos}\left[\frac{1}{2}(5\,c+3\,d\,x)\right]+9\,\mathrm{Cos}\left[\frac{1}{2}(3\,c+5\,d\,x)\right]\right)\right.$$
$$\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$\left(2\,i\sqrt{2}\,e^{-i\,(c+d\,x)}\left(9\left(1+e^{2\,i\,(c+d\,x)}\right)+9\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\right.\right.$$
$$\left.\left.\left.\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}[c+d\,x]\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)\right)$$

- **Problem 381: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]^{5/2}}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 160 leaves, 10 steps):

$$\frac{56\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{5\,a^2\,d}-\frac{5\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{a^2\,d}-\frac{5\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{a^2\,d}+$$
$$\frac{56\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,a^2\,d}-\frac{3\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{a^2\,d\,(1+\mathrm{Sec}[c+d\,x])}-\frac{\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}$$

Result (type 5, 366 leaves):

$$\frac{1}{5\,a^2\,(1+\mathrm{Sec}[c+d\,x])^2}$$
$$\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^4\left(\left(4\,i\sqrt{2}\,e^{-i\,(c+d\,x)}\left(56\left(1+e^{2\,i\,(c+d\,x)}\right)+56\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+25\,e^{i\,(c+d\,x)}\right.\right.\right.$$
$$\left.\left.\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}[c+d\,x]^2\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)+$$
$$\frac{1}{3\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}2\left(-216\,\mathrm{Cot}[c]-120\,\mathrm{Csc}[c]-40\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]+6\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]-120\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]+\right.$$
$$\left.\left.5\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\mathrm{Sin}\left[\frac{d\,x}{2}\right]-40\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]+6\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]+5\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]\right)\right)$$

- **Problem 382: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]^{3/2}}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 138 leaves, 9 steps):

$$-\frac{7\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a^2\,d}+\frac{10\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,a^2\,d}+\frac{10\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{7\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 341 leaves):

$$\frac{1}{3\,a^2\,(1+\text{Sec}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^4\left(-\left(4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(21\left(1+e^{2\,i\,(c+d\,x)}\right)+21\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+10\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]^2\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)+\frac{1}{d\,\text{Cos}[c+d\,x]^{3/2}}\left(48\,\text{Cot}[c]+36\,\text{Csc}[c]+8\,\text{Cos}[d\,x]\,\text{Sin}[c]+36\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{d\,x}{2}\right]-2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\text{Sin}\left[\frac{d\,x}{2}\right]+8\,\text{Cos}[c]\,\text{Sin}[d\,x]-2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{c}{2}\right]\right)\right)$$

- **Problem 383: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 112 leaves, 8 steps):

$$\frac{4\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a^2\,d}-\frac{5\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,a^2\,d}-\frac{5\,\text{Sin}[c+d\,x]}{3\,a^2\,d\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])}-\frac{\text{Sin}[c+d\,x]}{3\,d\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 374 leaves):

$$\left(4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(12\left(1+e^{2\,i\,(c+d\,x)}\right)+12\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+5\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]^2\right)\Big/\left(3\,d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+\frac{\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(-\frac{8\,\text{Cot}\left[\frac{c}{2}\right]}{d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2}$$

- **Problem 384: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\sqrt{\operatorname{Cos}[c+d x]}\,(a+a \operatorname{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 109 leaves, 8 steps):

$$-\frac{\operatorname{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a^2 d}+\frac{2 \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a^2 d}+\frac{\operatorname{Sin}[c+d x]}{a^2 d \sqrt{\operatorname{Cos}[c+d x]}\,(1+\operatorname{Sec}[c+d x])}-\frac{\operatorname{Sin}[c+d x]}{3 d \operatorname{Cos}[c+d x]^{3/2}(a+a \operatorname{Sec}[c+d x])^2}$$

Result (type 5, 656 leaves):

$$-\frac{1}{2(a+a \operatorname{Sec}[c+d x])^2} i \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c+d x]^2$$
$$\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$
$$\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)-$$
$$\left(4 \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c+d x]^2\right.$$
$$\operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$
$$\left.\sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(3 d \sqrt{1+\operatorname{Cot}[c]^2}\,(a+a \operatorname{Sec}[c+d x])^2\right)+$$
$$\frac{\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\left(\frac{4 \operatorname{Csc}[c]}{d}+\frac{4 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]}{d}-\frac{2 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{3 d}-\frac{2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Tan}\left[\frac{c}{2}\right]}{3 d}\right)}{\operatorname{Cos}[c+d x]^{3/2}(a+a \operatorname{Sec}[c+d x])^2}$$

- **Problem 386: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\operatorname{Cos}[c+d x]^{5/2}(a+a \operatorname{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 109 leaves, 8 steps):

$$\frac{\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a^2 d}+\frac{2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a^2 d}-\frac{\text{Sin}[c+d x]}{a^2 d \sqrt{\text{Cos}[c+d x]}\,(1+\text{Sec}[c+d x])}-\frac{\text{Sin}[c+d x]}{3 d\, \text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 370 leaves):

$$\left(4 i \sqrt{2}\, e^{-i (c+d x)} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(3\left(1+e^{2 i (c+d x)}\right)+3\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]-2 e^{i (c+d x)}\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)\text{Sec}[c+d x]^2\right)\Big/\left(3 d\left(-1+e^{2 i c}\right)\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\,(a+a\,\text{Sec}[c+d x])^2\right)+\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\left(-\frac{4\,\text{Csc}[c]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\text{Sin}\left[\frac{d x}{2}\right]}{3 d}-\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)}{\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^2}$$

- **Problem 387: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\text{Cos}[c+d x]^{7/2}\,(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 136 leaves, 9 steps):

$$-\frac{4\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a^2 d}-\frac{5\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a^2 d}+\frac{4\,\text{Sin}[c+d x]}{a^2 d\sqrt{\text{Cos}[c+d x]}}-\frac{5\,\text{Sin}[c+d x]}{3 a^2 d\,\text{Cos}[c+d x]^{3/2}\,(1+\text{Sec}[c+d x])}-\frac{\text{Sin}[c+d x]}{3 d\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 393 leaves):

$$-\left(4 i \sqrt{2}\, e^{-i (c+d x)} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(12\left(1+e^{2 i (c+d x)}\right)+12\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]-5 e^{i (c+d x)}\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)\text{Sec}[c+d x]^2\right)\Big/\left(3 d\left(-1+e^{2 i c}\right)\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\,(a+a\,\text{Sec}[c+d x])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\left(\frac{8\,\text{Cot}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\text{Sin}\left[\frac{d x}{2}\right]}{3 d}+\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right)\Big/\left(\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^2\right)$$

- **Problem 388: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\text{Cos}[c+d x]^{9/2} (a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 4, 162 leaves, 10 steps):

$$\frac{7 \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{a^2 d}+\frac{10 \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 a^2 d}+\frac{10 \text{Sin}[c+d x]}{3 a^2 d \text{Cos}[c+d x]^{3/2}}-\frac{7 \text{Sin}[c+d x]}{a^2 d \sqrt{\text{Cos}[c+d x]}}-\frac{7 \text{Sin}[c+d x]}{3 a^2 d \text{Cos}[c+d x]^{5/2} (1+\text{Sec}[c+d x])}-\frac{\text{Sin}[c+d x]}{3 d \text{Cos}[c+d x]^{7/2} (a+a \text{Sec}[c+d x])^2}$$

Result (type 5, 372 leaves):

$$\frac{1}{3 a^2 (1+\text{Sec}[c+d x])^2}\text{Cos}\left[\frac{1}{2} (c+d x)\right]^4 \left(-\frac{1}{8 d \text{Cos}[c+d x]^{7/2}}\left(82 \text{Cos}\left[\frac{1}{2} (c-d x)\right]+65 \text{Cos}\left[\frac{1}{2} (3 c+d x)\right]+68 \text{Cos}\left[\frac{1}{2} (c+3 d x)\right]+37 \text{Cos}\left[\frac{1}{2} (5 c+3 d x)\right]+53 \text{Cos}\left[\frac{1}{2} (3 c+5 d x)\right]+10 \text{Cos}\left[\frac{1}{2} (7 c+5 d x)\right]+21 \text{Cos}\left[\frac{1}{2} (5 c+7 d x)\right]\right) \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3+\left(4 i \sqrt{2}\, e^{-i (c+d x)} \left(21 \left(1+e^{2 i (c+d x)}\right)+21 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]-10 e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}[c+d x]^2\right)\Big/\left(d \left(-1+e^{2 i c}\right) \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)}\right)\right)$$

- **Problem 389: Result unnecessarily involves higher level functions.**

$$\int \frac{\text{Cos}[c+d x]^{5/2}}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 207 leaves, 11 steps):

$$\frac{231 \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{10 a^3 d}-\frac{21 \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{2 a^3 d}-\frac{21 \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{2 a^3 d}+\frac{77 \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{10 a^3 d}-\frac{\text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}-\frac{4 \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{5 a d (a+a \text{Sec}[c+d x])^2}-\frac{63 \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{10 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 5, 391 leaves):

$$\frac{1}{5 a^3 d (1+\text{Sec}[c+d x])^3} 2 \text{Cos}\left[\frac{1}{2}(c+d x)\right]^6 \left(\left(\left(42 i \sqrt{2} e^{-i (c+d x)} \left(11 \left(1+e^{2 i (c+d x)}\right)+11 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+5 e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}[c+d x]^3\right) \Big/ \left(\left(-1+e^{2 i c}\right) \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)}\right)+\frac{1}{\text{Cos}[c+d x]^{5/2}} \left(-264 \text{Cot}[c]-198 \text{Csc}[c]+\frac{1}{16} \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \left(-1210 \text{Sin}\left[\frac{d x}{2}\right]+770 \text{Sin}\left[c+\frac{d x}{2}\right]-840 \text{Sin}\left[c+\frac{3 d x}{2}\right]+150 \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-238 \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-40 \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-5 \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-5 \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+\text{Sin}\left[4 c+\frac{9 d x}{2}\right]+\text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)\right)\right)$$

Problem 390: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2}}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 181 leaves, 10 steps):

$$-\frac{119 \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{10 a^3 d}+\frac{11 \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{2 a^3 d}+\frac{11 \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{2 a^3 d}-\frac{\sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}-\frac{2 \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{3 a d (a+a \text{Sec}[c+d x])^2}-\frac{119 \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{30 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 5, 375 leaves):

$$\frac{1}{5 a^3 (1+\text{Sec}[c+d x])^3} \text{Cos}\left[\frac{1}{2}(c+d x)\right]^6 \left(-\left(4 i \sqrt{2} e^{-i (c+d x)} \left(119 \left(1+e^{2 i (c+d x)}\right)+119 \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+55 e^{i (c+d x)} \left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}[c+d x]^3\right) \Big/ \left(d \left(-1+e^{2 i c}\right) \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)}\right)+\frac{1}{3 d \text{Cos}[c+d x]^{5/2}} \left(720 \text{Cot}[c]+708 \text{Csc}[c]+\frac{1}{4} \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \left(1061 \text{Sin}\left[\frac{d x}{2}\right]-709 \text{Sin}\left[c+\frac{d x}{2}\right]+715 \text{Sin}\left[c+\frac{3 d x}{2}\right]-170 \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+202 \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+25 \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+5 \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+5 \text{Sin}\left[4 c+\frac{7 d x}{2}\right]\right)\right)\right)$$

Problem 391: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 155 leaves, 9 steps):

$$\frac{49\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}-\frac{13\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{6\,a^3\,d}-\frac{\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{8\,\text{Sin}[c+d\,x]}{15\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{13\,\text{Sin}[c+d\,x]}{6\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 357 leaves) :

$$\frac{1}{15\,a^3\,(1+\text{Sec}[c+d\,x])^3}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^6\left(-\frac{1}{8\,d\,\text{Cos}[c+d\,x]^{5/2}}\left(806\,\text{Cos}\left[\frac{1}{2}(c-d\,x)\right]+664\,\text{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+470\,\text{Cos}\left[\frac{1}{2}(c+3\,d\,x)\right]+265\,\text{Cos}\left[\frac{1}{2}(5\,c+3\,d\,x)\right]+117\,\text{Cos}\left[\frac{1}{2}(3\,c+5\,d\,x)\right]+30\,\text{Cos}\left[\frac{1}{2}(7\,c+5\,d\,x)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5+\left(4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(147\left(1+e^{2\,i\,(c+d\,x)}\right)+147\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+65\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]^3\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)\right)$$

- **Problem 392: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 155 leaves, 9 steps) :

$$-\frac{9\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}+\frac{\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{2\,a^3\,d}-\frac{\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{2\,\text{Sin}[c+d\,x]}{5\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 721 leaves) :

$$-\frac{1}{10\,(a+a\,\mathrm{Sec}[c+d\,x])^3}9\,i\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^3$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\Bigg(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\Bigg)-$$

$$\Bigg(2\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^3$$

$$\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/\left(d\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\Bigg(\frac{36\,\mathrm{Csc}[c]}{5\,d}+\frac{36\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}-\frac{12\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5\,d}-$$

$$\frac{12\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\Bigg)\Bigg)\Big/\left(\mathrm{Cos}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)$$

- **Problem 393: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 155 leaves, 9 steps):

$$-\frac{\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}+\frac{\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{6\,a^3\,d}+\frac{\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3}-$$

$$\frac{\mathrm{Sin}[c+d\,x]}{15\,a\,d\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{\mathrm{Sin}[c+d\,x]}{6\,d\sqrt{\mathrm{Cos}[c+d\,x]}\left(a^3+a^3\,\mathrm{Sec}[c+d\,x]\right)}$$

Result (type 5, 342 leaves):

$$\frac{1}{15 a^3 (1+\text{Sec}[c+d x])^3}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^6$$
$$\left(1\Big/\left(8 d \text{Cos}[c+d x]^{5/2}\right)\left(14 \text{Cos}\left[\frac{1}{2}(c-d x)\right]+16 \text{Cos}\left[\frac{1}{2}(3 c+d x)\right]+20 \text{Cos}\left[\frac{1}{2}(c+3 d x)\right]-5 \text{Cos}\left[\frac{1}{2}(5 c+3 d x)\right]+3 \text{Cos}\left[\frac{1}{2}(3 c+5 d x)\right]\right)\right.$$
$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$\left(4 i \sqrt{2} e^{-i (c+d x)}\left(3\left(1+e^{2 i (c+d x)}\right)+3\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+5 e^{i (c+d x)}\left(-1+e^{2 i c}\right)\right.\right.$$
$$\left.\left.\left.\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)\text{Sec}[c+d x]^3\right)\Big/\left(d\left(-1+e^{2 i c}\right)\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right)\right)$$

- **Problem 394: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\text{Cos}[c+d x]^{5/2}(a+a \text{Sec}[c+d x])^3}\, dx$$

Optimal (type 4, 155 leaves, 9 steps):

$$\frac{\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{10 a^3 d}+\frac{\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{6 a^3 d}-\frac{\text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{3/2}(a+a \text{Sec}[c+d x])^3}-$$
$$\frac{4 \text{Sin}[c+d x]}{15 a d \sqrt{\text{Cos}[c+d x]}(a+a \text{Sec}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{6 d \sqrt{\text{Cos}[c+d x]}\left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 5, 342 leaves):

$$\frac{1}{15 a^3 (1+\text{Sec}[c+d x])^3}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^6$$
$$\left(-1\Big/\left(8 d \text{Cos}[c+d x]^{5/2}\right)\left(4 \text{Cos}\left[\frac{1}{2}(c-d x)\right]+26 \text{Cos}\left[\frac{1}{2}(3 c+d x)\right]+10 \text{Cos}\left[\frac{1}{2}(c+3 d x)\right]+5 \text{Cos}\left[\frac{1}{2}(5 c+3 d x)\right]+3 \text{Cos}\left[\frac{1}{2}(3 c+5 d x)\right]\right)\right.$$
$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5+$$
$$\left(4 i \sqrt{2} e^{-i (c+d x)}\left(3\left(1+e^{2 i (c+d x)}\right)+3\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]-5 e^{i (c+d x)}\left(-1+e^{2 i c}\right)\right.\right.$$
$$\left.\left.\left.\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]\right)\text{Sec}[c+d x]^3\right)\Big/\left(d\left(-1+e^{2 i c}\right)\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right)\right)$$

- **Problem 395: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\text{Cos}[c+d x]^{7/2}(a+a \text{Sec}[c+d x])^3}\, dx$$

Optimal (type 4, 155 leaves, 9 steps):

$$\frac{9\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{10 a^3 d}+\frac{\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{2 a^3 d}-\frac{\text{Sin}[c+d x]}{5 d\,\text{Cos}[c+d x]^{5/2}(a+a\,\text{Sec}[c+d x])^3}-\frac{2\,\text{Sin}[c+d x]}{5 a d\,\text{Cos}[c+d x]^{3/2}(a+a\,\text{Sec}[c+d x])^2}-\frac{9\,\text{Sin}[c+d x]}{10 d\sqrt{\text{Cos}[c+d x]}\left(a^3+a^3\,\text{Sec}[c+d x]\right)}$$

Result (type 5, 721 leaves) :

$$\frac{1}{10(a+a\,\text{Sec}[c+d x])^3}9\,i\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^3$$
$$\left(\left(\left(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)-$$
$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^3\right.$$
$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(d\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\left(-\frac{36\,\text{Csc}[c]}{5 d}-\frac{36\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{5 d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\text{Sin}\left[\frac{d x}{2}\right]}{5 d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Sin}\left[\frac{d x}{2}\right]}{5 d}-\right.\right.$$
$$\left.\left.\frac{8\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{5 d}-\frac{2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right)\Big/\left(\text{Cos}[c+d x]^{5/2}(a+a\,\text{Sec}[c+d x])^3\right)$$

- **Problem 396: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Cos}[c+d x]^{9/2}(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 181 leaves, 10 steps) :

$$-\frac{49\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}-\frac{13\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{6\,a^3\,d}+\frac{49\,\text{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{8\,\text{Sin}[c+d\,x]}{15\,a\,d\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{13\,\text{Sin}[c+d\,x]}{6\,d\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 372 leaves) :

$$\frac{1}{15\,a^3\,(1+\text{Sec}[c+d\,x])^3}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^6\left(\frac{1}{16\,d\,\text{Cos}[c+d\,x]^{7/2}}\left(1284\,\text{Cos}\left[\frac{1}{2}(c-d\,x)\right]+921\,\text{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+1243\,\text{Cos}\left[\frac{1}{2}(c+3\,d\,x)\right]+374\,\text{Cos}\left[\frac{1}{2}(5\,c+3\,d\,x)\right]+670\,\text{Cos}\left[\frac{1}{2}(3\,c+5\,d\,x)\right]+65\,\text{Cos}\left[\frac{1}{2}(7\,c+5\,d\,x)\right]+147\,\text{Cos}\left[\frac{1}{2}(5\,c+7\,d\,x)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5-\left(4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(147\left(1+e^{2\,i\,(c+d\,x)}\right)+147\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-65\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]^3\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)\right)$$

Problem 397: Result unnecessarily involves higher level functions.

$$\int\frac{1}{\text{Cos}[c+d\,x]^{11/2}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 207 leaves, 11 steps) :

$$\frac{119\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}+\frac{11\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{2\,a^3\,d}+\frac{11\,\text{Sin}[c+d\,x]}{2\,a^3\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{119\,\text{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{2\,\text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{119\,\text{Sin}[c+d\,x]}{30\,d\,\text{Cos}[c+d\,x]^{5/2}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 402 leaves) :

$$\frac{1}{5\,a^3\,(1+\text{Sec}[c+d\,x])^3}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^6\left(-\frac{1}{96\,d\,\text{Cos}[c+d\,x]^{9/2}}\left(5134\,\text{Cos}\left[\frac{1}{2}(c-d\,x)\right]+4148\,\text{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+4664\,\text{Cos}\left[\frac{1}{2}(c+3\,d\,x)\right]+2476\,\text{Cos}\left[\frac{1}{2}(5\,c+3\,d\,x)\right]+3340\,\text{Cos}\left[\frac{1}{2}(3\,c+5\,d\,x)\right]+944\,\text{Cos}\left[\frac{1}{2}(7\,c+5\,d\,x)\right]+1620\,\text{Cos}\left[\frac{1}{2}(5\,c+7\,d\,x)\right]+165\,\text{Cos}\left[\frac{1}{2}(9\,c+7\,d\,x)\right]+357\,\text{Cos}\left[\frac{1}{2}(7\,c+9\,d\,x)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5+\left(4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\left(119\left(1+e^{2\,i\,(c+d\,x)}\right)+119\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-55\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]^3\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right)\right)$$

- **Problem 402: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 57 leaves, 3 steps):

$$\frac{2\,\sqrt{a}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}$$

Result (type 5, 113 leaves):

$$-\frac{1}{3\,d}2\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{\text{Cos}[c+d\,x]}\left(3\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]+e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

- **Problem 403: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 92 leaves, 4 steps):

$$\frac{\sqrt{a}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{a\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 146 leaves):

$$\frac{1}{3 d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a\ (1+\text{Sec}[c+d x])}\ \left(-3\ i\ e^{\frac{1}{2} i\ (c+d x)}\ \text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2 i\ (c+d x)}\right]\ \text{Sec}\left[\frac{1}{2}\ (c+d x)\right]-\right.$$
$$\left. i\ e^{\frac{3}{2} i\ (c+d x)}\ \text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2 i\ (c+d x)}\right]\ \text{Sec}\left[\frac{1}{2}\ (c+d x)\right]+3\ \text{Sec}[c+d x]\ \text{Tan}\left[\frac{1}{2}\ (c+d x)\right]\right)$$

- **Problem 404: Result unnecessarily involves higher level functions.**

$$\int \frac{\sqrt{a+a\ \text{Sec}[c+d x]}}{\text{Cos}[c+d x]^{5/2}}\, dx$$

Optimal (type 3, 136 leaves, 5 steps):

$$\frac{3\sqrt{a}\ \text{ArcSinh}\left[\frac{\sqrt{a}\ \text{Tan}[c+d x]}{\sqrt{a+a\ \text{Sec}[c+d x]}}\right]\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}}{4 d}+\frac{a\ \text{Sin}[c+d x]}{2 d\ \text{Cos}[c+d x]^{5/2}\ \sqrt{a+a\ \text{Sec}[c+d x]}}+\frac{3 a\ \text{Sin}[c+d x]}{4 d\ \text{Cos}[c+d x]^{3/2}\ \sqrt{a+a\ \text{Sec}[c+d x]}}$$

Result (type 5, 145 leaves):

$$\frac{1}{4 d}\sqrt{\text{Cos}[c+d x]}\ \text{Sec}\left[\frac{1}{2}\ (c+d x)\right]\ \sqrt{a\ (1+\text{Sec}[c+d x])}\ \left(-3\ i\ e^{\frac{1}{2} i\ (c+d x)}\ \text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2 i\ (c+d x)}\right]-\right.$$
$$\left. i\ e^{\frac{3}{2} i\ (c+d x)}\ \text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2 i\ (c+d x)}\right]+\text{Sec}[c+d x]\ (3+2\ \text{Sec}[c+d x])\ \text{Sin}\left[\frac{1}{2}\ (c+d x)\right]\right)$$

- **Problem 408: Result unnecessarily involves higher level functions.**

$$\int \sqrt{\text{Cos}[c+d x]}\ (a+a\ \text{Sec}[c+d x])^{3/2}\, dx$$

Optimal (type 3, 96 leaves, 5 steps):

$$\frac{2 a^{3/2}\ \text{ArcSinh}\left[\frac{\sqrt{a}\ \text{Tan}[c+d x]}{\sqrt{a+a\ \text{Sec}[c+d x]}}\right]\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}}{d}+\frac{2 a^2\ \text{Sin}[c+d x]}{d\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+a\ \text{Sec}[c+d x]}}$$

Result (type 5, 132 leaves):

$$-\frac{1}{3 d\ \left(1+e^{i\ (c+d x)}\right)}2\ i\ a\ \sqrt{\text{Cos}[c+d x]}$$
$$\left(-3+3\ e^{i\ (c+d x)}+6\ e^{i\ (c+d x)}\ \text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2 i\ (c+d x)}\right]+2\ e^{2 i\ (c+d x)}\ \text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2 i\ (c+d x)}\right]\right)$$
$$\sqrt{a\ (1+\text{Sec}[c+d x])}$$

- **Problem 409: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\ \text{Sec}[c+d x])^{3/2}}{\sqrt{\text{Cos}[c+d x]}}\, dx$$

Optimal (type 3, 95 leaves, 5 steps):

$$\frac{3\,a^{3/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{a^2\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 171 leaves):

$$\frac{1}{2\,d\,\sqrt{\text{Cos}[c+d\,x]}}a\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-3\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$
$$\left.i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 410: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{3/2}}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 140 leaves, 6 steps):

$$\frac{7\,a^{3/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+\frac{a^2\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{7\,a^2\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 167 leaves):

$$\frac{1}{24\,d\,\text{Cos}[c+d\,x]^{3/2}}$$
$$a\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-21\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$\left.7\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+3\,(2+7\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 411: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{3/2}}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 180 leaves, 7 steps):

$$\frac{11\,a^{3/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+$$
$$\frac{a^2\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{11\,a^2\,\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{11\,a^2\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 176 leaves):

$$\frac{1}{48\,d\,\text{Cos}[c+d\,x]^{5/2}}\,a\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-33\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-11\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(8+22\,\text{Cos}[c+d\,x]+33\,\text{Cos}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 415: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 138 leaves, 5 steps):

$$\frac{2\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{14\,a^3\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a^2\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 155 leaves):

$$\frac{1}{12\,d}a^2\,\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-6\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-2\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+15\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)$$

- **Problem 416: Result unnecessarily involves higher level functions.**

$$\int \sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 132 leaves, 5 steps):

$$\frac{5\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{a^3\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 167 leaves):

$$\frac{1}{12\,d\,\sqrt{\text{Cos}[c+d\,x]}}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-15\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-5\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+3\,(1+2\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 417: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 140 leaves, 5 steps):

$$\frac{19\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+\frac{9\,a^3\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 171 leaves):

$$\frac{1}{48\,d\,\text{Cos}[c+d\,x]^{3/2}}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-57\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-19\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+3\,(2+11\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 418: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 180 leaves, 6 steps):

$$\frac{25\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+\frac{13\,a^3\,\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{25\,a^3\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 180 leaves):

$$\frac{1}{96\,d\,\text{Cos}[c+d\,x]^{5/2}}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-75\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-25\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(8+34\,\text{Cos}[c+d\,x]+75\,\text{Cos}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 419: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 220 leaves, 7 steps):

$$\frac{163\,a^{5/2}\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+\frac{17\,a^3\,\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{163\,a^3\,\text{Sin}[c+d\,x]}{96\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{163\,a^3\,\text{Sin}[c+d\,x]}{64\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 190 leaves):

$$\frac{1}{768\,d\,\text{Cos}[c+d\,x]^{7/2}}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-489\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^4\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-163\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^4\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(48+184\,\text{Cos}[c+d\,x]+326\,\text{Cos}[c+d\,x]^2+489\,\text{Cos}[c+d\,x]^3\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 441: Unable to integrate problem.

$$\int(d\,\text{Cos}[e+f\,x])^n\,(a+a\,\text{Sec}[e+f\,x])^3\,dx$$

Optimal (type 5, 244 leaves, 8 steps):

$$-\frac{a^3\,(7-4\,n)\,(d\,\text{Cos}[e+f\,x])^n\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{n}{2},\frac{2+n}{2},\text{Cos}[e+f\,x]^2\right]\text{Sin}[e+f\,x]}{f\,(2-n)\,n\,\sqrt{\text{Sin}[e+f\,x]^2}}-\frac{a^3\,(1-4\,n)\,\text{Cos}[e+f\,x]\,(d\,\text{Cos}[e+f\,x])^n\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+n}{2},\frac{3+n}{2},\text{Cos}[e+f\,x]^2\right]\text{Sin}[e+f\,x]}{f\,(1-n)\,(1+n)\,\sqrt{\text{Sin}[e+f\,x]^2}}+\frac{a^3\,(5-2\,n)\,(d\,\text{Cos}[e+f\,x])^n\,\text{Tan}[e+f\,x]}{f\,(1-n)\,(2-n)}+\frac{(d\,\text{Cos}[e+f\,x])^n\,\left(a^3+a^3\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{f\,(2-n)}$$

Result (type 8, 25 leaves):

$$\int (d\,\mathrm{Cos}[e+f\,x])^n\,(a+a\,\mathrm{Sec}[e+f\,x])^3\,dx$$

Problem 442: Unable to integrate problem.

$$\int (d\,\mathrm{Cos}[e+f\,x])^n\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,dx$$

Optimal (type 5, 179 leaves, 7 steps):

$$-\frac{2\,a^2\,(d\,\mathrm{Cos}[e+f\,x])^n\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{n}{2},\frac{2+n}{2},\mathrm{Cos}[e+f\,x]^2\right]\mathrm{Sin}[e+f\,x]}{f\,n\,\sqrt{\mathrm{Sin}[e+f\,x]^2}}-\frac{a^2\,(1-2\,n)\,\mathrm{Cos}[e+f\,x]\,(d\,\mathrm{Cos}[e+f\,x])^n\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+n}{2},\frac{3+n}{2},\mathrm{Cos}[e+f\,x]^2\right]\mathrm{Sin}[e+f\,x]}{f\,(1-n)\,(1+n)\,\sqrt{\mathrm{Sin}[e+f\,x]^2}}+\frac{a^2\,(d\,\mathrm{Cos}[e+f\,x])^n\,\mathrm{Tan}[e+f\,x]}{f\,(1-n)}$$

Result (type 8, 25 leaves):

$$\int (d\,\mathrm{Cos}[e+f\,x])^n\,(a+a\,\mathrm{Sec}[e+f\,x])^2\,dx$$

Problem 443: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (d\,\mathrm{Cos}[e+f\,x])^n\,(a+a\,\mathrm{Sec}[e+f\,x])\,dx$$

Optimal (type 5, 132 leaves, 5 steps):

$$-\frac{a\,(d\,\mathrm{Cos}[e+f\,x])^n\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{n}{2},\frac{2+n}{2},\mathrm{Cos}[e+f\,x]^2\right]\mathrm{Sin}[e+f\,x]}{f\,n\,\sqrt{\mathrm{Sin}[e+f\,x]^2}}-\frac{a\,(d\,\mathrm{Cos}[e+f\,x])^{1+n}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+n}{2},\frac{3+n}{2},\mathrm{Cos}[e+f\,x]^2\right]\mathrm{Sin}[e+f\,x]}{d\,f\,(1+n)\,\sqrt{\mathrm{Sin}[e+f\,x]^2}}$$

Result (type 6, 3856 leaves):

$$\left(a\,\mathrm{Cos}[e+f\,x]^n\,(d\,\mathrm{Cos}[e+f\,x])^n\,(1+\mathrm{Sec}[e+f\,x])\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right.$$
$$\left(\left(3\,\mathrm{AppellF1}\left[\frac{1}{2},1-n,n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\Big/\left(\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right.\right.$$
$$\left(-3\,\mathrm{AppellF1}\left[\frac{1}{2},1-n,n,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+2\left(n\,\mathrm{AppellF1}\left[\frac{3}{2},1-n,1+n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(-1+n)\,\mathrm{AppellF1}\left[\frac{3}{2},2-n,n,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-n,\,1+n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-n,\,1+n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-\right.$$

$$2\left(n\,\text{AppellF1}\left[\frac{3}{2},\,1-n,\,1+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\right.$$

$$\left.\left.(1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-n,\,2+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right)\right)\Big/$$

$$\left(f\left(\frac{1}{2}\,\text{Cos}[e+f\,x]^n\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},\,1-n,\,n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right.\right.\right.\right.$$

$$\left(-3\,\text{AppellF1}\left[\frac{1}{2},\,1-n,\,n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3}{2},\,1-n,\,1+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,2-n,\,n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-n,\,1+n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-n,\,1+n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-2\left(n\,\text{AppellF1}\left[\frac{3}{2},\,1-n,\,1+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-n,\,2+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right)-$$

$$n\,\text{Cos}[e+f\,x]^{-1+n}\,\text{Sin}[e+f\,x]\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},\,1-n,\,n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\Big/\right.$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\left(-3\,\text{AppellF1}\left[\frac{1}{2},\,1-n,\,n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\right.\right.$$

$$2\left(n\,\text{AppellF1}\left[\frac{3}{2},\,1-n,\,1+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.(-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,2-n,\,n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-n,\,1+n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,-n,\,1+n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-2\left(n\,\text{AppellF1}\left[\frac{3}{2},\,1-n,\,1+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2},\,-n,\,2+n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)\right)+$$

$$\text{Cos}[e+f\,x]^n\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},\,1-n,\,n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/\right.$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2 \left(-3\,\text{AppellF1}\left[\frac{1}{2}, 1-n, n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$2\left(n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, 2-n, n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(3\left(-\frac{1}{3} n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2}, 2-n, n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) \left(-3\,\text{AppellF1}\left[\frac{1}{2}, 1-n, n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$2\left(n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, 2-n, n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -n, 1+n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}\left[\frac{1}{2}(e+f x)\right] \text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -n, 1+n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2}, -n, 2+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(3\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \left(-\frac{1}{3} n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]-\right.\right.$$

$$\left.\left.\frac{1}{3}(1+n)\,\text{AppellF1}\left[\frac{3}{2}, -n, 2+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, -n, 1+n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2},\right.\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2}, -n, 2+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-\left(3\,\text{AppellF1}\left[\frac{1}{2}, 1-n, n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$

$$\left(2\left(n\,\text{AppellF1}\left[\frac{3}{2}, 1-n, 1+n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$\left.(-1+n)\,\text{AppellF1}\left[\frac{3}{2}, 2-n, n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]-$$

$$3\left(-\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{2},1-n,1+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}(1-n)\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{2},2-n,n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$
$$\left(n\left(-\frac{3}{5}(1+n)\text{AppellF1}\left[\frac{5}{2},1-n,2+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$
$$\left.\frac{3}{5}(1-n)\text{AppellF1}\left[\frac{5}{2},2-n,1+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$
$$(-1+n)\left(-\frac{3}{5}n\,\text{AppellF1}\left[\frac{5}{2},2-n,1+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$
$$\left.\left.\left.\left.\left.\frac{3}{5}(2-n)\text{AppellF1}\left[\frac{5}{2},3-n,n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$
$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\left(-3\,\text{AppellF1}\left[\frac{1}{2},1-n,n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\right.\right.$$
$$\left(n\,\text{AppellF1}\left[\frac{3}{2},1-n,1+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.\left.(-1+n)\text{AppellF1}\left[\frac{3}{2},2-n,n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)-$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-n,1+n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\right.$$
$$\left(-2\left(n\,\text{AppellF1}\left[\frac{3}{2},1-n,1+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left.(1+n)\text{AppellF1}\left[\frac{3}{2},-n,2+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$
$$3\left(-\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{2},1-n,1+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{3}(1+n)\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{2},-n,2+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)-2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$
$$\left(n\left(-\frac{3}{5}(1+n)\text{AppellF1}\left[\frac{5}{2},1-n,2+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.\right.$$
$$\left.\frac{3}{5}(1-n)\text{AppellF1}\left[\frac{5}{2},2-n,1+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$
$$(1+n)\left(-\frac{3}{5}n\,\text{AppellF1}\left[\frac{5}{2},1-n,2+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\right.$$
$$\left.\left.\left.\left.\left.\frac{3}{5}(2+n)\text{AppellF1}\left[\frac{5}{2},-n,3+n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},-n,1+n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(n\,\text{AppellF1}\left[\frac{3}{2},1-n,1+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+n)\,\text{AppellF1}\left[\frac{3}{2},-n,2+n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Bigg)$$

Problem 444: Unable to integrate problem.

$$\int \frac{(d\,\text{Cos}[e+f x])^n}{a+a\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 5, 178 leaves, 7 steps):

$$\frac{(d\,\text{Cos}[e+f x])^n\,\text{Sin}[e+f x]}{f\,(a+a\,\text{Sec}[e+f x])}-\frac{\text{Cos}[e+f x]\,(d\,\text{Cos}[e+f x])^n\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+n}{2},\frac{3+n}{2},\text{Cos}[e+f x]^2\right]\text{Sin}[e+f x]}{a f\sqrt{\text{Sin}[e+f x]^2}}+\frac{(1+n)\,\text{Cos}[e+f x]^2\,(d\,\text{Cos}[e+f x])^n\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+n}{2},\frac{4+n}{2},\text{Cos}[e+f x]^2\right]\text{Sin}[e+f x]}{a f\,(2+n)\sqrt{\text{Sin}[e+f x]^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{(d\,\text{Cos}[e+f x])^n}{a+a\,\text{Sec}[e+f x]}\,dx$$

Problem 445: Unable to integrate problem.

$$\int \frac{(d\,\text{Cos}[e+f x])^n}{(a+a\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 5, 215 leaves, 8 steps):

$$\frac{2\,(2+n)\,(d\,\text{Cos}[e+f x])^n\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{n}{2},\frac{2+n}{2},\text{Cos}[e+f x]^2\right]\text{Sin}[e+f x]}{3 a^2 f\sqrt{\text{Sin}[e+f x]^2}}-\frac{(3+2 n)\,\text{Cos}[e+f x]\,(d\,\text{Cos}[e+f x])^n\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+n}{2},\frac{3+n}{2},\text{Cos}[e+f x]^2\right]\text{Sin}[e+f x]}{3 a^2 f\sqrt{\text{Sin}[e+f x]^2}}-\frac{2\,(2+n)\,(d\,\text{Cos}[e+f x])^n\,\text{Tan}[e+f x]}{3 a^2 f\,(1+\text{Sec}[e+f x])}-\frac{(d\,\text{Cos}[e+f x])^n\,\text{Tan}[e+f x]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}$$

Result (type 8, 25 leaves):

$$\int \frac{(d\,\text{Cos}[e+f x])^n}{(a+a\,\text{Sec}[e+f x])^2}\,dx$$

Problem 446: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^4 (a+b\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 85 leaves, 6 steps):

$$\frac{3 b\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{a\,\text{Tan}[c+d x]}{d}+\frac{3 b\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{8 d}+\frac{b\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{4 d}+\frac{a\,\text{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 227 leaves):

$$-\frac{3 b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{3 b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{b}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{3 b}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{b}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{3 b}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{2 a\,\text{Tan}[c+d x]}{3 d}+\frac{a\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d}$$

Problem 449: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (a+b\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 24 leaves, 4 steps):

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{b\,\text{Tan}[c+d x]}{d}$$

Result (type 3, 81 leaves):

$$-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b\,\text{Tan}[c+d x]}{d}$$

Problem 450: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 16 leaves, 2 steps):

$$a x+\frac{b\,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}$$

Result (type 3, 73 leaves):

$$a x-\frac{b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}$$

Problem 456: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^4 (a+b\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 135 leaves, 7 steps):

$$\frac{3 a b\,\text{ArcTanh}[\text{Sin}[c+d x]]}{4 d}+\frac{(5 a^2+4 b^2)\,\text{Tan}[c+d x]}{5 d}+\frac{3 a b\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{4 d}+\frac{a b\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{2 d}+\frac{b^2\,\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{5 d}+\frac{(5 a^2+4 b^2)\,\text{Tan}[c+d x]^3}{15 d}$$

Result (type 3, 301 leaves):

$$-\frac{3 a b\,\text{Log}[\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)]]}{4 d}+\frac{3 a b\,\text{Log}[\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)]]}{4 d}+\frac{a b}{8 d\,(\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)])^4}+\frac{3 a b}{8 d\,(\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)])^2}-\frac{a b}{8 d\,(\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)])^4}-\frac{3 a b}{8 d\,(\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)])^2}+\frac{2 a^2\,\text{Tan}[c+d x]}{3 d}+\frac{8 b^2\,\text{Tan}[c+d x]}{15 d}+\frac{a^2\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d}+\frac{4 b^2\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{15 d}+\frac{b^2\,\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{5 d}$$

Problem 457: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^3 (a+b\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 110 leaves, 6 steps):

$$\frac{(4 a^2+3 b^2)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{2 a b\,\text{Tan}[c+d x]}{d}+\frac{(4 a^2+3 b^2)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{8 d}+\frac{b^2\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{4 d}+\frac{2 a b\,\text{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 375 leaves):

$$-\frac{a^2\,\text{Log}[\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)]]}{2 d}-\frac{3 b^2\,\text{Log}[\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)]]}{8 d}+\frac{a^2\,\text{Log}[\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)]]}{2 d}+\frac{3 b^2\,\text{Log}[\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)]]}{8 d}+\frac{b^2}{16 d\,(\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)])^4}+\frac{a^2}{4 d\,(\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)])^2}+\frac{3 b^2}{16 d\,(\text{Cos}[\frac{1}{2}(c+d x)]-\text{Sin}[\frac{1}{2}(c+d x)])^2}-\frac{b^2}{16 d\,(\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)])^4}-\frac{a^2}{4 d\,(\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)])^2}-\frac{3 b^2}{16 d\,(\text{Cos}[\frac{1}{2}(c+d x)]+\text{Sin}[\frac{1}{2}(c+d x)])^2}+\frac{4 a b\,\text{Tan}[c+d x]}{3 d}+\frac{2 a b\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d}$$

Problem 459: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]\,(a+b\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 59 leaves, 5 steps):

$$\frac{\left(2 a^2+b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{2 a b \,\text{Tan}[c+d x]}{d}+\frac{b^2 \,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 d}$$

Result (type 3, 218 leaves):

$$\frac{1}{4 d}\text{Sec}[c+d x]^2\left(-2 a^2 \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-b^2 \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\left(2 a^2+b^2\right)\text{Cos}[2(c+d x)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+2 a^2 \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+b^2 \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+2 b^2 \,\text{Sin}[c+d x]+4 a b \,\text{Sin}[2(c+d x)]\right)$$

Problem 460: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 33 leaves, 4 steps):

$$a^2 x+\frac{2 a b \,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{b^2 \,\text{Tan}[c+d x]}{d}$$

Result (type 3, 77 leaves):

$$\frac{1}{d}\left(a\left(a c+a d x-2 b \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+2 b \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+b^2 \,\text{Tan}[c+d x]\right)$$

Problem 461: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]\,(a+b\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 33 leaves, 4 steps):

$$2 a b x+\frac{b^2 \,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{a^2 \,\text{Sin}[c+d x]}{d}$$

Result (type 3, 105 leaves):

$$2 a b x-\frac{b^2 \,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b^2 \,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a^2 \,\text{Cos}[d x]\,\text{Sin}[c]}{d}+\frac{a^2 \,\text{Cos}[c]\,\text{Sin}[d x]}{d}$$

Problem 466: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^3\,(a+b\,\text{Sec}[c+d x])^3\,dx$$

Optimal (type 3, 189 leaves, 8 steps) :

$$\frac{a\left(4 a^2+9 b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}-\frac{\left(3 a^4-52 a^2 b^2-16 b^4\right) \text{Tan}[c+d x]}{30 b d}-\frac{a\left(6 a^2-71 b^2\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{120 d}-\frac{\left(3 a^2-16 b^2\right)(a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{60 b d}-\frac{a(a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{20 b d}+\frac{(a+b \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{5 b d}$$

Result (type 3, 619 leaves) :

$$\frac{\left(-4 a^3-9 a b^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{\left(4 a^3+9 a b^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+$$
$$\frac{15 a b^2+2 b^3}{80 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{60 a^3+60 a^2 b+135 a b^2+19 b^3}{240 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{20 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5}+$$
$$\frac{b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{20 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5}+\frac{-15 a b^2-2 b^3}{80 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{-60 a^3-60 a^2 b-135 a b^2-19 b^3}{240 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{2\left(15 a^2 b \text{Sin}\left[\frac{1}{2}(c+d x)\right]+4 b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{15 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+\frac{2\left(15 a^2 b \text{Sin}\left[\frac{1}{2}(c+d x)\right]+4 b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{15 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\frac{60 a^2 b \text{Sin}\left[\frac{1}{2}(c+d x)\right]+19 b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{120 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{60 a^2 b \text{Sin}\left[\frac{1}{2}(c+d x)\right]+19 b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{120 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}$$

- **Problem 467: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^2 (a+b \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 130 leaves, 7 steps) :

$$\frac{3 b\left(4 a^2+b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{a\left(a^2+4 b^2\right) \text{Tan}[c+d x]}{2 d}+\frac{b\left(2 a^2+3 b^2\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{a(a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{4 d}+\frac{(a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 455 leaves) :

$$-\frac{3\left(4a^2b+b^3\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]}{8d}+\frac{3\left(4a^2b+b^3\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]}{8d}+$$
$$\frac{b^3}{16d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^4}+\frac{12a^2b+4ab^2+3b^3}{16d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+$$
$$\frac{ab^2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{2d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}-\frac{b^3}{16d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^4}+\frac{ab^2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{2d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+$$
$$\frac{-12a^2b-4ab^2-3b^3}{16d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{a^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+2ab^2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+\frac{a^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+2ab^2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}$$

- **Problem 468: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+dx]\,(a+b\,\text{Sec}[c+dx])^3\,dx$$

Optimal (type 3, 99 leaves, 6 steps):

$$\frac{a\left(2a^2+3b^2\right)\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{2b\left(4a^2+b^2\right)\text{Tan}[c+dx]}{3d}+\frac{5ab^2\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{6d}+\frac{b\,(a+b\,\text{Sec}[c+dx])^2\,\text{Tan}[c+dx]}{3d}$$

Result (type 3, 206 leaves):

$$-\frac{1}{24d}\text{Sec}[c+dx]^3\left(9a\left(2a^2+3b^2\right)\text{Cos}[c+dx]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)+\right.$$
$$3a\left(2a^2+3b^2\right)\text{Cos}[3(c+dx)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)-$$
$$\left.4b\left(9a^2+4b^2+9ab\,\text{Cos}[c+dx]+\left(9a^2+2b^2\right)\text{Cos}[2(c+dx)]\right)\text{Sin}[c+dx]\right)$$

- **Problem 469: Result more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+dx])^3\,dx$$

Optimal (type 3, 73 leaves, 5 steps):

$$a^3x+\frac{b\left(6a^2+b^2\right)\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{5ab^2\,\text{Tan}[c+dx]}{2d}+\frac{b^2\,(a+b\,\text{Sec}[c+dx])\,\text{Tan}[c+dx]}{2d}$$

Result (type 3, 256 leaves):

$$\frac{1}{4 d} \text{Sec}[c+d x]^2 \left(2 a^3 c+2 a^3 d x-6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\text{Cos}[2 (c+d x)] \left(2 a^3 (c+d x)-b \left(6 a^2+b^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b \left(6 a^2+b^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+2 b^3 \text{Sin}[c+d x]+6 a b^2 \text{Sin}[2 (c+d x)]\right)$$

Problem 477: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^2 (a+b \text{Sec}[c+d x])^4 \, dx$$

Optimal (type 3, 179 leaves, 8 steps):

$$\frac{a b \left(4 a^2+3 b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{2 \left(3 a^4+28 a^2 b^2+4 b^4\right) \text{Tan}[c+d x]}{15 d}+\frac{a b \left(6 a^2+29 b^2\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{30 d}+\frac{\left(3 a^2+4 b^2\right) (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{15 d}+\frac{a (a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{5 d}+\frac{(a+b \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{5 d}$$

Result (type 3, 663 leaves):

$$\frac{\left(-4 a^3 b-3 a b^3\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+\frac{\left(4 a^3 b+3 a b^3\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+\frac{10 a b^3+b^4}{40 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{240 a^3 b+120 a^2 b^2+180 a b^3+19 b^4}{240 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{20 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^5}+\frac{b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{20 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^5}+\frac{-10 a b^3-b^4}{40 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{-240 a^3 b-120 a^2 b^2-180 a b^3-19 b^4}{240 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{15 a^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+60 a^2 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+8 b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{15 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{15 a^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+60 a^2 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+8 b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{15 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{120 a^2 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+19 b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{120 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{120 a^2 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+19 b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{120 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}$$

Problem 478: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (a+b \text{Sec}[c+d x])^4 \, dx$$

Optimal (type 3, 146 leaves, 7 steps):

$$\frac{(8a^4+24a^2b^2+3b^4)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{8d}+\frac{ab\,(19a^2+16b^2)\,\text{Tan}[c+dx]}{6d}+\frac{b^2\,(26a^2+9b^2)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{24d}+\frac{7ab\,(a+b\,\text{Sec}[c+dx])^2\,\text{Tan}[c+dx]}{12d}+\frac{b\,(a+b\,\text{Sec}[c+dx])^3\,\text{Tan}[c+dx]}{4d}$$

Result (type 3, 807 leaves) :

$$\frac{(-8a^4-24a^2b^2-3b^4)\,\text{Cos}[c+dx]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right](a+b\,\text{Sec}[c+dx])^4}{8d\,(b+a\,\text{Cos}[c+dx])^4}+$$
$$\frac{(8a^4+24a^2b^2+3b^4)\,\text{Cos}[c+dx]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right](a+b\,\text{Sec}[c+dx])^4}{8d\,(b+a\,\text{Cos}[c+dx])^4}+$$
$$\frac{b^4\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4}{16d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^4}+\frac{(72a^2b^2+16ab^3+9b^4)\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4}{48d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+$$
$$\frac{2ab^3\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{3d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}-\frac{b^4\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4}{16d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^4}+$$
$$\frac{2ab^3\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{3d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{(-72a^2b^2-16ab^3-9b^4)\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4}{48d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+$$
$$\frac{4\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4\left(3a^3b\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+2ab^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{3d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+$$
$$\frac{4\,\text{Cos}[c+dx]^4\,(a+b\,\text{Sec}[c+dx])^4\left(3a^3b\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+2ab^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{3d\,(b+a\,\text{Cos}[c+dx])^4\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}$$

- **Problem 479: Result more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+dx])^4\,dx$$

Optimal (type 3, 107 leaves, 6 steps) :

$$a^4x+\frac{2ab\,(2a^2+b^2)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{d}+\frac{b^2\,(17a^2+2b^2)\,\text{Tan}[c+dx]}{3d}+\frac{4ab^3\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{3d}+\frac{b^2\,(a+b\,\text{Sec}[c+dx])^2\,\text{Tan}[c+dx]}{3d}$$

Result (type 3, 246 leaves) :

$$\frac{1}{12\,d}\,\mathrm{Sec}[c+d\,x]^3\left(9\,a\,\mathrm{Cos}[c+d\,x]\left(a^3\,(c+d\,x)-2\,b\,\left(2\,a^2+b^2\right)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,b\,\left(2\,a^2+b^2\right)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+3\,a\,\mathrm{Cos}[3\,(c+d\,x)]\left(a^3\,(c+d\,x)-2\,b\,\left(2\,a^2+b^2\right)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,b\,\left(2\,a^2+b^2\right)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+4\,b^2\,\left(9\,a^2+2\,b^2+6\,a\,b\,\mathrm{Cos}[c+d\,x]+\left(9\,a^2+b^2\right)\,\mathrm{Cos}[2\,(c+d\,x)]\right)\,\mathrm{Sin}[c+d\,x]\right)$$

Problem 480: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\,dx$$

Optimal (type 3, 104 leaves, 6 steps):

$$4\,a^3\,b\,x+\frac{b^2\,\left(12\,a^2+b^2\right)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{a^2\,\left(2\,a^2-b^2\right)\,\mathrm{Sin}[c+d\,x]}{2\,d}+\frac{b^2\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{2\,d}+\frac{3\,a\,b^3\,\mathrm{Tan}[c+d\,x]}{d}$$

Result (type 3, 280 leaves):

$$\frac{1}{4\,d}\,\mathrm{Sec}[c+d\,x]^2\left(8\,a^3\,b\,c+8\,a^3\,b\,d\,x-12\,a^2\,b^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-b^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+12\,a^2\,b^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+b^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+b\,\mathrm{Cos}[2\,(c+d\,x)]\left(8\,a^3\,(c+d\,x)-b\,\left(12\,a^2+b^2\right)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+b\,\left(12\,a^2+b^2\right)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\left(a^4+2\,b^4\right)\,\mathrm{Sin}[c+d\,x]+8\,a\,b^3\,\mathrm{Sin}[2\,(c+d\,x)]+a^4\,\mathrm{Sin}[3\,(c+d\,x)]\right)$$

Problem 486: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\mathrm{Sec}[c+d\,x])^5\,dx$$

Optimal (type 3, 158 leaves, 7 steps):

$$a^5\,x+\frac{b\,\left(40\,a^4+40\,a^2\,b^2+3\,b^4\right)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{a\,b^2\,\left(53\,a^2+20\,b^2\right)\,\mathrm{Tan}[c+d\,x]}{6\,d}+\frac{b^3\,\left(58\,a^2+9\,b^2\right)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{24\,d}+\frac{11\,a\,b^2\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Tan}[c+d\,x]}{12\,d}+\frac{b^2\,(a+b\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 855 leaves):

$$\frac{a^5 (c+d x) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5}{d (b+a \text{Cos}[c+d x])^5}+$$
$$\frac{\left(-40 a^4 b-40 a^2 b^3-3 b^5\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^5}{8 d (b+a \text{Cos}[c+d x])^5}+$$
$$\frac{\left(40 a^4 b+40 a^2 b^3+3 b^5\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^5}{8 d (b+a \text{Cos}[c+d x])^5}+$$
$$\frac{b^5 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5}{16 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{\left(120 a^2 b^3+20 a b^4+9 b^5\right) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5}{48 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$
$$\frac{5 a b^4 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-\frac{b^5 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5}{16 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$
$$\frac{5 a b^4 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{\left(-120 a^2 b^3-20 a b^4-9 b^5\right) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5}{48 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$
$$\frac{10 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5 \left(3 a^3 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+a b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}{3 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+$$
$$\frac{10 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^5 \left(3 a^3 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+a b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}{3 d (b+a \text{Cos}[c+d x])^5 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}$$

- **Problem 505: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Cos}[c+d x]^3}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 261 leaves, 8 steps):

$$-\frac{b \left(a^2+4 b^2\right) x}{a^5}+\frac{2 b^4 \left(5 a^2-4 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^5 (a-b)^{3/2} (a+b)^{3/2} d}+\frac{\left(2 a^4+7 a^2 b^2-12 b^4\right) \text{Sin}[c+d x]}{3 a^4 \left(a^2-b^2\right) d}-$$
$$\frac{b \left(a^2-2 b^2\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{a^3 \left(a^2-b^2\right) d}+\frac{\left(a^2-4 b^2\right) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right) d}+\frac{b^2 \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 176 leaves):

$$\frac{1}{12\,a^5\,d}\left(-12\,b\,(-i\,a+2\,b)\,(i\,a+2\,b)\,(c+d\,x)+\frac{24\,b^4\left(-5\,a^2+4\,b^2\right)\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]}{\left(a^2-b^2\right)^{3/2}}+\right.$$

$$\left.9\,a\left(a^2+4\,b^2\right)\,\text{Sin}[c+d\,x]+\frac{12\,a\,b^5\,\text{Sin}[c+d\,x]}{(-a+b)\,(a+b)\,(b+a\,\text{Cos}[c+d\,x])}-6\,a^2\,b\,\text{Sin}[2\,(c+d\,x)]+a^3\,\text{Sin}[3\,(c+d\,x)]\right)$$

- **Problem 529: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{(5+3\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 120 leaves, 6 steps):

$$\frac{x}{125}+\frac{8361\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{256\,000\,d}-$$

$$\frac{8361\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{256\,000\,d}+\frac{9\,\text{Tan}[c+d\,x]}{160\,d\,(5+3\,\text{Sec}[c+d\,x])^2}+\frac{963\,\text{Tan}[c+d\,x]}{12\,800\,d\,(5+3\,\text{Sec}[c+d\,x])}$$

Result (type 3, 241 leaves):

$$\frac{1}{512\,000\,d\,(3+5\,\text{Cos}[c+d\,x])^2}\left(88\,064\,c+88\,064\,d\,x+359\,523\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.$$

$$60\,\text{Cos}[c+d\,x]\left(2048\,(c+d\,x)+8361\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-8361\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+$$

$$25\,\text{Cos}[2\,(c+d\,x)]\left(2048\,(c+d\,x)+8361\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-8361\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-$$

$$\left.359\,523\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+115\,560\,\text{Sin}[c+d\,x]+110\,700\,\text{Sin}[2\,(c+d\,x)]\right)$$

- **Problem 530: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{(5+3\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 145 leaves, 7 steps):

$$\frac{x}{625}+\frac{278151\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{20480000\,d}-\frac{278151\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{20480000\,d}+\frac{3\,\text{Tan}[c+d\,x]}{80\,d\,(5+3\,\text{Sec}[c+d\,x])^3}+\frac{519\,\text{Tan}[c+d\,x]}{12800\,d\,(5+3\,\text{Sec}[c+d\,x])^2}+\frac{38733\,\text{Tan}[c+d\,x]}{1024000\,d\,(5+3\,\text{Sec}[c+d\,x])}$$

Result (type 3, 344 leaves) :

$$\frac{1}{81920000\,d\,(3+5\,\text{Cos}[c+d\,x])^3}\Bigg(18284544\,c+18284544\,d\,x+4096000\,c\,\text{Cos}[3\,(c+d\,x)]+4096000\,d\,x\,\text{Cos}[3\,(c+d\,x)]+155208258\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+34768875\,\text{Cos}[3\,(c+d\,x)]\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+915\,\text{Cos}[c+d\,x]\left(32768\,(c+d\,x)+278151\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-278151\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+450\,\text{Cos}[2\,(c+d\,x)]\left(32768\,(c+d\,x)+278151\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-278151\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-155208258\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-34768875\,\text{Cos}[3\,(c+d\,x)]\,\text{Log}\left[2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+52174260\,\text{Sin}[c+d\,x]+51462000\,\text{Sin}[2\,(c+d\,x)]+24286500\,\text{Sin}[3\,(c+d\,x)]\Bigg)$$

Problem 531: Unable to integrate problem.

$$\int \text{Sec}[c+d\,x]^3\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 292 leaves, 5 steps) :

$$\frac{1}{15\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(2\,a^2-9\,b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,(2\,a+9\,b)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{4\,a\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,b\,d}+\frac{2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,b\,d}$$

Result (type 8, 25 leaves) :

$$\int \text{Sec}[c+d\,x]^3\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Problem 532: Unable to integrate problem.

$$\int \text{Sec}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 241 leaves, 4 steps) :

$$-\frac{1}{3 b^2 d}2 a (a-b) \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{2 (a-b) \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{3 b d} + \frac{2 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 8, 25 leaves) :

$$\int \operatorname{Sec}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \, dx$$

Problem 534: Unable to integrate problem.

$$\int \sqrt{a+b \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 125 leaves, 1 step) :

$$-\frac{1}{\sqrt{a+b} d} 2 \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a}{a+b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b}}{\sqrt{a+b \operatorname{Sec}[c+d x]}}\right], \frac{a-b}{a+b}\right] \sqrt{-\frac{b (1-\operatorname{Sec}[c+d x])}{a+b \operatorname{Sec}[c+d x]}} \sqrt{\frac{b (1+\operatorname{Sec}[c+d x])}{a+b \operatorname{Sec}[c+d x]}} (a+b \operatorname{Sec}[c+d x])$$

Result (type 8, 16 leaves) :

$$\int \sqrt{a+b \operatorname{Sec}[c+d x]} \, dx$$

Problem 535: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \operatorname{Cos}[c+d x] \sqrt{a+b \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 330 leaves, 6 steps) :

$$\frac{(a-b)\sqrt{a+b}\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}}{b d}+$$

$$\frac{\sqrt{a+b}\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}}{d}-$$

$$\frac{b\sqrt{a+b}\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}}{a d}+\frac{\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d}$$

Result (type 4, 2713 leaves) :

$$\Bigg(\text{Cos}[c+d x]\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{a+b\,\text{Sec}[c+d x]}$$

$$\Bigg(i(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$\sqrt{2}\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,(b+a\,\text{Cos}[c+d x])\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Bigg)\Bigg/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4}\right.$$

$$\left(\frac{1}{\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4}}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left(\mathrm{i}\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\right.$$

$$2\,\mathrm{i}\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$\left.\sqrt{2}\,\sqrt{\frac{-a+b}{a+b}}\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{2\sqrt{\frac{-a+b}{a+b}}\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4}}\,a\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]$$

$$\left(\mathrm{i}\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\right.$$

$$2\,\mathrm{i}\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$\left.\sqrt{2}\,\sqrt{\frac{-a+b}{a+b}}\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\frac{1}{2\sqrt{\frac{-a+b}{a+b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\right)^{3/2}}\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}$$

$$\left(\mathrm{i}\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\right.$$

$$2\,\mathrm{i}\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$\sqrt{2}\,\sqrt{\frac{-a+b}{a+b}}\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)$$

$$\Big(-\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\,\text{Sin}[c+d\,x]+2\,\text{Cos}[c+d\,x]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\,\Big(-1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)+$$

$$\frac{1}{\sqrt{\frac{-a+b}{a+b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4}}\,\sqrt{\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]}\,\Big(-1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)$$

$$\Bigg(-\frac{\sqrt{\frac{-a+b}{a+b}}\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}{\sqrt{2}}+\sqrt{2}\,a\,\sqrt{\frac{-a+b}{a+b}}\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sin}[c+d\,x]\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-$$

$$\frac{\sqrt{\frac{-a+b}{a+b}}\,(b+a\,\text{Cos}[c+d\,x])\,\Big(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}{\sqrt{2}\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\Bigg(i\,(a-b)\,\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}$$

$$\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\Bigg(-\frac{a\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sin}[c+d\,x]}{a+b}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}{a+b}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(2\,\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}{a+b}}\Bigg)+\Bigg(i\,b\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\Bigg(-\frac{a\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sin}[c+d\,x]}{a+b}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}{a+b}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}{a+b}}\Bigg)-\frac{b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}}{\Big(1-\frac{(-a+b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a-b}\Big)\,\sqrt{1+\frac{(-a+b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a-b}}\,\sqrt{1+\frac{(-a+b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}}-$$

$$\left.\frac{(a-b)\sqrt{\frac{-a+b}{a+b}}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}}}{2\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}\right)+$$

$$\left(\left(\left(\mathrm{i}\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\right.\right.\right.$$

$$2\,\mathrm{i}\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$\left.\sqrt{2}\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left.\left.\left(2\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4}\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\right)\right)\right)$$

- **Problem 536: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 396 leaves, 7 steps):

$$\frac{(a-b)\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{4\,a\,d}+$$

$$\frac{\sqrt{a+b}\,(2\,a+b)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{4\,a\,d}-\frac{1}{4\,a^2\,d}$$

$$\sqrt{a+b}\,\left(4\,a^2-b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{b\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,a\,d}+\frac{\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1173 leaves):

$$\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,d}+$$

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.\right.$$

$$2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,\mathrm{i}\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,\mathrm{i}\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-8\,\mathrm{i}\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-\,i\,(a-b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,i\,\left(2\,a^2-a\,b-b^2\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\,a\,\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 537: Unable to integrate problem.**

$$\int \text{Sec}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 405 leaves, 7 steps) :

$$-\frac{1}{315\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,a^4+33\,a^2\,b^2+147\,b^4\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-\frac{1}{315\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,a^3+6\,a^2\,b+39\,a\,b^2-147\,b^3\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$
$$\frac{2\,a\,\left(8\,a^2+39\,b^2\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}+\frac{2\,\left(8\,a^2+49\,b^2\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}-$$
$$\frac{8\,a\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{63\,b^2\,d}+\frac{2\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{9\,b\,d}$$

Result (type 8, 25 leaves) :

$$\int \text{Sec}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Problem 538: Unable to integrate problem.

$$\int \text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 342 leaves, 6 steps) :

$$\frac{1}{105\,b^3\,d}4\,a\,(a-b)\,\sqrt{a+b}\,\left(3\,a^2-41\,b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+\frac{1}{105\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(6\,a^2+57\,a\,b-25\,b^2\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$
$$\frac{2\,\left(6\,a^2-25\,b^2\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b\,d}-\frac{4\,a\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,b\,d}+\frac{2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 8, 25 leaves) :

$$\int \text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Problem 539: Unable to integrate problem.

$$\int \mathrm{Sec}[c+d x]^2 (a+b\,\mathrm{Sec}[c+d x])^{3/2}\, dx$$

Optimal (type 4, 282 leaves, 5 steps):

$$-\frac{1}{5 b^2 d} 2 (a-b) \sqrt{a+b} \left(a^2+3 b^2\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} - \frac{1}{5 b d} 2 (a-3 b) (a-b) \sqrt{a+b}\, \mathrm{Cot}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{2 a \sqrt{a+b\,\mathrm{Sec}[c+d x]}\, \mathrm{Tan}[c+d x]}{5 d} + \frac{2 (a+b\,\mathrm{Sec}[c+d x])^{3/2} \mathrm{Tan}[c+d x]}{5 d}$$

Result (type 8, 25 leaves):

$$\int \mathrm{Sec}[c+d x]^2 (a+b\,\mathrm{Sec}[c+d x])^{3/2}\, dx$$

Problem 540: Attempted integration timed out after 120 seconds.

$$\int \mathrm{Sec}[c+d x] (a+b\,\mathrm{Sec}[c+d x])^{3/2}\, dx$$

Optimal (type 4, 249 leaves, 4 steps):

$$-\frac{1}{3 b d} 8 a (a-b) \sqrt{a+b}\, \mathrm{Cot}[c+d x]\, \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{1}{3 b d} 2 (a-b) (3 a-b) \sqrt{a+b}\, \mathrm{Cot}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{2 b \sqrt{a+b\,\mathrm{Sec}[c+d x]}\, \mathrm{Tan}[c+d x]}{3 d}$$

Result (type 1, 1 leaves):

???

Problem 541: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+b\,\mathrm{Sec}[c+d x])^{3/2}\, dx$$

Optimal (type 4, 309 leaves, 5 steps):

$$-\frac{1}{d}2\,(a-b)\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{d}$$

$$2\,(2\,a-b)\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{2\,a\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{d}$$

Result (type 4, 882 leaves) :

$$\frac{2\,b\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d\,(b+a\,\text{Cos}[c+d\,x])}+$$

$$\Bigg(2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\Bigg(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3+$$

$$a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+2\,i\,a^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}+$$

$$2\,i\,a^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-i\,(a-b)\,b\,\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\Big(1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-$$

$$i\,(a-b)^2\,\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\sqrt{\frac{-a+b}{a+b}}\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{\frac{1}{1-\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\,\Big(-1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\Bigg)$$

Problem 542: Result unnecessarily involves imaginary or complex numbers.

$$\int \mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 334 leaves, 6 steps):

$$\frac{a\,(a-b)\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{b\,d}+$$

$$\frac{\sqrt{a+b}\,(a+2\,b)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{d}-$$

$$\frac{3\,b\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{d}+\frac{a\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 642 leaves):

$$\left((a+b\,\text{Sec}[c+d\,x])^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(-\text{i}\,a\,(a-b)\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,\text{i}\,(a-b)\,b\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$6\,\text{i}\,a\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\left.\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+a\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\right)\Bigg/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)$$

- **Problem 543: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 390 leaves, 7 steps) :

$$\frac{5\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{4\,d}+\frac{1}{4\,d}$$

$$\sqrt{a+b}\,(2\,a+5\,b)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,a\,d}$$

$$\sqrt{a+b}\,\left(4\,a^2+3\,b^2\right)\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{5\,b\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1159 leaves) :

$$\frac{a\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[2\,(c+d\,x)]}{4\,d\,(b+a\,\text{Cos}[c+d\,x])}-$$

$$\Bigg((a+b\,\text{Sec}[c+d\,x])^{3/2}\Bigg(5\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+5\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-10\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$

$$5\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-5\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$6\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-8\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$6\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-5\,\mathrm{i}\,(a-b)\,b\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,\mathrm{i}\,\left(2\,a^2-a\,b-b^2\right)\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\sqrt{\frac{-a+b}{a+b}}\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^{3/2}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 544: Attempted integration timed out after 120 seconds.**

$$\int \mathrm{Sec}[c+d\,x]^4\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 463 leaves, 8 steps) :

$$-\frac{1}{693\, b^4\, d}2\, a\, (a-b)\, \sqrt{a+b}\, \left(8\, a^4+51\, a^2\, b^2+741\, b^4\right)\, \text{Cot}[c+d\, x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{693\,b^3\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,\left(8\,a^4+6\,a^3\,b+57\,a^2\,b^2-606\,a\,b^3+135\,b^4\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(8\,a^4+57\,a^2\,b^2+135\,b^4\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{693\,b^2\,d}+$$

$$\frac{2\,a\,\left(8\,a^2+67\,b^2\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{693\,b^2\,d}+\frac{2\,\left(8\,a^2+81\,b^2\right)\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{693\,b^2\,d}-$$

$$\frac{8\,a\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{99\,b^2\,d}+\frac{2\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{11\,b\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 545: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 399 leaves, 7 steps) :

$$\frac{1}{315\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(10\,a^4-279\,a^2\,b^2-147\,b^4\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{315\,b^2\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,\left(10\,a^3+165\,a^2\,b-114\,a\,b^2+147\,b^3\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{4\,a\,\left(5\,a^2-57\,b^2\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b\,d}-$$

$$\frac{2\,\left(10\,a^2-49\,b^2\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{315\,b\,d}-\frac{4\,a\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{63\,b\,d}+\frac{2\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{9\,b\,d}$$

Result (type 1, 1 leaves) :

???

Problem 546: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d x]^2 (a+b\,\text{Sec}[c+d x])^{5/2}\,dx$$

Optimal (type 4, 333 leaves, 6 steps):

$$-\frac{1}{21 b^2 d} 2 a (a-b) \sqrt{a+b} \left(3 a^2+29 b^2\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{21 b d} 2 (a-b) \sqrt{a+b} \left(3 a^2-24 a b+5 b^2\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 \left(3 a^2+5 b^2\right) \sqrt{a+b\,\text{Sec}[c+d x]}\, \text{Tan}[c+d x]}{21 d} + \frac{2 a (a+b\,\text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{7 d} + \frac{2 (a+b\,\text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x]}{7 d}$$

Result (type 1, 1 leaves):

???

Problem 547: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d x] (a+b\,\text{Sec}[c+d x])^{5/2}\,dx$$

Optimal (type 4, 296 leaves, 5 steps):

$$-\frac{1}{15 b d} 2 (a-b) \sqrt{a+b} \left(23 a^2+9 b^2\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{15 b d} 2 (a-b) \sqrt{a+b} \left(15 a^2-8 a b+9 b^2\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{16 a b \sqrt{a+b\,\text{Sec}[c+d x]}\, \text{Tan}[c+d x]}{15 d} + \frac{2 b (a+b\,\text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{5 d}$$

Result (type 1, 1 leaves):

???

- **Problem 548: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (a + b \operatorname{Sec}[c + d x])^{5/2} \, dx$$

Optimal (type 4, 352 leaves, 6 steps) :

$$-\frac{1}{3 d}14 a (a - b) \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} + \frac{1}{3 d}$$

$$2 \sqrt{a + b} \left(9 a^2 - 7 a b + b^2\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} -$$

$$\frac{1}{d}2 a^2 \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticPi}\left[\frac{a + b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} +$$

$$\frac{2 b^2 \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Tan}[c + d x]}{3 d}$$

Result (type 4, 713 leaves) :

$$\left(2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(-7\,i\,a\,(a-b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\right.\right.$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$i\,\left(3\,a^3-9\,a^2\,b+7\,a\,b^2-b^3\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+6\,i\,a^3\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$\left.\left.7\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)\right)\Big/$$

$$\left(3\,\sqrt{\frac{-a+b}{a+b}}\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\;+$$

$$\frac{\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{14}{3}\,a\,b\,\text{Sin}[c+d\,x]+\frac{2}{3}\,b^2\,\text{Tan}[c+d\,x]\right)}{d\,(b+a\,\text{Cos}[c+d\,x])^2}$$

- **Problem 549: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 353 leaves, 6 steps) :

$$\frac{1}{b\,d}(a-b)\sqrt{a+b}\,\left(a^2-2\,b^2\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{d}$$

$$\sqrt{a+b}\,\left(a^2+6\,a\,b-2\,b^2\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{d}5\,a\,b\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{a^2\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 784 leaves) :

$$\frac{2 b^2 \operatorname{Cos}[c+d x]^2 (a+b \operatorname{Sec}[c+d x])^{5/2} \operatorname{Sin}[c+d x]}{d (b+a \operatorname{Cos}[c+d x])^2}+$$

$$\left((a+b \operatorname{Sec}[c+d x])^{5/2} \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \left(a^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+a^2 b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-2 a b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-2 b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.\right.$$

$$2 a^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+4 a b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+a^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a^2 b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-2 a b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$2 b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-10 a^2 b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-10 a^2 b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$\left(a^3+a^2 b-2 a b^2-2 b^3\right) \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+2 b\left(-3 a^2+3 a b+b^2\right) \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(d (b+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2} \left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

- **Problem 550: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]^2 (a+b \operatorname{Sec}[c+d x])^{5/2} \, dx$$

Optimal (type 4, 399 leaves, 7 steps) :

$$\frac{9\,a\,(a-b)\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{4\,d}+\frac{1}{4\,d}$$

$$\sqrt{a+b}\,\left(2\,a^2+9\,a\,b+8\,b^2\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}$$

$$\sqrt{a+b}\,\left(4\,a^2+15\,b^2\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{9\,a\,b\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}+\frac{a^2\,\mathrm{Cos}[c+d\,x]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 4588 leaves) :

$$\frac{a^2\,\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Sin}[2\,(c+d\,x)]}{4\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}+$$

$$\left(\left(\frac{a^3}{2\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{3\,a\,b^2}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{11\,a^2\,b\,\sqrt{\mathrm{Sec}[c+d\,x]}}{8\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.\right.$$

$$\left.\frac{b^3\,\sqrt{\mathrm{Sec}[c+d\,x]}}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{9\,a^2\,b\,\mathrm{Cos}[2\,(c+d\,x)]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{8\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}\right)(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}$$

$$\left(18\,i\,a\,(a-b)\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-\right.$$

$$4\,i\,\left(2\,a^3-a^2\,b+3\,a\,b^2-4\,b^3\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]+$$

$$4\,i\,a\,\left(4\,a^2+15\,b^2\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-$$

$$\left.\left.9\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Cos}[c+d\,x]\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(4\sqrt{\frac{-a+b}{a+b}}\ d\ (b+a\,\mathrm{Cos}[c+d\,x])^3\sqrt{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \mathrm{Sec}[c+d\,x]^{5/2}\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\right.$$

$$\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\left(-\left(\left(\left(\sqrt{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right.\right.\right.\right.$$

$$\left(18\,i\,a\,(a-b)\,b\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-\right.$$

$$4\,i\left(2a^3-a^2b+3ab^2-4b^3\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.$$

$$\left.\frac{a+b}{a-b}\right]+4\,i\,a\left(4a^2+15b^2\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\mathrm{ArcSinh}\left[\right.\right.$$

$$\left.\left.\left.\sqrt{\frac{-a+b}{a+b}}\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-9\,a\,b\sqrt{\frac{-a+b}{a+b}}\ \mathrm{Cos}[c+d\,x]\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Bigg/$$

$$\left.\left(4\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)+$$

$$\left(a\,\mathrm{Sin}[c+d\,x]\left(18\,i\,a\,(a-b)\,b\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-\right.\right.$$

$$4\,i\left(2a^3-a^2b+3ab^2-4b^3\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.$$

$$\left.\frac{a+b}{a-b}\right]+4\,i\,a\left(4a^2+15b^2\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] - 9 a b \sqrt{\frac{-a+b}{a+b}} \text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg) \Big/$$

$$\left(8 \sqrt{\frac{-a+b}{a+b}} (b+a \text{Cos}[c+d x])^{3/2} \sqrt{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]} \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right) -$$

$$\left(\text{Tan}\left[\frac{1}{2}(c+d x)\right] \left(18 i a (a-b) b \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{b+a \text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\right.\right.$$

$$\text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] - 4 i \left(2 a^3 - a^2 b + 3 a b^2 - 4 b^3\right) \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}$$

$$\sqrt{\frac{b+a \text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] + 4 i a \left(4 a^2 + 15 b^2\right)$$

$$\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{b+a \text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}} \text{EllipticPi}\left[-\frac{a+b}{a-b}, i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] -$$

$$9 a b \sqrt{\frac{-a+b}{a+b}} \text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg) \Big/$$

$$\left(8 \sqrt{\frac{-a+b}{a+b}} \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]} \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right) +$$

$$\left(-\frac{9}{2} a b \sqrt{\frac{-a+b}{a+b}} \text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 + \frac{1}{\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}} 9 i a (a-b) b \sqrt{\frac{b+a \text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\right.$$

$$\text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] \left(\frac{\text{Cos}[c+d x] \text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2} - \frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right) - \frac{1}{\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}$$

$$2\,i\left(2a^3-a^2 b+3ab^2-4b^3\right)\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\;\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}-\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)+\frac{1}{\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}2\,i\,a\left(4a^2+15b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}$$

$$\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\left(\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}-\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)+$$

$$\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}}9\,i\,a\,(a-b)\,b\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(-\frac{a\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}+\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])^2}\right)-\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}}$$

$$2\,i\left(2a^3-a^2 b+3ab^2-4b^3\right)\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\;\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(-\frac{a\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}+\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])^2}\right)+\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}}2\,i\,a\left(4a^2+15b^2\right)\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}$$

$$\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\left(-\frac{a\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}+\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])^2}\right)+$$

$$9a^2 b\sqrt{\frac{-a+b}{a+b}}\;\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Sin}[c+d x]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+9ab\sqrt{\frac{-a+b}{a+b}}\;(b+a\,\text{Cos}[c+d x])$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Sin}[c+d x]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-9ab\sqrt{\frac{-a+b}{a+b}}\;\text{Cos}[c+d x]\,(b+a\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+$$

$$\frac{2\sqrt{\frac{-a+b}{a+b}}\left(2a^3-a^2b+3ab^2-4b^3\right)\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{b+a\,\text{Cos}[c+dx]}{(a+b)(1+\text{Cos}[c+dx])}}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}{\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a-b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}}-$$

$$\frac{2a\sqrt{\frac{-a+b}{a+b}}\left(4a^2+15b^2\right)\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{b+a\,\text{Cos}[c+dx]}{(a+b)(1+\text{Cos}[c+dx])}}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}{\left(1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right)\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a-b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}}-\left(9a(a-b)b\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\right.$$

$$\left.\sqrt{\frac{b+a\,\text{Cos}[c+dx]}{(a+b)(1+\text{Cos}[c+dx])}}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a-b}}\right)\Big/\left(\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\right)\Big)\Big/$$

$$\left(4\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+dx]}\sqrt{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]}\left(-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)-$$

$$\left(\left(18\,i\,a(a-b)b\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{b+a\,\text{Cos}[c+dx]}{(a+b)(1+\text{Cos}[c+dx])}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a+b}{a-b}\right]-\right.\right.$$

$$4\,i\left(2a^3-a^2b+3ab^2-4b^3\right)\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{b+a\,\text{Cos}[c+dx]}{(a+b)(1+\text{Cos}[c+dx])}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\right.$$

$$\left.\frac{a+b}{a-b}\right]+4\,i\,a\left(4a^2+15b^2\right)\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{b+a\,\text{Cos}[c+dx]}{(a+b)(1+\text{Cos}[c+dx])}}\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.\left.i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a+b}{a-b}\right]-9ab\sqrt{\frac{-a+b}{a+b}}\,\text{Cos}[c+dx]\,(b+a\,\text{Cos}[c+dx])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]\,\text{Tan}[c+dx]\right)\right)\Big/$$

$$\left(8\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\sqrt{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]\right)^{3/2}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Bigg)\Bigg)$$

Problem 551: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Cos}[c+d\,x]^3\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 460 leaves, 8 steps):

$$\frac{1}{24\,b\,d}(a-b)\sqrt{a+b}\,\left(16\,a^2+33\,b^2\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{1}{24\,d}\sqrt{a+b}\,\left(16\,a^2+26\,a\,b+33\,b^2\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{1}{8\,a\,d}5\,b\sqrt{a+b}\,\left(4\,a^2+b^2\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{\left(16\,a^2+33\,b^2\right)\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{13\,a\,b\,\mathrm{Cos}[c+d\,x]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{12\,d}+\frac{a^2\,\mathrm{Cos}[c+d\,x]^2\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1026 leaves):

$$\frac{\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(\frac{1}{12}a^2\,\mathrm{Sin}[c+d\,x]+\frac{13}{24}a\,b\,\mathrm{Sin}[2\,(c+d\,x)]+\frac{1}{12}a^2\,\mathrm{Sin}[3\,(c+d\,x)]\right)}{d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}+$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(16\,a^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+16\,a^2\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+33\,a\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+33\,b^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-32\,a^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-\right.$$
$$66\,a\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+16\,a^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-16\,a^2\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+33\,a\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-33\,b^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$120\, a^2\, b\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\, \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} -$$

$$30\, b^3\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\, \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} -$$

$$120\, a^2\, b\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} - 30\, b^3\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\, \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} +$$

$$\left(16\, a^3+16\, a^2\, b+33\, a\, b^2+33\, b^3\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\, \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} - 2\, b\, \left(38\, a^2-13\, a\, b+24\, b^2\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\, \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right) \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(24\, d\, (b+a\,\text{Cos}[c+d\,x])^{5/2}\, \text{Sec}[c+d\,x]^{5/2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 552: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^4\, (a+b\,\text{Sec}[c+d\,x])^{5/2}\, dx$$

Optimal (type 4, 530 leaves, 9 steps):

$$\frac{1}{192\,a\,d}(a-b)\sqrt{a+b}\,\left(284\,a^2+15\,b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{192\,a\,d}\sqrt{a+b}\,\left(72\,a^3+284\,a^2\,b+118\,a\,b^2+15\,b^3\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{64\,a^2\,d}\sqrt{a+b}\,\left(48\,a^4+120\,a^2\,b^2-5\,b^4\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{b\,\left(284\,a^2+15\,b^2\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,a\,d}+\frac{\left(36\,a^2+59\,b^2\right)\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{96\,d}+$$

$$\frac{17\,a\,b\,\text{Cos}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{a^2\,\text{Cos}[c+d\,x]^3\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 1688 leaves) :

$$\frac{1}{d\,(b+a\,\text{Cos}[c+d\,x])^2}$$

$$\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{17}{96}\,a\,b\,\text{Sin}[c+d\,x]+\frac{1}{192}\left(48\,a^2+59\,b^2\right)\,\text{Sin}[2\,(c+d\,x)]+\frac{17}{96}\,a\,b\,\text{Sin}[3\,(c+d\,x)]+\frac{1}{32}\,a^2\,\text{Sin}[4\,(c+d\,x)]\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{5/2}\left(-284\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-284\,a^2\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-15\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.\right.$$

$$15\,b^4\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+568\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+30\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$284\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+284\,a^2\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-15\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$15\,b^4\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+288\,i\,a^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+720\,i\,a^2\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-$$

$$30\,\mathbb{i}\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+288\,\mathbb{i}\,a^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+$$

$$720\,\mathbb{i}\,a^2\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-30\,\mathbb{i}\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+$$

$$\mathbb{i}\,b\left(284\,a^3-284\,a^2\,b+15\,a\,b^2-15\,b^3\right)\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-$$

$$2\,\mathbb{i}\left(72\,a^4-36\,a^3\,b+38\,a^2\,b^2-59\,a\,b^3-15\,b^4\right)\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(192\, a \sqrt{\frac{-a+b}{a+b}}\, d\, (b + a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2} \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left.\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

- **Problem 553: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (a + b \operatorname{Sec}[c+d x])^{7/2}\, dx$$

Optimal (type 4, 403 leaves, 7 steps):

$$-\frac{1}{15 d} 2 (a-b) \sqrt{a+b} \left(58 a^2 + 9 b^2\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} +$$

$$\frac{1}{15 d} 2 \sqrt{a+b} \left(60 a^3 - 58 a^2 b + 22 a b^2 - 9 b^3\right) \operatorname{Cot}[c+d x]$$

$$\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{1}{d}$$

$$2 a^3 \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} +$$

$$\frac{26 a b^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{15 d} + \frac{2 b^2 (a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Tan}[c+d x]}{5 d}$$

Result (type 4, 1150 leaves):

$$\left(2 (a + b \operatorname{Sec}[c+d x])^{7/2}\right.$$

$$\left(58 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right] + 58 a^2 b^2 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right] + 9 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right] + 9 b^4 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right] -\right.$$

$$116 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3 - 18 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3 + 58 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5 -$$

$$58 a^2 b^2 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+9 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-9 b^4 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$30\, i\, a^4 \operatorname{EllipticPi}\left[-\frac{a+b}{a-b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+30\, i\, a^4 \operatorname{EllipticPi}\left[-\frac{a+b}{a-b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$i\, b\left(-58 a^3+58 a^2 b-9 a b^2+9 b^3\right) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$i\left(15 a^4-60 a^3 b+58 a^2 b^2-22 a b^3+9 b^4\right) \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(15 \sqrt{\frac{-a+b}{a+b}}\, d\,(b+a \operatorname{Cos}[c+d x])^{7/2} \operatorname{Sec}[c+d x]^{7/2} \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left.\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+$$

$$\frac{1}{d\,(b+a \operatorname{Cos}[c+d x])^3} \operatorname{Cos}[c+d x]^3\,(a+b \operatorname{Sec}[c+d x])^{7/2}$$

$$\left(\frac{2}{15} b \left(58 a^2 + 9 b^2\right) \operatorname{Sin}[c + d x] + \frac{32}{15} a b^2 \operatorname{Tan}[c + d x] + \frac{2}{5} b^3 \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]\right)$$

Problem 554: Unable to integrate problem.

$$\int \frac{\operatorname{Sec}[c + d x]^5}{\sqrt{a + b \operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 359 leaves, 6 steps):

$$\frac{1}{105 b^5 d} 8 a (a - b) \sqrt{a + b} \left(12 a^2 + 11 b^2\right) \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} + \frac{1}{105 b^4 d} 2 \sqrt{a + b} \left(48 a^3 - 12 a^2 b + 44 a b^2 + 25 b^3\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} + \frac{2 \left(24 a^2 + 25 b^2\right) \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Tan}[c + d x]}{105 b^3 d} - \frac{12 a \operatorname{Sec}[c + d x] \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Tan}[c + d x]}{35 b^2 d} + \frac{2 \operatorname{Sec}[c + d x]^2 \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Tan}[c + d x]}{7 b d}$$

Result (type 8, 25 leaves):

$$\int \frac{\operatorname{Sec}[c + d x]^5}{\sqrt{a + b \operatorname{Sec}[c + d x]}} \, dx$$

Problem 555: Unable to integrate problem.

$$\int \frac{\operatorname{Sec}[c + d x]^4}{\sqrt{a + b \operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 301 leaves, 5 steps):

$$-\frac{1}{15 b^4 d} 2 (a - b) \sqrt{a + b} \left(8 a^2 + 9 b^2\right) \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} - \frac{1}{15 b^3 d} 2 \sqrt{a + b} \left(8 a^2 - 2 a b + 9 b^2\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} - \frac{8 a \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Tan}[c + d x]}{15 b^2 d} + \frac{2 \operatorname{Sec}[c + d x] \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Tan}[c + d x]}{5 b d}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d\,x]^4}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 556: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d\,x]^3}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 244 leaves, 4 steps):

$$\frac{4\,a\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{3\,b^3\,d}+\frac{1}{3\,b^2\,d}$$
$$2\,\sqrt{a+b}\,(2\,a+b)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,b\,d}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d\,x]^3}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 557: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 204 leaves, 3 steps):

$$-\frac{1}{b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{2\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{b\,d}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 559: Unable to integrate problem.**

$$\int \frac{1}{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 106 leaves, 1 step):

$$-\frac{2\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\,\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a\,d}$$

Result (type 8, 16 leaves):

$$\int \frac{1}{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}\,dx$$

- **Problem 560: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Cos}[c+d\,x]}{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 338 leaves, 6 steps):

$$\frac{(a-b)\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a\,b\,d}+$$

$$\frac{\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a\,d}+$$

$$\frac{b\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\,\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{a\,d}$$

Result (type 4, 795 leaves):

$$\Big(\sqrt{b+a\,\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}[c+d\,x]}\ \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\ \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\Big(a\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+b\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-$$

$$a\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+b\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,b$$

$$\text{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i$$

$$(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Big)\Big)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\ d\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 561: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 401 leaves, 7 steps):

$$-\frac{1}{4a^2 d}3(a-b)\sqrt{a+b}\,\text{Cot}[c+dx]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+dx])}{a-b}}+\frac{1}{4a^2 d}$$

$$(2a-3b)\sqrt{a+b}\,\text{Cot}[c+dx]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+dx])}{a-b}}-\frac{1}{4a^3 d}$$

$$\sqrt{a+b}\left(4a^2+3b^2\right)\text{Cot}[c+dx]\,\text{EllipticPi}\Big[\frac{a+b}{a},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+dx])}{a-b}}-$$

$$\frac{3b\sqrt{a+b\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{4a^2 d}+\frac{\text{Cos}[c+dx]\sqrt{a+b\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2ad}$$

Result (type 4, 1195 leaves) :

$$\frac{(b+a\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]\,\text{Sin}[2(c+dx)]}{4ad\sqrt{a+b\,\text{Sec}[c+dx]}}-\Bigg(\sqrt{b+a\,\text{Cos}[c+dx]}\sqrt{\text{Sec}[c+dx]}\sqrt{\frac{a+b-a\,\text{Tan}[\frac{1}{2}(c+dx)]^2+b\,\text{Tan}[\frac{1}{2}(c+dx)]^2}{1+\text{Tan}[\frac{1}{2}(c+dx)]^2}}$$

$$\Bigg(3ab\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]+3b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]-6ab\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^3+3ab\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^5-$$

$$3b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^5+8\,i\,a^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a+b}{a-b}\Big]\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}[\frac{1}{2}(c+dx)]^2+b\,\text{Tan}[\frac{1}{2}(c+dx)]^2}{a+b}}+6\,i\,b^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2}\sqrt{\frac{a+b-a\,\text{Tan}[\frac{1}{2}(c+dx)]^2+b\,\text{Tan}[\frac{1}{2}(c+dx)]^2}{a+b}}+$$

$$8\,i\,a^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a+b}{a-b}\Big]\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}[\frac{1}{2}(c+dx)]^2+b\,\text{Tan}[\frac{1}{2}(c+dx)]^2}{a+b}}+6\,i\,b^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a+b}{a-b}\Big]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$3\,\mathrm{i}\,(a-b)\,b\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right] \sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 2\,\mathrm{i}\left(2a^2-a b+3b^2\right)\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(4a^2\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d x]}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 562: Unable to integrate problem.

$$\int \frac{\mathrm{Sec}[c+d x]^5}{(a+b\,\mathrm{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 399 leaves, 6 steps):

$$-\frac{1}{5b^5\sqrt{a+b}\,d}2\left(16a^4-8a^2b^2-3b^4\right)\mathrm{Cot}[c+d x]$$

$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d x])}{a-b}} - \frac{1}{5b^4\sqrt{a+b}\,d}$$

$$2\,(4a+3b)\left(4a^2+b^2\right)\mathrm{Cot}[c+d x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d x])}{a-b}} -$$

$$\frac{2a^2\,\mathrm{Sec}[c+d x]^2\,\mathrm{Tan}[c+d x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\mathrm{Sec}[c+d x]}} - \frac{2a\left(8a^2-3b^2\right)\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{5b^3\left(a^2-b^2\right)d} + \frac{2\left(6a^2-b^2\right)\mathrm{Sec}[c+d x]\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{5b^2\left(a^2-b^2\right)d}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d x]^5}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Problem 563: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x]^4}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 325 leaves, 5 steps):

$$\frac{2 a\left(8 a^2-5 b^2\right) \text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{3 b^4 \sqrt{a+b}\, d}+\frac{1}{3 b^3 \sqrt{a+b}\, d}$$

$$2 (2 a+b) (4 a+b) \text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} -$$

$$\frac{2 a^2\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{2 \left(4 a^2-b^2\right) \sqrt{a+b\,\text{Sec}[c+d x]}\;\text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right) d}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d x]^4}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Problem 564: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x]^3}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 257 leaves, 4 steps):

$$-\frac{2 \left(2 a^2-b^2\right) \text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{b^3 \sqrt{a+b}\, d}-$$

$$\frac{2 (2 a+b) \text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{b^2 \sqrt{a+b}\, d}-\frac{2 a^2\,\text{Tan}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d x]^3}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Problem 565: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 237 leaves, 4 steps):

$$\frac{2\,a\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{b^2\sqrt{a+b}\,d}+$$

$$\frac{2\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{b\sqrt{a+b}\,d}+\frac{2\,a\,\text{Tan}[c+d x]}{\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Problem 567: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 347 leaves, 6 steps):

$$\frac{2\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a\sqrt{a+b}\,d}-$$

$$\frac{2\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a\sqrt{a+b}\,d}-$$

$$\frac{2\sqrt{a+b}\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a^2\,d}+\frac{2\,b^2\,\text{Tan}[c+d x]}{a\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 1249 leaves):

$$\frac{(b+a\,\text{Cos}[c+d x])^2\,\text{Sec}[c+d x]^2\left(\frac{2\,b\,\text{Sin}[c+d x]}{a\left(-a^2+b^2\right)}+\frac{2\,b^2\,\text{Sin}[c+d x]}{a\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d x])}\right)}{d\,(a+b\,\text{Sec}[c+d x])^{3/2}}+$$

$$\Bigg(2\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\Bigg(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-2\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$i\,(a-b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+i\,\left(a^2+a\,b-2\,b^2\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)d\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 568: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]}{\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 396 leaves, 7 steps):

$$\frac{\left(a^2-3\,b^2\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a^2\,b\,\sqrt{a+b}\,d}+$$

$$\frac{(a+3\,b)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a^2\,\sqrt{a+b}\,d}+$$

$$\frac{3\,b\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a^3\,d}+$$

$$\frac{\mathrm{Sin}[c+d\,x]}{a\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+\frac{b\left(a^2-3\,b^2\right)\mathrm{Tan}[c+d\,x]}{a^2\left(a^2-b^2\right)d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 1077 leaves):

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^2\left(-\frac{2\,b^2\,\mathrm{Sin}[c+d\,x]}{a^2\left(-a^2+b^2\right)}-\frac{2\,b^3\,\mathrm{Sin}[c+d\,x]}{a^2\left(a^2-b^2\right)(b+a\,\mathrm{Cos}[c+d\,x])}\right)}{d\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}-$$

$$\left((b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^{3/2}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\Big(a^3 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right] + a^2 b \text{Tan}\left[\tfrac{1}{2}(c+d x)\right] - 3 a b^2 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right] - 3 b^3 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right] - 2 a^3 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^3 +$$

$$6 a b^2 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^3 + a^3 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^5 - a^2 b \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^5 - 3 a b^2 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^5 + 3 b^3 \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^5 +$$

$$6 a^2 b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]\right], \tfrac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$6 b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]\right], \tfrac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$6 a^2 b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]\right], \tfrac{a-b}{a+b}\right] \text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 6 b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]\right], \tfrac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$\left(a^3+a^2 b-3 a b^2-3 b^3\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]\right], \tfrac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + 2 a b (a+b) \,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]\right], \tfrac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg) \Big/$$

$$\left(a^2 \left(a^2-b^2\right) d \,(a+b \,\text{Sec}[c+d x])^{3/2} \sqrt{1+\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2} \left(a \left(-1+\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2\right) - b \left(1+\text{Tan}\left[\tfrac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 569: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 470 leaves, 8 steps):

$$-\frac{\left(7 a^2-15 b^2\right) \text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{4 a^3\sqrt{a+b}\,d}+\frac{1}{4 a^3\sqrt{a+b}\,d}\left(2 a^2-5 a b-15 b^2\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4 a^4 d}\sqrt{a+b}\left(4 a^2+15 b^2\right)\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{5 b\,\text{Sin}[c+d\,x]}{4 a^2 d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2 a d\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{b^2\left(7 a^2-15 b^2\right)\text{Tan}[c+d\,x]}{4 a^3\left(a^2-b^2\right) d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1745 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\left(\frac{2 b^3\,\text{Sin}[c+d\,x]}{a^3\left(-a^2+b^2\right)}+\frac{2 b^4\,\text{Sin}[c+d\,x]}{a^3\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d\,x])}+\frac{\text{Sin}[2\,(c+d\,x)]}{4 a^2}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\Bigg((b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\Bigg(-7 a^3 b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-7 a^2 b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15 a b^3\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$15 b^4\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+14 a^3 b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-30 a b^3\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-$$

$$7 a^3 b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+7 a^2 b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+15 a b^3\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$15 b^4\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-8\,i\,a^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-22\,i\,a^2\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$30\,i\,b^4\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-8\,i\,a^4\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$22\,i\,a^2\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+30\,i\,b^4\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$i\,b\,\left(7\,a^3-7\,a^2\,b-15\,a\,b^2+15\,b^3\right)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,i\,\left(2\,a^4-a^3\,b+9\,a^2\,b^2+5\,a\,b^3-15\,b^4\right)\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(4\,a^3\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 570: Unable to integrate problem.

$$\int\frac{\text{Sec}[c+d\,x]^5}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 427 leaves, 6 steps):

$$\frac{1}{3\,(a-b)\,b^5\,(a+b)^{3/2}\,d}$$

$$8\,a\left(4\,a^4-7\,a^2\,b^2+2\,b^4\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{3\,(a-b)\,b^4\,(a+b)^{3/2}\,d}2\left(16\,a^4+12\,a^3\,b-16\,a^2\,b^2-9\,a\,b^3-b^4\right)\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{2\,a^2\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,b\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{4\,a^3\left(3\,a^2-5\,b^2\right)\text{Tan}[c+d\,x]}{3\,b^3\left(a^2-b^2\right)^2d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\left(2\,a^2-b^2\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,b^3\left(a^2-b^2\right)d}$$

Result (type 8, 25 leaves):

$$\int\frac{\text{Sec}[c+d\,x]^5}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Problem 571: Unable to integrate problem.

$$\int\frac{\text{Sec}[c+d\,x]^4}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 362 leaves, 5 steps):

$$-\frac{1}{3\,(a-b)\,b^4\,(a+b)^{3/2}\,d}2\,\left(8\,a^4-15\,a^2\,b^2+3\,b^4\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{3\,(a-b)\,b^3\,(a+b)^{3/2}\,d}2\,\left(8\,a^3+6\,a^2\,b-9\,a\,b^2-3\,b^3\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,a^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{8\,a^2\,\left(a^2-2\,b^2\right)\,\text{Tan}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 25 leaves):

$$\int\frac{\text{Sec}[c+d\,x]^4}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Problem 572: Unable to integrate problem.

$$\int\frac{\text{Sec}[c+d\,x]^3}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 337 leaves, 5 steps):

$$\frac{4\,a\,\left(a^2-3\,b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{3\,(a-b)\,b^3\,(a+b)^{3/2}\,d}+\frac{1}{3\,(a-b)\,b^2\,(a+b)^{3/2}\,d}2\,\left(2\,a^2+3\,a\,b-3\,b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,a^2\,\text{Tan}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{4\,a\,\left(a^2-3\,b^2\right)\,\text{Tan}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 25 leaves):

$$\int\frac{\text{Sec}[c+d\,x]^3}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Problem 573: Unable to integrate problem.

$$\int\frac{\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 317 leaves, 5 steps) :

$$\frac{2\left(a^2+3 b^2\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}}{3(a-b) b^2(a+b)^{3/2} d}+$$

$$\frac{2(a-3 b) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}}{3(a-b) b(a+b)^{3/2} d}+$$

$$\frac{2 a \operatorname{Tan}[c+d x]}{3\left(a^2-b^2\right) d(a+b \operatorname{Sec}[c+d x])^{3/2}}+\frac{2\left(a^2+3 b^2\right) \operatorname{Tan}[c+d x]}{3\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 8, 25 leaves) :

$$\int \frac{\operatorname{Sec}[c+d x]^2}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Problem 574: Unable to integrate problem.

$$\int \frac{\operatorname{Sec}[c+d x]}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 304 leaves, 5 steps) :

$$-\frac{8 a \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}}{3(a-b) b(a+b)^{3/2} d}+$$

$$\frac{2(3 a-b) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}}{3(a-b) b(a+b)^{3/2} d}-$$

$$\frac{2 b \operatorname{Tan}[c+d x]}{3\left(a^2-b^2\right) d(a+b \operatorname{Sec}[c+d x])^{3/2}}-\frac{8 a b \operatorname{Tan}[c+d x]}{3\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 8, 23 leaves) :

$$\int \frac{\operatorname{Sec}[c+d x]}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Problem 575: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 448 leaves, 7 steps) :

$$\frac{2\left(7 a^2-3 b^2\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}}{3 a^2(a-b)(a+b)^{3/2} d}-\frac{1}{3 a^2(a-b)(a+b)^{3/2} d}$$

$$2\left(6 a^2-a b-3 b^2\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}-$$

$$\frac{2 \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}}{a^3 d}+$$

$$\frac{2 b^2 \operatorname{Tan}[c+d x]}{3 a\left(a^2-b^2\right) d(a+b \operatorname{Sec}[c+d x])^{3/2}}+\frac{2 b^2\left(7 a^2-3 b^2\right) \operatorname{Tan}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 4, 1798 leaves) :

$$\frac{1}{d(a+b \operatorname{Sec}[c+d x])^{5/2}}$$

$$(b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^3\left(\frac{2 b\left(-7 a^2+3 b^2\right) \operatorname{Sin}[c+d x]}{3 a^2\left(-a^2+b^2\right)^2}-\frac{2 b^3 \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)(b+a \operatorname{Cos}[c+d x])^2}-\frac{8\left(-2 a^2 b^2 \operatorname{Sin}[c+d x]+b^4 \operatorname{Sin}[c+d x]\right)}{3 a^2\left(a^2-b^2\right)^2(b+a \operatorname{Cos}[c+d x])}\right)+$$

$$\left(2(b+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(7 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+7 a^2 b^2 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-3 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$

$$3 b^4 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-14 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+6 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$

$$7 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-7 a^2 b^2 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$3 b^4 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-6 i a^4 \operatorname{EllipticPi}\left[-\frac{a+b}{a-b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+12\,\text{i}\,a^2\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$6\,\text{i}\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,\text{i}\,a^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,+$$

$$12\,\text{i}\,a^2\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,\text{i}\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$\text{i}\,b\left(7\,a^3-7\,a^2\,b-3\,a\,b^2+3\,b^3\right)\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,+$$

$$\text{i}\left(3\,a^4+6\,a^3\,b-13\,a^2\,b^2-2\,a\,b^3+6\,b^4\right)\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\left(3 a^2\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^2 d\,(a+b\,\text{Sec}[c+d x])^{5/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

■ **Problem 576: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d x]}{(a+b\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 510 leaves, 8 steps):

$$\frac{1}{3 a^3(a-b)\, b\,(a+b)^{3/2} d}\left(3 a^4-26 a^2 b^2+15 b^4\right)\text{Cot}[c+d x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 a^3(a-b)(a+b)^{3/2} d}$$

$$\left(3 a^3+21 a^2 b-5 a b^2-15 b^3\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{5 b\sqrt{a+b}\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a^4 d}+$$

$$\frac{\text{Sin}[c+d x]}{a d\,(a+b\,\text{Sec}[c+d x])^{3/2}}+\frac{b\left(3 a^2-5 b^2\right)\text{Tan}[c+d x]}{3 a^2\left(a^2-b^2\right) d\,(a+b\,\text{Sec}[c+d x])^{3/2}}+\frac{b\left(3 a^4-26 a^2 b^2+15 b^4\right)\text{Tan}[c+d x]}{3 a^3\left(a^2-b^2\right)^2 d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 1493 leaves):

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d x])^{5/2}}(b+a\,\text{Cos}[c+d x])^3\,\text{Sec}[c+d x]^3$$

$$\left(-\frac{4 b^2\left(-5 a^2+3 b^2\right)\text{Sin}[c+d x]}{3 a^3\left(-a^2+b^2\right)^2}+\frac{2 b^4\,\text{Sin}[c+d x]}{3 a^3\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d x])^2}+\frac{2\left(-11 a^2 b^3\,\text{Sin}[c+d x]+7 b^5\,\text{Sin}[c+d x]\right)}{3 a^3\left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+d x])}\right)-$$

$$\left((b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(3\,a^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\,a^4\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-26\,a^3\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-26\,a^2\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\,a\,b^4\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$15\,b^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,a^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+52\,a^3\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-30\,a\,b^4\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+3\,a^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$3\,a^4\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-26\,a^3\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+26\,a^2\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+15\,a\,b^4\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-15\,b^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$30\,a^4\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$60\,a^2\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$30\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$30\,a^4\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-60\,a^2\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+30\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$\left(3\,a^5+3\,a^4\,b-26\,a^3\,b^2-26\,a^2\,b^3+15\,a\,b^4+15\,b^5\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+2 a b\left(6 a^3+9 a^2 b-2 a b^2-5 b^3\right)\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\Big]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(3 a\left(a^3-a b^2\right)^2 d\,(a+b\,\text{Sec}[c+d x])^{5/2}\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 577: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 562 leaves, 9 steps):

$$-\frac{1}{12 a^4 (a-b)(a+b)^{3/2} d}\left(33 a^4-170 a^2 b^2+105 b^4\right)\text{Cot}[c+d x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{12 a^4 (a-b)(a+b)^{3/2} d}$$

$$(a+3 b)\left(6 a^3-45 a^2 b+35 b^3\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{1}{4 a^5 d}\sqrt{a+b}\left(4 a^2+35 b^2\right)\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{7 b\,\text{Sin}[c+d x]}{4 a^2 d\,(a+b\,\text{Sec}[c+d x])^{3/2}}+\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2 a d\,(a+b\,\text{Sec}[c+d x])^{3/2}}-\frac{b^2\left(27 a^2-35 b^2\right)\text{Tan}[c+d x]}{12 a^3\left(a^2-b^2\right) d\,(a+b\,\text{Sec}[c+d x])^{3/2}}-\frac{b^2\left(33 a^4-170 a^2 b^2+105 b^4\right)\text{Tan}[c+d x]}{12 a^4\left(a^2-b^2\right)^2 d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 2285 leaves):

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d x])^{5/2}}(b+a\,\text{Cos}[c+d x])^3\,\text{Sec}[c+d x]^3$$

$$\left(\frac{2 b^3\left(-13 a^2+9 b^2\right)\text{Sin}[c+d x]}{3 a^4\left(-a^2+b^2\right)^2}-\frac{2 b^5\,\text{Sin}[c+d x]}{3 a^4\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d x])^2}-\frac{4\left(-7 a^2 b^4\,\text{Sin}[c+d x]+5 b^6\,\text{Sin}[c+d x]\right)}{3 a^4\left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+d x])}+\frac{\text{Sin}[2(c+d x)]}{4 a^3}\right)-$$

$$\left((b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(33\,a^5\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+33\,a^4\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-170\,a^3\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$170\,a^2\,b^4\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+105\,a\,b^5\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+105\,b^6\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$66\,a^5\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+340\,a^3\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-210\,a\,b^5\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$33\,a^5\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-33\,a^4\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-170\,a^3\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$170\,a^2\,b^4\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+105\,a\,b^5\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-105\,b^6\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$24\,i\,a^6\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+162\,i\,a^4\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$396\,i\,a^2\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+210\,i\,b^6\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+$$

$$24\,i\,a^6\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+162\,i\,a^4\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-$$

$$396\,i\,a^2\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+210\,i\,b^6\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+$$

$$i\,b\left(-33\,a^5+33\,a^4\,b+170\,a^3\,b^2-170\,a^2\,b^3-105\,a\,b^4+105\,b^5\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-$$

$$2\,i\left(6\,a^6-3\,a^5\,b+57\,a^4\,b^2+54\,a^3\,b^3-184\,a^2\,b^4-35\,a\,b^5+105\,b^6\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\;\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(12\,a^4\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^2 d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 578: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{1}{(a+b\,\text{Sec}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 535 leaves, 8 steps):

$$\frac{1}{15\,a^3\,(a-b)^2\,(a+b)^{5/2}\,d}$$
$$2\left(58\,a^4-41\,a^2\,b^2+15\,b^4\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{1}{15\,a^3\,(a-b)^2\,(a+b)^{5/2}\,d}2\left(45\,a^4-13\,a^3\,b-36\,a^2\,b^2+5\,a\,b^3+15\,b^4\right)\text{Cot}[c+d\,x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^4\,d}+$$
$$\frac{2\,b^2\,\text{Tan}[c+d\,x]}{5\,a\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}+\frac{2\,b^2\left(13\,a^2-5\,b^2\right)\text{Tan}[c+d\,x]}{15\,a^2\left(a^2-b^2\right)^2 d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,b^2\left(58\,a^4-41\,a^2\,b^2+15\,b^4\right)\text{Tan}[c+d\,x]}{15\,a^3\left(a^2-b^2\right)^3 d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 2346 leaves):

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^{7/2}}(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^4\left(\frac{2\,b\left(58\,a^4-41\,a^2\,b^2+15\,b^4\right)\text{Sin}[c+d\,x]}{15\,a^3\left(-a^2+b^2\right)^3}+\frac{2\,b^4\,\text{Sin}[c+d\,x]}{5\,a^3\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d\,x])^3}+\right.$$
$$\left.\frac{2\left(-19\,a^2\,b^3\,\text{Sin}[c+d\,x]+11\,b^5\,\text{Sin}[c+d\,x]\right)}{15\,a^3\left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+d\,x])^2}+\frac{2\left(74\,a^4\,b^2\,\text{Sin}[c+d\,x]-65\,a^2\,b^4\,\text{Sin}[c+d\,x]+23\,b^6\,\text{Sin}[c+d\,x]\right)}{15\,a^3\left(a^2-b^2\right)^3(b+a\,\text{Cos}[c+d\,x])}\right)+$$

$$\left(2\,(b+a\,\mathrm{Cos}[c+d\,x])^{7/2}\,\mathrm{Sec}[c+d\,x]^{7/2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(58\,a^5\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+58\,a^4\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-41\,a^3\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$41\,a^2\,b^4\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\,a\,b^5\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\,b^6\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$116\,a^5\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+82\,a^3\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-30\,a\,b^5\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$58\,a^5\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-58\,a^4\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-41\,a^3\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$41\,a^2\,b^4\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+15\,a\,b^5\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-15\,b^6\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$30\,i\,a^6\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+90\,i\,a^4\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$90\,i\,a^2\,b^4\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+30\,i\,b^6\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$30\,i\,a^6\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+90\,i\,a^4\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$90\,i\,a^2\,b^4\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+30\,i\,b^6\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$i\,b\left(-58\,a^5+58\,a^4\,b+41\,a^3\,b^2-41\,a^2\,b^3-15\,a\,b^4+15\,b^5\right)\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$i\left(15\,a^6+45\,a^5\,b-103\,a^4\,b^2-23\,a^3\,b^3+86\,a^2\,b^4+10\,a\,b^5-30\,b^6\right)\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(15\,a^3\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^3 d\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 615: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{7/2}}{(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 279 leaves, 10 steps):

$$-\frac{\left(3\,a^2-2\,b^2\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\left(a^2-b^2\right)d}-$$

$$\frac{a\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{b\left(a^2-b^2\right)d}-\frac{a\left(3\,a^2-5\,b^2\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2a}{a+b},\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{(a-b)\,b^2\,(a+b)^2\,d}+$$

$$\frac{\left(3\,a^2-2\,b^2\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b^2\left(a^2-b^2\right)d}-\frac{a^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 632 leaves):

$$\frac{\sqrt{\text{Sec}[c+d\,x]}\left(\frac{\left(-3\,a^2+2\,b^2\right)\text{Sin}[c+d\,x]}{b^2\left(-a^2+b^2\right)}+\frac{a^2\,\text{Sin}[c+d\,x]}{b\left(-a^2+b^2\right)(b+a\,\text{Cos}[c+d\,x])}\right)}{d}-\frac{1}{4\,(a-b)\,b^2\,(a+b)\,d}$$

$$\left(-\left(2\left(8\,a^2\,b-4\,b^3\right)\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right](a+b\,\text{Sec}[c+d\,x])\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\right.$$

$$\left(a\,(b+a\,\text{Cos}[c+d\,x])\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$

$$\left(2\left(9\,a^3-10\,a\,b^2\right)\text{Cos}[c+d\,x]^2\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]+\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\right)\right.$$

$$\left.(a+b\,\text{Sec}[c+d\,x])\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left(b\,(b+a\,\text{Cos}[c+d\,x])\left(1-\text{Cos}[c+d\,x]^2\right)\right)-$$

$$\left(2\left(3\,a^3-2\,a\,b^2\right)\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\left(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\right.\right.$$

$$\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}+$$

$$a^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}-$$

$$\left.\left.2\,b^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\left(1-\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\left(2-\text{Sec}[c+d\,x]^2\right)\right)\right)$$

Problem 616: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}}{(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 214 leaves, 9 steps):

$$\frac{a\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{b\left(a^2-b^2\right)d}+\frac{\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{\left(a^2-b^2\right)d}+$$

$$\frac{\left(a^2-3\,b^2\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{(a-b)\,b\,(a+b)^2\,d}-\frac{a^2\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 587 leaves):

$$\frac{\sqrt{\text{Sec}[c+d\,x]}\left(\frac{a\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)}+\frac{a\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d}+$$

$$\frac{1}{4\,(a-b)\,b\,(a+b)\,d}\Bigg(-\Bigg(8\,b\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/$$
$$\left((b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)+$$
$$\Bigg(2\,(3\,a^2-4\,b^2)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)$$
$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\,\left(b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)-$$
$$\Bigg(2\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}$$
$$\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Bigg)\Big/$$
$$\left(b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\Bigg)$$

Problem 617: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}}{(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 208 leaves, 9 steps):

$$-\frac{\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{(a^2-b^2)\,d}-\frac{b\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,(a^2-b^2)\,d}+$$
$$\frac{(a^2+b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,(a-b)\,(a+b)^2\,d}+\frac{a\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 633 leaves):

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{5/2}\left(-\frac{\mathrm{Sin}[c+d\,x]}{-a^2+b^2}+\frac{b\,\mathrm{Sin}[c+d\,x]}{(-a^2+b^2)\,(b+a\,\mathrm{Cos}[c+d\,x])}\right)}{d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}+$$

$$\frac{1}{4\,(-a+b)\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^2\left(-\left(8\,b\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{EllipticPi}\left[-\frac{b}{a},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\right.\right.$$

$$\left.(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)-$$

$$\left(2\,a\,\mathrm{Cos}[c+d\,x]^2\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]+\mathrm{EllipticPi}\left[-\frac{b}{a},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\right)\right.$$

$$\left.(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)-$$

$$\left(2\,\mathrm{Cos}[2\,(c+d\,x)]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\left(2\,a\,b-2\,a\,b\,\mathrm{Sec}[c+d\,x]^2+2\,a\,b\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\sqrt{\mathrm{Sec}[c+d\,x]}\right.\right.$$

$$\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+$$

$$a^2\,\mathrm{EllipticPi}\left[-\frac{b}{a},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}-$$

$$\left.2\,b^2\,\mathrm{EllipticPi}\left[-\frac{b}{a},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\right)\mathrm{Sin}[c+d\,x]\Big)\Big/$$

$$\left.\left(a\,b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(2-\mathrm{Sec}[c+d\,x]^2\right)\right)\right)$$

- **Problem 618: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Sec}[c+d\,x]}}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 227 leaves, 9 steps):

$$\frac{b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a\,(a^2-b^2)\,d}+\frac{(2\,a^2-b^2)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a^2\,(a^2-b^2)\,d}-$$

$$\frac{b\,(3\,a^2-b^2)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a^2\,(a-b)\,(a+b)^2\,d}-\frac{b\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{(a^2-b^2)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

Result (type 4, 630 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{5/2}\left(\frac{b\,\text{Sin}[c+d\,x]}{a\,(-a^2+b^2)}+\frac{b^2\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^2}+$$

$$\frac{1}{4\,(a-b)\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\left(-\left(8\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\right.\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left((b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)-$$
$$\left(2\,\text{Cos}[c+d\,x]^2\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]+\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left((b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)-$$
$$\left(2\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\left(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\right.\right.$$
$$\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$a^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$\left.\left.2\,b^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\text{Sin}[c+d\,x]\right)\Big/$$
$$\left.\left(a^2\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\right)$$

- **Problem 619: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 244 leaves, 9 steps):

$$\frac{(2\,a^2-3\,b^2)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,(a^2-b^2)\,d}-\frac{b\,(4\,a^2-3\,b^2)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^3\,(a^2-b^2)\,d}+$$
$$\frac{b^2\,(5\,a^2-3\,b^2)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^3\,(a-b)\,(a+b)^2\,d}+\frac{b^2\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 608 leaves):

$$\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(-\frac{b^2\,\text{Sin}[c+d\,x]}{a^2\,(-a^2+b^2)}-\frac{b^3\,\text{Sin}[c+d\,x]}{a^2\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d}+$$

$$\frac{1}{4\,a\,(-a+b)\,(a+b)\,d}\left(-\left(8\,b\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\right.$$
$$((b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2))+$$
$$\left(2\,(-2\,a^2+b^2)\,\text{Cos}[c+d\,x]^2\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\,(b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2))-$$
$$\left(2\,(-2\,a^2+3\,b^2)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\left(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right.\right.$$
$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$a^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$\left.\left.2\,b^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left.\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\right)$$

- **Problem 620: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 304 leaves, 10 steps):

$$-\frac{b\,(4\,a^2-5\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^3\,(a^2-b^2)\,d}+$$
$$\frac{(2\,a^4+16\,a^2\,b^2-15\,b^4)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^4\,(a^2-b^2)\,d}-$$
$$\frac{b^3\,(7\,a^2-5\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^4\,(a-b)\,(a+b)^2\,d}+$$
$$\frac{(2\,a^2-5\,b^2)\,\text{Sin}[c+d\,x]}{3\,a^2\,(a^2-b^2)\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{b^2\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 639 leaves):

$$\frac{1}{12 a^2 (a-b)(a+b) d}$$

$$\Bigg(-\Big(2\left(4 a^3+8 a b^2\right) \text{Cos}[c+d x]^2 \,\text{EllipticPi}\left[-\frac{b}{a}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right] (a+b \,\text{Sec}[c+d x]) \sqrt{1-\text{Sec}[c+d x]^2}\, \text{Sin}[c+d x]\Big) \Big/ \left(a (b+a \,\text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right) +$$

$$\Big(2\left(-8 a^2 b+5 b^3\right) \text{Cos}[c+d x]^2 \left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right] + \text{EllipticPi}\left[-\frac{b}{a}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right]\right)$$

$$(a+b \,\text{Sec}[c+d x]) \sqrt{1-\text{Sec}[c+d x]^2}\, \text{Sin}[c+d x]\Big) \Big/ \left(b (b+a \,\text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right) -$$

$$\Big(2\left(-12 a^2 b+15 b^3\right) \text{Cos}[2 (c+d x)] (a+b \,\text{Sec}[c+d x]) \Big(2 a b-2 a b \,\text{Sec}[c+d x]^2+2 a b \,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right]$$

$$\sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2} + a (a-2 b) \,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2} +$$

$$a^2 \,\text{EllipticPi}\left[-\frac{b}{a}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2} -$$

$$2 b^2 \,\text{EllipticPi}\left[-\frac{b}{a}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right], -1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}\Big) \text{Sin}[c+d x]\Big) \Big/$$

$$\left(a^2 b (b+a \,\text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right) \sqrt{\text{Sec}[c+d x]} \left(2-\text{Sec}[c+d x]^2\right)\right)\Bigg) +$$

$$\frac{\sqrt{\text{Sec}[c+d x]} \left(\frac{b^3 \,\text{Sin}[c+d x]}{a^3 \left(-a^2+b^2\right)} + \frac{b^4 \,\text{Sin}[c+d x]}{a^3 \left(a^2-b^2\right) (b+a \,\text{Cos}[c+d x])} + \frac{\text{Sin}[2 (c+d x)]}{3 a^2}\right)}{d}$$

▪ Problem 622: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^{7/2}}{(a+b \,\text{Sec}[c+d x])^3} \,dx$$

Optimal (type 4, 315 leaves, 10 steps):

$$\frac{3 a \left(a^2-3 b^2\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{4 b^2 \left(a^2-b^2\right)^2 d} + \frac{\left(a^2-7 b^2\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{4 b \left(a^2-b^2\right)^2 d} +$$

$$\frac{3 \left(a^4-2 a^2 b^2+5 b^4\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{4 (a-b)^2 b^2 (a+b)^3 d} -$$

$$\frac{a^2 \,\text{Sec}[c+d x]^{3/2} \,\text{Sin}[c+d x]}{2 b \left(a^2-b^2\right) d (a+b \,\text{Sec}[c+d x])^2} - \frac{3 a^2 \left(a^2-3 b^2\right) \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{4 b^2 \left(a^2-b^2\right)^2 d (a+b \,\text{Sec}[c+d x])}$$

Result (type 4, 697 leaves):

$$\frac{1}{16\,(a-b)^2\,b^2\,(a+b)^2\,d}\Bigg(-\Bigg(2\,(8\,a^3\,b-32\,a\,b^3)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\left(a\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$

$$\Bigg(2\,(9\,a^4-19\,a^2\,b^2+16\,b^4)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\left(b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)-$$

$$\Bigg(2\,(3\,a^4-9\,a^2\,b^2)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$

$$a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$

$$2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Bigg)\Big/$$

$$\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\,\left(2-\text{Sec}[c+d\,x]^2\right)\right)\Bigg)+$$

$$\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{3\,a\,(-a^2+3\,b^2)\,\text{Sin}[c+d\,x]}{4\,b^2\,(-a^2+b^2)^2}-\frac{a\,\text{Sin}[c+d\,x]}{2\,(-a^2+b^2)\,(b+a\,\text{Cos}[c+d\,x])^2}+\frac{a^3\,\text{Sin}[c+d\,x]-7\,a\,b^2\,\text{Sin}[c+d\,x]}{4\,b\,(-a^2+b^2)^2\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d}$$

Problem 623: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 313 leaves, 10 steps):

$$\frac{(a^2+5\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,b\,(a^2-b^2)^2\,d}+\frac{3\,(a^2+b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,a\,(a^2-b^2)^2\,d}+$$

$$\frac{(a^4-10\,a^2\,b^2-3\,b^4)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\Big[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\Big]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,a\,(a-b)^2\,b\,(a+b)^3\,d}-$$

$$\frac{a^2\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b\,(a^2-b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{a\,(a^2-7\,b^2)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,(a^2-b^2)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 733 leaves):

$$\frac{1}{16\,(a-b)^2\,b\,(a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]^3$$
$$\Bigg(-\Big(2\,(8\,a^2\,b+16\,b^3)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Big)\Big/$$
$$\Big(a\,(b+a\,\mathrm{Cos}[c+d\,x])\,(1-\mathrm{Cos}[c+d\,x]^2)\Big)+$$
$$\Big(2\,(3\,a^3-9\,a\,b^2)\,\mathrm{Cos}[c+d\,x]^2\,\Big(\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]+\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)$$
$$(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Big)\Big/\Big(b\,(b+a\,\mathrm{Cos}[c+d\,x])\,(1-\mathrm{Cos}[c+d\,x]^2)\Big)-$$
$$\Big(2\,(a^3+5\,a\,b^2)\,\mathrm{Cos}[2\,(c+d\,x)]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\mathrm{Sec}[c+d\,x]^2+2\,a\,b\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]$$
$$\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+$$
$$a^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}-$$
$$2\,b^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\Big)\,\mathrm{Sin}[c+d\,x]\Big)\Big/$$
$$\Big(a^2\,b\,(b+a\,\mathrm{Cos}[c+d\,x])\,(1-\mathrm{Cos}[c+d\,x]^2)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(2-\mathrm{Sec}[c+d\,x]^2)\Big)\Bigg)+\frac{1}{d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}$$
$$(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]^{7/2}\,\Bigg(-\frac{(a^2+5\,b^2)\,\mathrm{Sin}[c+d\,x]}{4\,b\,(-a^2+b^2)^2}+\frac{b\,\mathrm{Sin}[c+d\,x]}{2\,(-a^2+b^2)\,(b+a\,\mathrm{Cos}[c+d\,x])^2}+$$
$$\frac{3\,(a^2\,\mathrm{Sin}[c+d\,x]+b^2\,\mathrm{Sin}[c+d\,x])}{4\,(-a^2+b^2)^2\,(b+a\,\mathrm{Cos}[c+d\,x])}\Bigg)$$

- **Problem 624: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}}{(a+b\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 306 leaves, 10 steps):

$$-\frac{(5\,a^2+b^2)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,a\,(a^2-b^2)^2\,d}-\frac{b\,(7\,a^2-b^2)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,a^2\,(a^2-b^2)^2\,d}+$$
$$\frac{(3\,a^4+10\,a^2\,b^2-b^4)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticPi}\Big[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,a^2\,(a-b)^2\,(a+b)^3\,d}+$$
$$\frac{a\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,(a^2-b^2)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}+\frac{3\,(a^2+b^2)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,(a^2-b^2)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

Result (type 4, 724 leaves) :

$$-\frac{1}{16\,(a-b)^2\,(a+b)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^3}\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^3\,\Bigg(-\Bigg(48\,b\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\Big((b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)+\Bigg(2\,\big(-a^2-5\,b^2\big)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\Big(b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)-\Bigg(2\,\big(5\,a^2+b^2\big)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Bigg)\Big/\Big(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\,\sqrt{\text{Sec}[c+d\,x]}\,\big(2-\text{Sec}[c+d\,x]^2\big)\Big)\Bigg)+\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^3}\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^{7/2}\,\left(\frac{\big(5\,a^2+b^2\big)\,\text{Sin}[c+d\,x]}{4\,a\,\big(a^2-b^2\big)^2}+\frac{b^2\,\text{Sin}[c+d\,x]}{2\,a\,\big(a^2-b^2\big)\,(b+a\,\text{Cos}[c+d\,x])^2}+\frac{-7\,a^2\,b\,\text{Sin}[c+d\,x]+b^3\,\text{Sin}[c+d\,x]}{4\,a\,\big(a^2-b^2\big)^2\,(b+a\,\text{Cos}[c+d\,x])}\right)$$

- **Problem 625: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 323 leaves, 10 steps) :

$$\frac{3\,b\,\left(3\,a^2-b^2\right)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,a^2\,\left(a^2-b^2\right)^2\,d}+$$
$$\frac{\left(8\,a^4-5\,a^2\,b^2+3\,b^4\right)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,a^3\,\left(a^2-b^2\right)^2\,d}-$$
$$\frac{3\,b\,\left(5\,a^4-2\,a^2\,b^2+b^4\right)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,a^3\,(a-b)^2\,(a+b)^3\,d}-$$
$$\frac{b\,\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{2\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}-\frac{b\,\left(7\,a^2-b^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{4\,a\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 749 leaves) :

$$\frac{1}{16\,a\,(a-b)^2\,(a+b)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^3}\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^3$$
$$\left(-\left(2\,\left(16\,a^3+8\,a\,b^2\right)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\ \text{Sin}[c+d\,x]\right)\Big/\right.$$
$$\left(a\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$
$$\left(2\,\left(-5\,a^2\,b-b^3\right)\,\text{Cos}[c+d\,x]^2\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\ \text{Sin}[c+d\,x]\right)\Big/\left(b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)-$$
$$\left(2\,\left(9\,a^2\,b-3\,b^3\right)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\left(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right.\right.$$
$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$a^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$\left.\left.2\,b^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left.\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\,\left(2-\text{Sec}[c+d\,x]^2\right)\right)\right)+\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^3}$$
$$(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^{7/2}\,\left(\frac{3\,b\,\left(-3\,a^2+b^2\right)\,\text{Sin}[c+d\,x]}{4\,a^2\,\left(-a^2+b^2\right)^2}-\frac{b^3\,\text{Sin}[c+d\,x]}{2\,a^2\,\left(a^2-b^2\right)\,(b+a\,\text{Cos}[c+d\,x])^2}+\right.$$
$$\left.\frac{11\,a^2\,b^2\,\text{Sin}[c+d\,x]-5\,b^4\,\text{Sin}[c+d\,x]}{4\,a^2\,\left(a^2-b^2\right)^2\,(b+a\,\text{Cos}[c+d\,x])}\right)$$

- **Problem 626: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{\sqrt{\text{Sec}[c+d x]}\ (a+b\ \text{Sec}[c+d x])^3}\, dx$$

Optimal (type 4, 342 leaves, 10 steps):

$$\frac{\left(8 a^4-29 a^2 b^2+15 b^4\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{4 a^3 \left(a^2-b^2\right)^2 d}-$$
$$\frac{3 b \left(8 a^4-11 a^2 b^2+5 b^4\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{4 a^4 \left(a^2-b^2\right)^2 d}+$$
$$\frac{b^2 \left(35 a^4-38 a^2 b^2+15 b^4\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{4 a^4 (a-b)^2 (a+b)^3 d}+$$
$$\frac{b^2 \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{2 a \left(a^2-b^2\right) d\ (a+b\ \text{Sec}[c+d x])^2}+\frac{b^2 \left(11 a^2-5 b^2\right) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{4 a^2 \left(a^2-b^2\right)^2 d\ (a+b\ \text{Sec}[c+d x])}$$

Result (type 4, 712 leaves):

$$\begin{aligned}
&\frac{1}{16\,a^2\,(a-b)^2\,(a+b)^2\,d}\\
&\Bigg(-\Big(2\,(-32\,a^3\,b+8\,a\,b^3)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\,\text{Sin}[c+d\,x]\Big)\Big/\\
&\quad\Big(a\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)+\\
&\quad\Big(2\,(8\,a^4-7\,a^2\,b^2+5\,b^4)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\\
&\quad\quad(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\,\text{Sin}[c+d\,x]\Big)\Big/\Big(b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)-\\
&\quad\Big(2\,(8\,a^4-29\,a^2\,b^2+15\,b^4)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\\
&\quad\quad\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+\\
&\quad\quad a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-\\
&\quad\quad 2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Big)\Big/\\
&\quad\Big(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\,\sqrt{\text{Sec}[c+d\,x]}\,\big(2-\text{Sec}[c+d\,x]^2\big)\Big)\Bigg)+\\
&\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(-\frac{b^2\,(-13\,a^2+7\,b^2)\,\text{Sin}[c+d\,x]}{4\,a^3\,(-a^2+b^2)^2}+\frac{b^4\,\text{Sin}[c+d\,x]}{2\,a^3\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d\,x])^2}+\frac{3\,(-5\,a^2\,b^3\,\text{Sin}[c+d\,x]+3\,b^5\,\text{Sin}[c+d\,x])}{4\,a^3\,(a^2-b^2)^2\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d}
\end{aligned}$$

Problem 628: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 237 leaves, 12 steps):

$$\begin{aligned}
&\frac{b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\,\text{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\Big]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\,\text{EllipticPi}\Big[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\Big]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\\
&\frac{\text{EllipticE}\Big[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\Big]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{d}
\end{aligned}$$

Result (type 4, 321 leaves):

$$\frac{1}{4\,d\,\sqrt{\text{Sec}[c+d\,x]}}\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(\frac{2\,a\,\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{(a+b)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-\left(2\,i\sqrt{-\frac{a\,(-1+\text{Cos}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Cos}[c+d\,x])}{a-b}}\,\text{Csc}[c+d\,x]\left(-2\,b\,(a+b)\right.\right.\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.\left.a\,\text{EllipticPi}\left[1-\frac{a}{b},i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\right)\Big/\left(a\sqrt{\frac{1}{a-b}}\,b\sqrt{b+a\,\text{Cos}[c+d\,x]}\right)+4\,\text{Tan}[c+d\,x]\right)$$

Problem 634: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 299 leaves, 13 steps):

$$\frac{7\,a\,b\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(3\,a^2+4\,b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{5\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{5\,a\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{b\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 549 leaves):

$$\frac{1}{16\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}}$$

$$(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{8\,a\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(-a^2-8\,b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\right.$$

$$\left(10\,\mathrm{i}\,a^2\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{5}{4}\,a\,\text{Tan}[c+d\,x]+\frac{1}{2}\,b\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)}{d\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}}$$

- **Problem 635: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 249 leaves, 12 steps):

$$\frac{(2\,a^2+b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{3\,a\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{b\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{b\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 394 leaves):

$$\frac{1}{4\,d\,\text{Sec}[c+d\,x]^{3/2}}(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{8\,a^2\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{(b+a\,\text{Cos}[c+d\,x])^2}+\frac{10\,a\,b\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{(b+a\,\text{Cos}[c+d\,x])^2}-\right.$$

$$\left(2\,\text{i}\sqrt{-\frac{a\,(-1+\text{Cos}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Cos}[c+d\,x])}{a-b}}\;\text{Csc}[c+d\,x]\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+\right.\right.$$

$$a\left(2\,b\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.\left.a\,\text{EllipticPi}\left[1-\frac{a}{b},\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\right)\Big/\left(a\sqrt{\frac{1}{a-b}}(b+a\,\text{Cos}[c+d\,x])^{3/2}\right)+\frac{4\,b\,\text{Tan}[c+d\,x]}{b+a\,\text{Cos}[c+d\,x]}\right)$$

- **Problem 640: Result unnecessarily involves imaginary or complex numbers.**

$$\int \text{Sec}[c+d\,x]^{3/2}(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 369 leaves, 14 steps):

$$\frac{b\,(59\,a^2+16\,b^2)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{24\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{5\,a\,(a^2+4\,b^2)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{8\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{(33\,a^2+16\,b^2)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}+\frac{(33\,a^2+16\,b^2)\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{24\,d}+$$

$$\frac{13\,a\,b\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{12\,d}+\frac{b^2\,\text{Sec}[c+d\,x]^{5/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 602 leaves):

$$-\frac{1}{96\, d\, (b+a\, \text{Cos}[c+d\, x])^{5/2}\, \text{Sec}[c+d\, x]^{5/2}}\, a\, (a+b\, \text{Sec}[c+d\, x])^{5/2}$$

$$\left(-\frac{104\, a\, b\, \sqrt{\frac{b+a\, \text{Cos}[c+d\, x]}{a+b}}\, \text{EllipticF}\left[\frac{1}{2}\, (c+d\, x),\, \frac{2\, a}{a+b}\right]}{\sqrt{b+a\, \text{Cos}[c+d\, x]}}+\frac{2\, \left(3\, a^2-104\, b^2\right)\, \sqrt{\frac{b+a\, \text{Cos}[c+d\, x]}{a+b}}\, \text{EllipticPi}\left[2,\, \frac{1}{2}\, (c+d\, x),\, \frac{2\, a}{a+b}\right]}{\sqrt{b+a\, \text{Cos}[c+d\, x]}}+\right.$$

$$\left(2\, i\, \left(33\, a^2+16\, b^2\right)\, \sqrt{\frac{a-a\, \text{Cos}[c+d\, x]}{a+b}}\, \sqrt{\frac{a+a\, \text{Cos}[c+d\, x]}{a-b}}\, \text{Cos}[2\, (c+d\, x)]\right.$$

$$\left(-2\, b\, (a+b)\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\, \sqrt{b+a\, \text{Cos}[c+d\, x]}\right],\, \frac{-a+b}{a+b}\right]+a\, \left(2\, b\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\, \sqrt{b+a\, \text{Cos}[c+d\, x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\, \text{EllipticPi}\left[1-\frac{a}{b},\, i\, \text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\, \sqrt{b+a\, \text{Cos}[c+d\, x]}\right],\, \frac{-a+b}{a+b}\right]\right)\right)\, \text{Sin}[c+d\, x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\, b\, \sqrt{1-\text{Cos}[c+d\, x]^2}\, \sqrt{\frac{a^2-a^2\, \text{Cos}[c+d\, x]^2}{a^2}}\, \left(-a^2+2\, b^2-4\, b\, (b+a\, \text{Cos}[c+d\, x])+2\, (b+a\, \text{Cos}[c+d\, x])^2\right)\right)\right)+$$

$$\left((a+b\, \text{Sec}[c+d\, x])^{5/2}\, \left(\frac{1}{24}\, \text{Sec}[c+d\, x]\, \left(33\, a^2\, \text{Sin}[c+d\, x]+16\, b^2\, \text{Sin}[c+d\, x]\right)+\frac{13}{12}\, a\, b\, \text{Sec}[c+d\, x]\, \text{Tan}[c+d\, x]+\right.\right.$$

$$\left.\left.\frac{1}{3}\, b^2\, \text{Sec}[c+d\, x]^2\, \text{Tan}[c+d\, x]\right)\right)\Big/\left(d\, (b+a\, \text{Cos}[c+d\, x])^2\, \text{Sec}[c+d\, x]^{5/2}\right)$$

- **Problem 641: Result unnecessarily involves imaginary or complex numbers.**

$$\int \sqrt{\text{Sec}[c+d\, x]}\, (a+b\, \text{Sec}[c+d\, x])^{5/2}\, dx$$

Optimal (type 4, 314 leaves, 13 steps) :

$$\frac{a\left(8 a^2+11 b^2\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d x]}}{4 d\sqrt{a+b\,\mathrm{Sec}[c+d x]}}+$$

$$\frac{b\left(15 a^2+4 b^2\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d x]}}{4 d\sqrt{a+b\,\mathrm{Sec}[c+d x]}}-\frac{9\,a\,b\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{4 d\sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{a+b}}\sqrt{\mathrm{Sec}[c+d x]}}+$$

$$\frac{9\,a\,b\sqrt{\mathrm{Sec}[c+d x]}\sqrt{a+b\,\mathrm{Sec}[c+d x]}\;\mathrm{Sin}[c+d x]}{4 d}+\frac{b^2\,\mathrm{Sec}[c+d x]^{3/2}\sqrt{a+b\,\mathrm{Sec}[c+d x]}\;\mathrm{Sin}[c+d x]}{2 d}$$

Result (type 4, 560 leaves):

$$\frac{1}{16 d\,(b+a\,\mathrm{Cos}[c+d x])^{5/2}\,\mathrm{Sec}[c+d x]^{5/2}}(a+b\,\mathrm{Sec}[c+d x])^{5/2}$$

$$\left(\frac{2\left(16 a^3+4 a b^2\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d x]}}+\frac{2\left(21 a^2 b+8 b^3\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d x]}}-\right.$$

$$\left(18\,i\,a^2\sqrt{\frac{a-a\,\mathrm{Cos}[c+d x]}{a+b}}\sqrt{\frac{a+a\,\mathrm{Cos}[c+d x]}{a-b}}\;\mathrm{Cos}[2(c+d x)]\left(-2 b\,(a+b)\right.\right.$$

$$\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d x]}\right],\frac{-a+b}{a+b}\right]+a\left(2 b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d x]}\right],\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\sqrt{1-\mathrm{Cos}[c+d x]^2}\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d x]^2}{a^2}}\left(-a^2+2 b^2-4 b\,(b+a\,\mathrm{Cos}[c+d x])+2\,(b+a\,\mathrm{Cos}[c+d x])^2\right)\right)\right)+$$

$$\frac{(a+b\,\mathrm{Sec}[c+d x])^{5/2}\left(\frac{9}{4} a\,b\,\mathrm{Tan}[c+d x]+\frac{1}{2} b^2\,\mathrm{Sec}[c+d x]\,\mathrm{Tan}[c+d x]\right)}{d\,(b+a\,\mathrm{Cos}[c+d x])^2\,\mathrm{Sec}[c+d x]^{5/2}}$$

- **Problem 642: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 263 leaves, 12 steps):

$$\frac{b\left(4a^2+b^2\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{d\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+\frac{5\,a\,b^2\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{d\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{\left(2a^2-b^2\right)\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{d\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{b^2\sqrt{\mathrm{Sec}[c+d\,x]}\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 538 leaves):

$$\frac{b^2\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{1}{4\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^{5/2}}\,a\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(\frac{24\,a\,b\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\left(2a^2+9b^2\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\left(2\,i\left(2a^2-b^2\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2b^2-4b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)$$

- **Problem 643: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 262 leaves, 12 steps):

$$\frac{2\,a\,(a^2+2\,b^2)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,b^3\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\frac{14\,a\,b\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a^2\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 540 leaves):

$$\frac{2\,a^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{1}{6\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}}(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{2\,(2\,a^3+18\,a\,b^2)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$
$$\frac{2\,(7\,a^2\,b+6\,b^3)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\left(14\,i\,a^2\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$
$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$
$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$
$$\left.\left(\sqrt{\frac{1}{a-b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

Problem 647: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[c+d x]^{7/2}}{\sqrt{a+b\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 312 leaves, 13 steps):

$$-\frac{a\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d x]}}{4\,b\,d\sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{\left(3a^2+4b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d x]}}{4\,b^2\,d\sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{3\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d x]}}{4\,b^2\,d\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\;\sqrt{\text{Sec}[c+d x]}}-\frac{3\,a\sqrt{\text{Sec}[c+d x]}\;\sqrt{a+b\,\text{Sec}[c+d x]}\;\text{Sin}[c+d x]}{4\,b^2\,d}+\frac{\text{Sec}[c+d x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d x]}\;\text{Sin}[c+d x]}{2\,b\,d}$$

Result (type 4, 555 leaves):

$$\frac{1}{16\,b^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}$$

$$\left(\frac{8\,a\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\,\left(9\,a^2+8\,b^2\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(6\,\mathbb{i}\,a^2\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\,\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$a\,\left(2\,b\,\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,\left(-\frac{3\,a\,\text{Tan}[c+d\,x]}{4\,b^2}+\frac{\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,b}\right)}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

- **Problem 648: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[c+d\,x]^{5/2}}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 246 leaves, 12 steps) :

$$\frac{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+\frac{\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,d}$$

Result (type 4, 461 leaves) :

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{1}{4\,b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

$$a\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\left(\frac{6\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\mathrm{i}\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$a\left(2\,b\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

Problem 654: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[c+d\,x]^{7/2}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 345 leaves, 13 steps) :

$$\frac{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{3\,a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{b^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\left(3\,a^2-b^2\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{2\,a^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\left(3\,a^2-b^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d}$$

Result (type 4, 592 leaves) :

$$-\frac{1}{4\,(a-b)\,b^2\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,a\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}$$

$$\left(\frac{8\,a\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\,\left(9\,a^2-7\,b^2\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,i\,\left(3\,a^2-b^2\right)\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\,\left(-2\,b\,(a+b)\right.\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{3/2}\,\left(-\frac{2\,a^3\,\text{Sin}[c+d\,x]}{b^2\,\left(-a^2+b^2\right)\,(b+a\,\text{Cos}[c+d\,x])}+\frac{\text{Tan}[c+d\,x]}{b^2}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}$$

- **Problem 655: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 206 leaves, 9 steps) :

$$\frac{2\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b\,(a^2-b^2)\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}-\frac{2\,a^2\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,(a^2-b^2)\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 557 leaves):

$$\frac{2\,a^2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{1}{2\,(a-b)\,b\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\left(\frac{4\,a\,b\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(3\,a^2-2\,b^2)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\left(2\,i\,a^2\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

- **Problem 661: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^{9/2}}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 458 leaves, 14 steps):

$$\frac{\left(5 a^2-3 b^2\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{3 b^2 \left(a^2-b^2\right) d \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{5 a \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{b^3 d \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\frac{\left(15 a^4-26 a^2 b^2+3 b^4\right) \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{3 b^3 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}-\frac{2 a^2 \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^{3/2}}-$$

$$\frac{2 a^2 \left(5 a^2-9 b^2\right) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{\left(15 a^4-26 a^2 b^2+3 b^4\right) \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{3 b^3 \left(a^2-b^2\right)^2 d}$$

Result (type 4, 677 leaves) :

$$-\frac{1}{12\,(a-b)^2\,b^3\,(a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}\,a\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^{5/2}$$

$$\left(\frac{2\left(20\,a^3\,b-36\,a\,b^3\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{2\left(45\,a^4-86\,a^2\,b^2+33\,b^4\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\mathrm{i}\left(15\,a^4-26\,a^2\,b^2+3\,b^4\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]^{5/2}\left(-\frac{2\,a^3\,\mathrm{Sin}[c+d\,x]}{3\,b^2\,\left(-a^2+b^2\right)\,(b+a\,\mathrm{Cos}[c+d\,x])^2}-\right.$$

$$\left.\frac{4\left(-3\,a^5\,\mathrm{Sin}[c+d\,x]+5\,a^3\,b^2\,\mathrm{Sin}[c+d\,x]\right)}{3\,b^3\,\left(-a^2+b^2\right)^2\,(b+a\,\mathrm{Cos}[c+d\,x])}+\frac{\mathrm{Tan}[c+d\,x]}{b^3}\right)$$

- **Problem 662: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{7/2}}{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 370 leaves, 13 steps) :

$$-\frac{2\,a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,a\,\left(3\,a^2-7\,b^2\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{2\,a^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{2\,a^2\,\left(3\,a^2-7\,b^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 661 leaves) :

$$\frac{1}{6\,(a-b)^2\,b^2\,(a+b)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\left(\frac{2\left(4\,a^3\,b-12\,a\,b^3\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\left(9\,a^4-19\,a^2\,b^2+6\,b^4\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\text{i}\,\left(3\,a^4-7\,a^2\,b^2\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^{5/2}\left(\frac{2\,a^2\,\text{Sin}[c+d\,x]}{3\,b\,\left(-a^2+b^2\right)\,(b+a\,\text{Cos}[c+d\,x])^2}+\frac{2\left(-3\,a^4\,\text{Sin}[c+d\,x]+7\,a^2\,b^2\,\text{Sin}[c+d\,x]\right)}{3\,b^2\,\left(-a^2+b^2\right)^2\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}$$

- **Problem 685: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{1/3}\,dx$$

Optimal (type 6, 105 leaves, 3 steps):

$$\frac{\sqrt{2}\;\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2},\,-\frac{1}{3},\,\frac{3}{2},\,\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\,\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}}$$

Result (type 6, 11 281 leaves): Display of huge result suppressed!

- **Problem 687: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,dx$$

Optimal (type 6, 362 leaves, 10 steps):

$$\frac{3\left(9 a^2+32 b^2\right)(a+b \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]}{220 b^2 d}-\frac{9 a (a+b \operatorname{Sec}[c+d x])^{5/3} \operatorname{Tan}[c+d x]}{44 b^2 d}+\frac{3 \operatorname{Sec}[c+d x] (a+b \operatorname{Sec}[c+d x])^{5/3} \operatorname{Tan}[c+d x]}{11 b d}+$$
$$\left(a\left(18 a^2+49 b^2\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, -\frac{2}{3}, \frac{3}{2}, \frac{1}{2}(1-\operatorname{Sec}[c+d x]), \frac{b(1-\operatorname{Sec}[c+d x])}{a+b}\right](a+b \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]\right) \Big/$$
$$\left(110 \sqrt{2} b^3 d \sqrt{1+\operatorname{Sec}[c+d x]}\left(\frac{a+b \operatorname{Sec}[c+d x]}{a+b}\right)^{2/3}\right)-$$
$$\left(\left(9 a^4+23 a^2 b^2-32 b^4\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{3}, \frac{3}{2}, \frac{1}{2}(1-\operatorname{Sec}[c+d x]), \frac{b(1-\operatorname{Sec}[c+d x])}{a+b}\right]\left(\frac{a+b \operatorname{Sec}[c+d x]}{a+b}\right)^{1/3} \operatorname{Tan}[c+d x]\right) \Big/$$
$$\left(55 \sqrt{2} b^3 d \sqrt{1+\operatorname{Sec}[c+d x]}(a+b \operatorname{Sec}[c+d x])^{1/3}\right)$$

Result (type 6, 33 386 leaves): Display of huge result suppressed!

Problem 688: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Sec}[c+d x]^3 (a+b \operatorname{Sec}[c+d x])^{2/3} \, dx$$

Optimal (type 6, 305 leaves, 9 steps):

$$-\frac{9 a (a+b \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]}{40 b d}+\frac{3 (a+b \operatorname{Sec}[c+d x])^{5/3} \operatorname{Tan}[c+d x]}{8 b d}-$$
$$\left(\left(6 a^2-25 b^2\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, -\frac{2}{3}, \frac{3}{2}, \frac{1}{2}(1-\operatorname{Sec}[c+d x]), \frac{b(1-\operatorname{Sec}[c+d x])}{a+b}\right](a+b \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]\right) \Big/$$
$$\left(20 \sqrt{2} b^2 d \sqrt{1+\operatorname{Sec}[c+d x]}\left(\frac{a+b \operatorname{Sec}[c+d x]}{a+b}\right)^{2/3}\right)+$$
$$\frac{3 a\left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{3}, \frac{3}{2}, \frac{1}{2}(1-\operatorname{Sec}[c+d x]), \frac{b(1-\operatorname{Sec}[c+d x])}{a+b}\right]\left(\frac{a+b \operatorname{Sec}[c+d x]}{a+b}\right)^{1/3} \operatorname{Tan}[c+d x]}{10 \sqrt{2} b^2 d \sqrt{1+\operatorname{Sec}[c+d x]}(a+b \operatorname{Sec}[c+d x])^{1/3}}$$

Result (type 6, 29 862 leaves): Display of huge result suppressed!

Problem 689: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Sec}[c+d x]^2 (a+b \operatorname{Sec}[c+d x])^{2/3} \, dx$$

Optimal (type 6, 260 leaves, 8 steps):

$$\frac{3 (a+b \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]}{5 d}+\frac{2 \sqrt{2} a \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, -\frac{2}{3}, \frac{3}{2}, \frac{1}{2}(1-\operatorname{Sec}[c+d x]), \frac{b(1-\operatorname{Sec}[c+d x])}{a+b}\right](a+b \operatorname{Sec}[c+d x])^{2/3} \operatorname{Tan}[c+d x]}{5 b d \sqrt{1+\operatorname{Sec}[c+d x]}\left(\frac{a+b \operatorname{Sec}[c+d x]}{a+b}\right)^{2/3}}-$$
$$\frac{2 \sqrt{2}\left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{3}, \frac{3}{2}, \frac{1}{2}(1-\operatorname{Sec}[c+d x]), \frac{b(1-\operatorname{Sec}[c+d x])}{a+b}\right]\left(\frac{a+b \operatorname{Sec}[c+d x]}{a+b}\right)^{1/3} \operatorname{Tan}[c+d x]}{5 b d \sqrt{1+\operatorname{Sec}[c+d x]}(a+b \operatorname{Sec}[c+d x])^{1/3}}$$

Result (type 6, 9607 leaves): Display of huge result suppressed!

- **Problem 690: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,dx$$

Optimal (type 6, 105 leaves, 3 steps):

$$\frac{\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}}$$

Result (type 6, 11 285 leaves): Display of huge result suppressed!

- **Problem 692: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{4/3}\,dx$$

Optimal (type 6, 108 leaves, 3 steps):

$$\left(\sqrt{2}\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{4}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\right)$$

Result (type 6, 11 551 leaves): Display of huge result suppressed!

- **Problem 694: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{5/3}\,dx$$

Optimal (type 6, 412 leaves, 11 steps):

$$\frac{3\,a\,(18\,a^2+97\,b^2)\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{1232\,b^2\,d}+\frac{3\,(18\,a^2+121\,b^2)\,(a+b\,\text{Sec}[c+d\,x])^{5/3}\,\text{Tan}[c+d\,x]}{1232\,b^2\,d}-\frac{9\,a\,(a+b\,\text{Sec}[c+d\,x])^{8/3}\,\text{Tan}[c+d\,x]}{77\,b^2\,d}+\frac{3\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{8/3}\,\text{Tan}[c+d\,x]}{14\,b\,d}+\left((36\,a^4+164\,a^2\,b^2+605\,b^4)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(616\,\sqrt{2}\,b^3\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)-\left(a\,(18\,a^4+79\,a^2\,b^2-97\,b^4)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(308\,\sqrt{2}\,b^3\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

Result (type 6, 44 504 leaves): Display of huge result suppressed!

- **Problem 695: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^3\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/3}\,dx$$

Optimal (type 6, 356 leaves, 10 steps):

$$-\frac{3\left(15\,a^2-64\,b^2\right)(a+b\,\mathrm{Sec}[c+d\,x])^{2/3}\,\mathrm{Tan}[c+d\,x]}{440\,b\,d}-\frac{9\,a\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/3}\,\mathrm{Tan}[c+d\,x]}{88\,b\,d}+\frac{3\,(a+b\,\mathrm{Sec}[c+d\,x])^{8/3}\,\mathrm{Tan}[c+d\,x]}{11\,b\,d}-\left(a\left(30\,a^2-373\,b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x]),\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}\right](a+b\,\mathrm{Sec}[c+d\,x])^{2/3}\,\mathrm{Tan}[c+d\,x]\right)\Big/\left(220\,\sqrt{2}\,b^2\,d\,\sqrt{1+\mathrm{Sec}[c+d\,x]}\left(\frac{a+b\,\mathrm{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)+\left(\left(15\,a^4-79\,a^2\,b^2+64\,b^4\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x]),\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\mathrm{Sec}[c+d\,x]}{a+b}\right)^{1/3}\mathrm{Tan}[c+d\,x]\right)\Big/\left(110\,\sqrt{2}\,b^2\,d\,\sqrt{1+\mathrm{Sec}[c+d\,x]}\,(a+b\,\mathrm{Sec}[c+d\,x])^{1/3}\right)$$

Result (type 6, 33 405 leaves): Display of huge result suppressed!

- **Problem 696: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^2\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/3}\,dx$$

Optimal (type 6, 299 leaves, 9 steps):

$$\frac{3\,a\,(a+b\,\mathrm{Sec}[c+d\,x])^{2/3}\,\mathrm{Tan}[c+d\,x]}{8\,d}+\frac{3\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/3}\,\mathrm{Tan}[c+d\,x]}{8\,d}+\left(\left(2\,a^2+5\,b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x]),\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}\right](a+b\,\mathrm{Sec}[c+d\,x])^{2/3}\,\mathrm{Tan}[c+d\,x]\right)\Big/\left(4\,\sqrt{2}\,b\,d\,\sqrt{1+\mathrm{Sec}[c+d\,x]}\left(\frac{a+b\,\mathrm{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)-\frac{a\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x]),\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\mathrm{Sec}[c+d\,x]}{a+b}\right)^{1/3}\mathrm{Tan}[c+d\,x]}{2\,\sqrt{2}\,b\,d\,\sqrt{1+\mathrm{Sec}[c+d\,x]}\,(a+b\,\mathrm{Sec}[c+d\,x])^{1/3}}$$

Result (type 6, 29 873 leaves): Display of huge result suppressed!

- **Problem 697: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/3}\,dx$$

Optimal (type 6, 108 leaves, 3 steps):

$$\left(\sqrt{2}\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{5}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)$$

Result (type 6, 11 531 leaves) : Display of huge result suppressed!

Problem 699: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^4}{(a+b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 6, 313 leaves, 9 steps) :

$$-\frac{9\,a\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{20\,b^2\,d}+\frac{3\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{8\,b\,d}+\left(\left(18\,a^2+25\,b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(20\,\sqrt{2}\,b^3\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)-\frac{a\,\left(9\,a^2+11\,b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\,\text{Tan}[c+d\,x]}{10\,\sqrt{2}\,b^3\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 6, 29 880 leaves) : Display of huge result suppressed!

Problem 700: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^3}{(a+b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 6, 265 leaves, 8 steps) :

$$\frac{3\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,b\,d}-\frac{3\,\sqrt{2}\,a\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,b^2\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}}+\left(\sqrt{2}\,\left(3\,a^2+2\,b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(5\,b^2\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

Result (type 6, 18 777 leaves) : Display of huge result suppressed!

Problem 701: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 6, 219 leaves, 7 steps):

$$\frac{\sqrt{2}\ \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d x]),\frac{b(1-\text{Sec}[c+d x])}{a+b}\right](a+b\,\text{Sec}[c+d x])^{2/3}\,\text{Tan}[c+d x]}{b\,d\sqrt{1+\text{Sec}[c+d x]}\left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{2/3}}-\frac{\sqrt{2}\ a\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d x]),\frac{b(1-\text{Sec}[c+d x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{1/3}\text{Tan}[c+d x]}{b\,d\sqrt{1+\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])^{1/3}}$$

Result (type 6, 10665 leaves): Display of huge result suppressed!

Problem 702: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d x]}{(a+b\,\text{Sec}[c+d x])^{1/3}}\,dx$$

Optimal (type 6, 105 leaves, 3 steps):

$$\frac{\sqrt{2}\ \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d x]),\frac{b(1-\text{Sec}[c+d x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{1/3}\text{Tan}[c+d x]}{d\sqrt{1+\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])^{1/3}}$$

Result (type 6, 310 leaves):

$$\left(15\,(a-b)^2\,(a+b)\,\text{AppellF1}\left[\frac{2}{3},\frac{1}{2},\frac{1}{2},\frac{5}{3},\frac{a+b\,\text{Sec}[c+d x]}{a-b},\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right]\text{Cos}[c+d x]\,\text{Cot}[c+d x]^3\,(1+\text{Sec}[c+d x])\,(b-b\,\text{Sec}[c+d x])\,(a+b\,\text{Sec}[c+d x])^{2/3}\right)\Big/\left(b^2\,(-a+b)\,d\left(3\,(a-b)\,\text{AppellF1}\left[\frac{5}{3},\frac{1}{2},\frac{3}{2},\frac{8}{3},\frac{a+b\,\text{Sec}[c+d x]}{a-b},\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right](b+a\,\text{Cos}[c+d x])+(a+b)\left(10\,(a-b)\,\text{AppellF1}\left[\frac{2}{3},\frac{1}{2},\frac{1}{2},\frac{5}{3},\frac{a+b\,\text{Sec}[c+d x]}{a-b},\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right]\text{Cos}[c+d x]+3\,\text{AppellF1}\left[\frac{5}{3},\frac{3}{2},\frac{1}{2},\frac{8}{3},\frac{a+b\,\text{Sec}[c+d x]}{a-b},\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right](b+a\,\text{Cos}[c+d x])\right)\right)\right)$$

Problem 704: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d x]}{(a+b\,\text{Sec}[c+d x])^{2/3}}\,dx$$

Optimal (type 6, 105 leaves, 3 steps):

$$\frac{\sqrt{2}\ \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d x]),\frac{b(1-\text{Sec}[c+d x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{2/3}\text{Tan}[c+d x]}{d\sqrt{1+\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])^{2/3}}$$

Result (type 6, 310 leaves):

$$\left(24\,(a-b)^2\,(a+b)\,\text{AppellF1}\left[\frac{1}{3},\frac{1}{2},\frac{1}{2},\frac{4}{3},\frac{a+b\,\text{Sec}[c+d\,x]}{a-b},\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right]\right.$$
$$\left.\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^3\,(1+\text{Sec}[c+d\,x])\,(b-b\,\text{Sec}[c+d\,x])\,(a+b\,\text{Sec}[c+d\,x])^{1/3}\right)\Big/$$
$$\left(b^2\,(-a+b)\,d\,\left(3\,(a-b)\,\text{AppellF1}\left[\frac{4}{3},\frac{1}{2},\frac{3}{2},\frac{7}{3},\frac{a+b\,\text{Sec}[c+d\,x]}{a-b},\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right]\,(b+a\,\text{Cos}[c+d\,x])+\right.\right.$$
$$(a+b)\,\left(8\,(a-b)\,\text{AppellF1}\left[\frac{1}{3},\frac{1}{2},\frac{1}{2},\frac{4}{3},\frac{a+b\,\text{Sec}[c+d\,x]}{a-b},\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right]\,\text{Cos}[c+d\,x]+\right.$$
$$\left.\left.\left.3\,\text{AppellF1}\left[\frac{4}{3},\frac{3}{2},\frac{1}{2},\frac{7}{3},\frac{a+b\,\text{Sec}[c+d\,x]}{a-b},\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right]\,(b+a\,\text{Cos}[c+d\,x])\right)\right)\right)$$

- **Problem 706: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]}{(a+b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 6, 110 leaves, 3 steps):

$$\frac{\sqrt{2}\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{4}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\,\text{Tan}[c+d\,x]}{(a+b)\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 6, 12 814 leaves): Display of huge result suppressed!

- **Problem 708: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^4}{(a+b\,\text{Sec}[c+d\,x])^{5/3}}\,dx$$

Optimal (type 6, 378 leaves, 9 steps):

$$-\frac{3\,a^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{2/3}}+\frac{3\,\left(3\,a^2-b^2\right)\,(a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{4\,b^2\,\left(a^2-b^2\right)\,d}-$$
$$\left(a\,\left(9\,a^2-7\,b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{1}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(2\,\sqrt{2}\,b^3\,\left(a^2-b^2\right)\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\right)+$$
$$\left(\left(9\,a^4-10\,a^2\,b^2-b^4\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{2}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(2\,\sqrt{2}\,b^3\,\left(a^2-b^2\right)\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\right)$$

Result (type 6, 33 538 leaves): Display of huge result suppressed!

Problem 709: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^3}{(a+b\,\text{Sec}[c+d x])^{5/3}}\,dx$$

Optimal (type 6, 307 leaves, 8 steps):

$$-\frac{3 a^2 \text{Tan}[c+d x]}{2 b \left(a^2-b^2\right) d (a+b\,\text{Sec}[c+d x])^{2/3}}+\left(\left(3 a^2-2 b^2\right) \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{1}{3},\frac{3}{2},\frac{1}{2} (1-\text{Sec}[c+d x]),\frac{b (1-\text{Sec}[c+d x])}{a+b}\right] (a+b\,\text{Sec}[c+d x])^{1/3} \text{Tan}[c+d x]\right)\Big/\left(\sqrt{2}\, b^2 \left(a^2-b^2\right) d \sqrt{1+\text{Sec}[c+d x]} \left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{1/3}\right)-\frac{a \left(3 a^2-4 b^2\right) \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{2}{3},\frac{3}{2},\frac{1}{2} (1-\text{Sec}[c+d x]),\frac{b (1-\text{Sec}[c+d x])}{a+b}\right] \left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{2/3} \text{Tan}[c+d x]}{\sqrt{2}\, b^2 \left(a^2-b^2\right) d \sqrt{1+\text{Sec}[c+d x]}\, (a+b\,\text{Sec}[c+d x])^{2/3}}$$

Result (type 6, 30 028 leaves): Display of huge result suppressed!

Problem 710: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{5/3}}\,dx$$

Optimal (type 6, 289 leaves, 8 steps):

$$\frac{3 a \text{Tan}[c+d x]}{2 \left(a^2-b^2\right) d (a+b\,\text{Sec}[c+d x])^{2/3}}-\frac{a \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{1}{3},\frac{3}{2},\frac{1}{2} (1-\text{Sec}[c+d x]),\frac{b (1-\text{Sec}[c+d x])}{a+b}\right] (a+b\,\text{Sec}[c+d x])^{1/3} \text{Tan}[c+d x]}{\sqrt{2}\, b \left(a^2-b^2\right) d \sqrt{1+\text{Sec}[c+d x]} \left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{1/3}}+\frac{\left(a^2-2 b^2\right) \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{2}{3},\frac{3}{2},\frac{1}{2} (1-\text{Sec}[c+d x]),\frac{b (1-\text{Sec}[c+d x])}{a+b}\right] \left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{2/3} \text{Tan}[c+d x]}{\sqrt{2}\, b \left(a^2-b^2\right) d \sqrt{1+\text{Sec}[c+d x]}\, (a+b\,\text{Sec}[c+d x])^{2/3}}$$

Result (type 6, 18 901 leaves): Display of huge result suppressed!

Problem 711: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]}{(a+b\,\text{Sec}[c+d x])^{5/3}}\,dx$$

Optimal (type 6, 110 leaves, 3 steps):

$$\frac{\sqrt{2}\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{5}{3},\frac{3}{2},\frac{1}{2} (1-\text{Sec}[c+d x]),\frac{b (1-\text{Sec}[c+d x])}{a+b}\right] \left(\frac{a+b\,\text{Sec}[c+d x]}{a+b}\right)^{2/3} \text{Tan}[c+d x]}{(a+b) d \sqrt{1+\text{Sec}[c+d x]}\, (a+b\,\text{Sec}[c+d x])^{2/3}}$$

Result (type 6, 12 838 leaves): Display of huge result suppressed!

Problem 713: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x]^{2/3}}{a+b \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 6, 174 leaves, 6 steps):

$$\frac{a \operatorname{AppellF1}\left[\frac{1}{2},-\frac{1}{6},1,\frac{3}{2},\operatorname{Sin}[c+d x]^2,\frac{a^2 \operatorname{Sin}[c+d x]^2}{a^2-b^2}\right] \operatorname{Sin}[c+d x]}{\left(a^2-b^2\right) d \left(\operatorname{Cos}[c+d x]^2\right)^{1/6} \operatorname{Sec}[c+d x]^{1/3}}-\frac{b \operatorname{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\operatorname{Sin}[c+d x]^2,\frac{a^2 \operatorname{Sin}[c+d x]^2}{a^2-b^2}\right] \left(\operatorname{Cos}[c+d x]^2\right)^{1/3} \operatorname{Sec}[c+d x]^{2/3} \operatorname{Sin}[c+d x]}{\left(a^2-b^2\right) d}$$

Result (type 6, 4609 leaves):

$$\left(9 \left(a^2-b^2\right) \operatorname{Sec}[c+d x]^{5/3} \operatorname{Sin}[c+d x] \left(\left(b \operatorname{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right] \sqrt{1+\operatorname{Tan}[c+d x]^2}\right) \Big/ \right.\right.$$
$$\left(9 \left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left(6 b^2 \operatorname{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right) \operatorname{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\left.\operatorname{Tan}[c+d x]^2\right)+\left(a \operatorname{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \Big/$$
$$\left(-9 \left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]-2 \left(3 b^2 \operatorname{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left.\left.\left.\left.2 \left(-a^2+b^2\right) \operatorname{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \operatorname{Tan}[c+d x]^2\right)\right)\right) \Big/$$
$$\left(d \left(a+b \operatorname{Sec}[c+d x]\right) \left(1+\operatorname{Tan}[c+d x]^2\right)^{2/3} \left(-a^2+b^2 \left(1+\operatorname{Tan}[c+d x]^2\right)\right) \left(-\frac{1}{\left(1+\operatorname{Tan}[c+d x]^2\right)^{2/3} \left(-a^2+b^2 \left(1+\operatorname{Tan}[c+d x]^2\right)\right)^2}\right.\right.$$
$$18 b^2 \left(a^2-b^2\right) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]^2 \left(\left(b \operatorname{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right] \sqrt{1+\operatorname{Tan}[c+d x]^2}\right) \Big/ \right.$$
$$\left(9 \left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(6 b^2 \operatorname{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\operatorname{Tan}[c+d x]^2,\right.\right.\right.$$
$$\left.\left.\left.\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right) \operatorname{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \operatorname{Tan}[c+d x]^2\right)+$$
$$\left(a \operatorname{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\frac{b^2 \operatorname{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \Big/ \left(-9 \left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\operatorname{Tan}[c+d x]^2,\right.\right.$$

$$\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big] - 2\left(3\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\right.$$
$$\left.2\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\text{Tan}[c+d\,x]^2\Bigg)\Bigg) -$$
$$\frac{1}{\left(1+\text{Tan}[c+d\,x]^2\right)^{5/3}\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)}\,12\left(a^2-b^2\right)\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2$$
$$\left(\left(b\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\Big/\right.$$
$$\left(9\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(6\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.$$
$$\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\text{Tan}[c+d\,x]^2\right)+$$
$$\left(a\,\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\Big/\left(-9\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]-\right.$$
$$2\left(3\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+2\left(-a^2+b^2\right)\right.$$
$$\left.\left.\text{AppellF1}\Big[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\text{Tan}[c+d\,x]^2\right)\Bigg)+\frac{1}{\left(1+\text{Tan}[c+d\,x]^2\right)^{2/3}\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)}$$
$$9\left(a^2-b^2\right)\text{Sec}[c+d\,x]^2\left(\left(b\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\Big/\right.$$
$$\left(9\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(6\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.$$
$$\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\text{Tan}[c+d\,x]^2\right)+$$
$$\left(a\,\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\Big/\left(-9\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]-\right.$$
$$2\left(3\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+2\left(-a^2+b^2\right)\right.$$
$$\left.\left.\text{AppellF1}\Big[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\right)\text{Tan}[c+d\,x]^2\right)\Bigg)+\frac{1}{\left(1+\text{Tan}[c+d\,x]^2\right)^{2/3}\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)}$$
$$9\left(a^2-b^2\right)\text{Tan}[c+d\,x]\left(\left(b\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\Big/\right.$$

$$\left(\sqrt{1+\text{Tan}[c+d\,x]^2}\,\left(9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},\right.\right.\right.\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\,\text{Tan}[c+d\,x]^2\Bigg)\Bigg)+$$

$$\left(b\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-\frac{1}{9}\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\right.\right.\right.$$

$$\left.\left.\left.\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\Big/$$

$$\left(9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)+$$

$$\left(a\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-\frac{4}{9}\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\right.\right.\right.$$

$$\left.\left.\left.\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(-9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\left(3\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)-$$

$$\left(b\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{1+\text{Tan}[c+d\,x]^2}\,\left(2\left(6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.\right.\right.$$

$$\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]+$$

$$9\left(a^2-b^2\right)\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-\right.$$

$$\left.\frac{1}{9}\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)+$$

$$\text{Tan}[c+d\,x]^2\left(6\,b^2\left(\frac{1}{5\left(a^2-b^2\right)}12\,b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{6},3,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\right.\right.$$

$$\left.\frac{1}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{7}{6},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)+$$

$$\left(-a^2+b^2\right)\left(\frac{6\,b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{7}{6},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\left(a^2-b^2\right)}-\right.$$

$$\left.\left.\left.\left.\frac{7}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{13}{6},1,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\right)\right)\Big/$$

$$\left(9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)^2-$$

$$\left(a\,\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\left(-4\left(3\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.\right.$$

$$\left.2\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-$$

$$9\left(a^2-b^2\right)\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-\right.$$

$$\left.\frac{4}{9}\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)-$$

$$2\,\text{Tan}[c+d\,x]^2\left(3\,b^2\left(\frac{1}{5\left(a^2-b^2\right)}12\,b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{2}{3},3,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\right.\right.$$

$$\left.\text{Tan}[c+d\,x]-\frac{4}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)+$$

$$2\left(-a^2+b^2\right)\left(\frac{6\,b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{3},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\left(a^2-b^2\right)}-\right.$$

$$2\,\text{AppellF1}\left[\frac{5}{2},\frac{8}{3},1,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$
$$\Bigg(-9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{2}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\Bigg(3\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{2}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.$$
$$\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d\,x]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

Problem 714: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^{1/3}}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 6, 174 leaves, 6 steps):

$$\frac{a\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},1,\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\text{Sin}[c+d\,x]}{\left(a^2-b^2\right)d\left(\text{Cos}[c+d\,x]^2\right)^{1/3}\text{Sec}[c+d\,x]^{2/3}}-$$
$$\frac{b\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{6},1,\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\left(\text{Cos}[c+d\,x]^2\right)^{1/6}\text{Sec}[c+d\,x]^{1/3}\,\text{Sin}[c+d\,x]}{\left(a^2-b^2\right)d}$$

Result (type 6, 4610 leaves):

$$\Bigg(9\left(a^2-b^2\right)\text{Sec}[c+d\,x]^{4/3}\,\text{Sin}[c+d\,x]\Bigg(\Bigg(b\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{1+\text{Tan}[c+d\,x]^2}\Bigg)\Bigg/$$
$$\Bigg(9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$
$$2\Bigg(3\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)$$
$$\text{Tan}[c+d\,x]^2\Bigg)+\Bigg(a\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\Bigg/$$
$$\Bigg(-9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\Bigg(-6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$
$$5\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{11}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d\,x]^2\Bigg)\Bigg)\Bigg)\Bigg/$$
$$\Bigg(d\,(a+b\,\text{Sec}[c+d\,x])\left(1+\text{Tan}[c+d\,x]^2\right)^{5/6}\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg(-\frac{1}{\left(1+\text{Tan}[c+d\,x]^2\right)^{5/6}\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)^2}$$

$$18\, b^2 \left(a^2-b^2\right) \mathrm{Sec}[c+d\,x]^2\, \mathrm{Tan}[c+d\,x]^2 \left(\left(b\, \mathrm{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] \sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right) \Big/ \right.$$

$$\left(9 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + 2 \left(3\, b^2\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + \left(-a^2+b^2\right) \mathrm{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \mathrm{Tan}[c+d\,x]^2\right) +$$

$$\left(a\, \mathrm{AppellF1}\left[\frac{1}{2}, \frac{5}{6}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \Big/ \left(-9 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{1}{2}, \frac{5}{6}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \right.\right.$$

$$\left.\frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + \left(-6\, b^2\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{5}{6}, 2, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + \right.$$

$$\left.\left.\left. 5 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{3}{2}, \frac{11}{6}, 1, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \mathrm{Tan}[c+d\,x]^2\right)\right) -$$

$$\frac{1}{\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{11/6} \left(-a^2+b^2 \left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)}\, 15 \left(a^2-b^2\right) \mathrm{Sec}[c+d\,x]^2\, \mathrm{Tan}[c+d\,x]^2$$

$$\left(\left(b\, \mathrm{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] \sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right) \Big/ \right.$$

$$\left(9 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + 2 \left(3\, b^2\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + \left(-a^2+b^2\right) \mathrm{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \mathrm{Tan}[c+d\,x]^2\right) +$$

$$\left(a\, \mathrm{AppellF1}\left[\frac{1}{2}, \frac{5}{6}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \Big/ \left(-9 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{1}{2}, \frac{5}{6}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + \right.$$

$$\left(-6\, b^2\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{5}{6}, 2, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + 5 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{3}{2}, \frac{11}{6}, 1, \frac{5}{2}, \right.\right.$$

$$\left.\left.\left. -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \mathrm{Tan}[c+d\,x]^2\right)\right) + \frac{1}{\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{5/6} \left(-a^2+b^2 \left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)}$$

$$9 \left(a^2-b^2\right) \mathrm{Sec}[c+d\,x]^2 \left(\left(b\, \mathrm{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] \sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right) \Big/ \right.$$

$$\left(9 \left(a^2-b^2\right) \mathrm{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + 2 \left(3\, b^2\, \mathrm{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right] + \left(-a^2+b^2\right) \mathrm{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, -\mathrm{Tan}[c+d\,x]^2, \frac{b^2\, \mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right) \mathrm{Tan}[c+d\,x]^2\right) +$$

$$\left(a\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\Big/\left(-9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left(-6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+5\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{11}{6},1,\frac{5}{2},\right.\right.$$

$$\left.\left.\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\right)+\frac{1}{\left(1+\text{Tan}[c+d\,x]^2\right)^{5/6}\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)}$$

$$9\left(a^2-b^2\right)\text{Tan}[c+d\,x]\left(\left(b\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\Big/\right.$$

$$\left(\sqrt{1+\text{Tan}[c+d\,x]^2}\left(9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\left(3\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\right)+$$

$$\left(b\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-\frac{2}{9}\,\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\right.\right.\right.$$

$$\left.\left.\left.\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\Big/$$

$$\left(9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\left(3\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)+$$

$$\left(a\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-\frac{5}{9}\,\text{AppellF1}\left[\frac{3}{2},\frac{11}{6},\right.\right.\right.$$

$$\left.\left.\left.1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(-9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-6\,b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+5\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{11}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)-$$

$$\Bigg(b\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\sqrt{1+\text{Tan}[c+d\,x]^2}\,\Bigg(4\,\Big(3\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,$$

$$\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Big)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]+$$

$$9\left(a^2-b^2\right)\Bigg(\frac{2\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-$$

$$\frac{2}{9}\,\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+$$

$$2\,\text{Tan}[c+d\,x]^2\,\Bigg(3\,b^2\,\Bigg(\frac{1}{5\left(a^2-b^2\right)}12\,b^2\,\text{AppellF1}\Big[\frac{5}{2},\frac{1}{3},3,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2$$

$$\text{Tan}[c+d\,x]-\frac{2}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+$$

$$\left(-a^2+b^2\right)\Bigg(\frac{6\,b^2\,\text{AppellF1}\Big[\frac{5}{2},\frac{4}{3},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\left(a^2-b^2\right)}-$$

$$\frac{8}{5}\,\text{AppellF1}\Big[\frac{5}{2},\frac{7}{3},1,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(9\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+2\,\Big(3\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,$$

$$\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Big)\,\text{Tan}[c+d\,x]^2\Bigg)^2-$$

$$\Bigg(a\,\text{AppellF1}\Big[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\Bigg(2\,\Big(-6\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$5\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{3}{2},\frac{11}{6},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Big)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-$$

$$9\left(a^2-b^2\right)\Bigg(\frac{2\,b^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\left(a^2-b^2\right)}-$$

$$\frac{5}{9}\text{AppellF1}\left[\frac{3}{2},\frac{11}{6},1,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Bigg)+$$

$$\text{Tan}[c+d x]^2\left(-6 b^2\left(\frac{1}{5\left(a^2-b^2\right)}12 b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{6},3,\frac{7}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\right.\right.$$

$$\left.\text{Tan}[c+d x]-\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},2,\frac{7}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)+$$

$$5\left(a^2-b^2\right)\left(\frac{1}{5\left(a^2-b^2\right)}6 b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{11}{6},2,\frac{7}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\right.$$

$$\left.\left.\left.\left.\frac{11}{5}\text{AppellF1}\left[\frac{5}{2},\frac{17}{6},1,\frac{7}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)\right)\right)\right)\Bigg/$$

$$\left(-9\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{5}{6},1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(-6 b^2\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{6},2,\frac{5}{2},-\text{Tan}[c+d x]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+5\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{2},\frac{11}{6},1,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\right)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 715: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Sec}[c+d x]^{1/3}\,(a+b\,\text{Sec}[c+d x])}\,dx$$

Optimal (type 6, 174 leaves, 6 steps):

$$-\frac{b\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{6},1,\frac{3}{2},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\text{Sin}[c+d x]}{\left(a^2-b^2\right)d\left(\text{Cos}[c+d x]^2\right)^{1/6}\,\text{Sec}[c+d x]^{1/3}}+$$

$$\frac{a\,\text{AppellF1}\left[\frac{1}{2},-\frac{2}{3},1,\frac{3}{2},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\left(\text{Cos}[c+d x]^2\right)^{1/3}\,\text{Sec}[c+d x]^{2/3}\,\text{Sin}[c+d x]}{\left(a^2-b^2\right)d}$$

Result (type 6, 9174 leaves): Display of huge result suppressed!

- **Problem 716: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\text{Sec}[c+d x]^{2/3}\,(a+b\,\text{Sec}[c+d x])}\,dx$$

Optimal (type 6, 174 leaves, 6 steps):

$$-\frac{b\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{3},1,\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\text{Sin}[c+d\,x]}{\left(a^2-b^2\right)d\left(\text{Cos}[c+d\,x]^2\right)^{1/3}\text{Sec}[c+d\,x]^{2/3}}+\frac{a\,\text{AppellF1}\left[\frac{1}{2},-\frac{5}{6},1,\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\left(\text{Cos}[c+d\,x]^2\right)^{1/6}\text{Sec}[c+d\,x]^{1/3}\text{Sin}[c+d\,x]}{\left(a^2-b^2\right)d}$$

Result (type 6, 9178 leaves) : Display of huge result suppressed!

- **Problem 718: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^{5/3}\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\text{Unintegrable}\left[\text{Sec}[c+d\,x]^{5/3}\sqrt{a+b\,\text{Sec}[c+d\,x]},x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 720: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^{2/3}\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\text{Unintegrable}\left[\text{Sec}[c+d\,x]^{2/3}\sqrt{a+b\,\text{Sec}[c+d\,x]},x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 726: Attempted integration timed out after 120 seconds.**

$$\int \frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\text{Sec}[c+d\,x]^{7/3}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\text{Sec}[c+d\,x]^{7/3}},x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 727: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^{7/3}\left(a+b\,\text{Sec}[c+d\,x]\right)^{3/2}dx$$

Optimal (type 9, 27 leaves, 0 steps):

Unintegrable[Sec[c + d x]^(7/3) (a + b Sec[c + d x])^(3/2), x]

Result (type 1, 1 leaves):

???

Problem 728: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]^{5/3}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

Unintegrable[Sec[c + d x]^(5/3) (a + b Sec[c + d x])^(3/2), x]

Result (type 1, 1 leaves):

???

Problem 729: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]^{4/3}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

Unintegrable[Sec[c + d x]^(4/3) (a + b Sec[c + d x])^(3/2), x]

Result (type 1, 1 leaves):

???

Problem 730: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]^{2/3}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

Unintegrable[Sec[c + d x]^(2/3) (a + b Sec[c + d x])^(3/2), x]

Result (type 1, 1 leaves):

???

Problem 732: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}}{\text{Sec}[c+d\,x]^{1/3}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

Unintegrable[(a + b Sec[c + d x])^(3/2) / Sec[c + d x]^(1/3), x]

Result (type 1, 1 leaves) :

???

- **Problem 736: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}{\mathrm{Sec}[c+d\,x]^{7/3}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\mathrm{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}{\mathrm{Sec}[c+d\,x]^{7/3}},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 737: Attempted integration timed out after 120 seconds.**

$$\int \mathrm{Sec}[c+d\,x]^{7/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\mathrm{Unintegrable}\left[\mathrm{Sec}[c+d\,x]^{7/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 738: Attempted integration timed out after 120 seconds.**

$$\int \mathrm{Sec}[c+d\,x]^{5/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\mathrm{Unintegrable}\left[\mathrm{Sec}[c+d\,x]^{5/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 739: Attempted integration timed out after 120 seconds.**

$$\int \mathrm{Sec}[c+d\,x]^{4/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\mathrm{Unintegrable}\left[\mathrm{Sec}[c+d\,x]^{4/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2},\,x\right]$$

Result (type 1, 1 leaves) :

???

Problem 740: Attempted integration timed out after 120 seconds.

$$\int \mathrm{Sec}[c+d\,x]^{2/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\mathrm{Unintegrable}\left[\mathrm{Sec}[c+d\,x]^{2/3}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 742: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\mathrm{Sec}[c+d\,x]^{1/3}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\mathrm{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\mathrm{Sec}[c+d\,x]^{1/3}},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 744: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\mathrm{Sec}[c+d\,x]^{4/3}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\mathrm{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\mathrm{Sec}[c+d\,x]^{4/3}},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 746: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\mathrm{Sec}[c+d\,x]^{7/3}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\mathrm{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}{\mathrm{Sec}[c+d\,x]^{7/3}},\ x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 756: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\text{Sec}[c+d\,x]^{7/3}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{\text{Sec}[c+d\,x]^{7/3}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 758: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d\,x]^{5/3}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\text{Sec}[c+d\,x]^{5/3}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 760: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d\,x]^{2/3}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\text{Sec}[c+d\,x]^{2/3}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 762: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\text{Sec}[c+d\,x]^{1/3}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{\text{Sec}[c+d\,x]^{1/3}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 764: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\operatorname{Sec}[c+d x]^{4/3}\,(a+b\operatorname{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{\operatorname{Sec}[c+d x]^{4/3}\,(a+b\operatorname{Sec}[c+d x])^{3/2}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 766: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\operatorname{Sec}[c+d x]^{7/3}\,(a+b\operatorname{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{\operatorname{Sec}[c+d x]^{7/3}\,(a+b\operatorname{Sec}[c+d x])^{3/2}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 768: Attempted integration timed out after 120 seconds.**

$$\int \frac{\operatorname{Sec}[c+d x]^{5/3}}{(a+b\operatorname{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\operatorname{Sec}[c+d x]^{5/3}}{(a+b\operatorname{Sec}[c+d x])^{5/2}},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 770: Attempted integration timed out after 120 seconds.**

$$\int \frac{\operatorname{Sec}[c+d x]^{2/3}}{(a+b\operatorname{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\operatorname{Sec}[c+d x]^{2/3}}{(a+b\operatorname{Sec}[c+d x])^{5/2}},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 772: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\text{Sec}[c+d\,x]^{1/3}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{1}{\text{Sec}[c+d\,x]^{1/3}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 774: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\text{Sec}[c+d\,x]^{4/3}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{1}{\text{Sec}[c+d\,x]^{4/3}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 776: Attempted integration timed out after 120 seconds.**

$$\int \frac{1}{\text{Sec}[c+d\,x]^{7/3}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 9, 27 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{1}{\text{Sec}[c+d\,x]^{7/3}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}},\,x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 780: Result more than twice size of optimal antiderivative.**

$$\int \frac{(d\,\text{Sec}[e+f\,x])^n}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 6, 192 leaves, 6 steps) :

$$\frac{1}{\left(a^2-b^2\right) f} a \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+n), 1, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2}(-1+n)} (d\, \text{Sec}[e+f x])^n \text{Sin}[e+f x] - \frac{b\, \text{AppellF1}\left[\frac{1}{2}, \frac{n}{2}, 1, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \left(\text{Cos}[e+f x]^2\right)^{n/2} (d\, \text{Sec}[e+f x])^n \text{Sin}[e+f x]}{\left(a^2-b^2\right) f}$$

Result (type 6, 5280 leaves) : Display of huge result suppressed!

Problem 781: Result more than twice size of optimal antiderivative.

$$\int \frac{(d\, \text{Sec}[e+f x])^n}{(a+b\, \text{Sec}[e+f x])^2} \, dx$$

Optimal (type 6, 299 leaves, 9 steps) :

$$\frac{1}{\left(a^2-b^2\right)^2 f} a^2 \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-3+n), 2, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2}(-1+n)} (d\, \text{Sec}[e+f x])^n \text{Sin}[e+f x] + \frac{1}{\left(a^2-b^2\right)^2 f} b^2 \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+n), 2, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2}(-1+n)} (d\, \text{Sec}[e+f x])^n \text{Sin}[e+f x] - \frac{1}{\left(a^2-b^2\right)^2 f} 2 a b \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-2+n), 2, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \left(\text{Cos}[e+f x]^2\right)^{n/2} (d\, \text{Sec}[e+f x])^n \text{Sin}[e+f x]$$

Result (type 6, 10 428 leaves) : Display of huge result suppressed!

Problem 788: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^3 (a+b\, \text{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 273 leaves, 8 steps) :

$$\frac{(a+b\, \text{Sec}[e+f x])^{1+m} \text{Tan}[e+f x]}{b f (2+m)} - \left(\sqrt{2}\, a (a+b) \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, -1-m, \frac{3}{2}, \frac{1}{2}(1-\text{Sec}[e+f x]), \frac{b (1-\text{Sec}[e+f x])}{a+b}\right] (a+b\, \text{Sec}[e+f x])^m \left(\frac{a+b\, \text{Sec}[e+f x]}{a+b}\right)^{-m} \text{Tan}[e+f x]\right) \Big/ \left(b^2 f (2+m) \sqrt{1+\text{Sec}[e+f x]}\right) + \left(\sqrt{2} \left(a^2+b^2 (1+m)\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, -m, \frac{3}{2}, \frac{1}{2}(1-\text{Sec}[e+f x]), \frac{b (1-\text{Sec}[e+f x])}{a+b}\right] (a+b\, \text{Sec}[e+f x])^m \left(\frac{a+b\, \text{Sec}[e+f x]}{a+b}\right)^{-m} \text{Tan}[e+f x]\right) \Big/ \left(b^2 f (2+m) \sqrt{1+\text{Sec}[e+f x]}\right)$$

Result (type 6, 8908 leaves) : Display of huge result suppressed!

Problem 789: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^2 (a+b\, \text{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 220 leaves, 7 steps):

$$\frac{1}{b\, f \sqrt{1+\text{Sec}[e+f x]}}\sqrt{2}\, (a+b)\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-1-m,\frac{3}{2},\frac{1}{2}(1-\text{Sec}[e+f x]),\frac{b\,(1-\text{Sec}[e+f x])}{a+b}\right]$$

$$(a+b\,\text{Sec}[e+f x])^m \left(\frac{a+b\,\text{Sec}[e+f x]}{a+b}\right)^{-m} \text{Tan}[e+f x]-\frac{1}{b\, f\sqrt{1+\text{Sec}[e+f x]}}$$

$$\sqrt{2}\, a\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}(1-\text{Sec}[e+f x]),\frac{b\,(1-\text{Sec}[e+f x])}{a+b}\right] (a+b\,\text{Sec}[e+f x])^m \left(\frac{a+b\,\text{Sec}[e+f x]}{a+b}\right)^{-m} \text{Tan}[e+f x]$$

Result (type 6, 5564 leaves): Display of huge result suppressed!

■ Problem 790: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]\, (a+b\,\text{Sec}[e+f x])^m \, dx$$

Optimal (type 6, 103 leaves, 3 steps):

$$\frac{1}{f\sqrt{1+\text{Sec}[e+f x]}}\sqrt{2}\, \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}(1-\text{Sec}[e+f x]),\frac{b\,(1-\text{Sec}[e+f x])}{a+b}\right] (a+b\,\text{Sec}[e+f x])^m \left(\frac{a+b\,\text{Sec}[e+f x]}{a+b}\right)^{-m} \text{Tan}[e+f x]$$

Result (type 6, 2828 leaves):

$$-\left(\left(6\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] (b+a\,\text{Cos}[e+f x])^m\, \text{Sec}[e+f x]^{1+m}\, (a+b\,\text{Sec}[e+f x])^m\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) \Big/ \left(f\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b)\, m\, \text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,(1+m)\,\text{AppellF1}\left[\frac{3}{2},2+m,-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)$$

$$\left(\left(6\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] (b+a\,\text{Cos}[e+f x])^m\, \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]^m\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) \Big/ \left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b)\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},2+m,-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right](b+a\,\text{Cos}[e+f x])^m\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]^m\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b)\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},2+m,-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(6a(a+b)\,m\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right](b+a\,\text{Cos}[e+f x])^{-1+m}\right.$$

$$\left.\text{Sec}[e+f x]^m\,\text{Sin}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b)\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},2+m,-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(6(a+b)\,m\,\text{AppellF1}\left[\frac{1}{2},1+m,-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right](b+a\,\text{Cos}[e+f x])^m\right.$$

$$\left.\operatorname{Sec}[e+f x]^{1+m} \operatorname{Sin}[e+f x] \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right) \Big/$$

$$\left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3(a+b) \operatorname{AppellF1}\left[\frac{1}{2}, 1+m,-m, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b) m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.$$

$$\left.\left.\left.\operatorname{AppellF1}\left[\frac{3}{2}, 2+m,-m, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(6(a+b)(b+a \operatorname{Cos}[e+f x])^m \operatorname{Sec}[e+f x]^m \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-\frac{1}{3(a+b)}(a-b) m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2},\right.\right.\right.$$

$$\left.\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\left.\left.\frac{1}{3}(1+m) \operatorname{AppellF1}\left[\frac{3}{2}, 2+m,-m, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right) \Big/$$

$$\left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3(a+b) \operatorname{AppellF1}\left[\frac{1}{2}, 1+m,-m, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b) m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.$$

$$\left.\left.\left.\operatorname{AppellF1}\left[\frac{3}{2}, 2+m,-m, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(6(a+b) \operatorname{AppellF1}\left[\frac{1}{2}, 1+m,-m, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right](b+a \operatorname{Cos}[e+f x])^m \operatorname{Sec}[e+f x]^m\right.$$

$$\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\left(2\left(-(a-b) m \operatorname{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.\right.$$

$$\text{AppellF1}\left[\frac{3}{2}, 2+m, -m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$3(a+b)\left(-\frac{1}{3(a+b)}(a-b)\,m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}(1+m)\,\text{AppellF1}\left[\frac{3}{2}, 2+m, -m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\left(-(a-b)\,m\left(\frac{1}{5(a+b)}3(a-b)(1-m)\,\text{AppellF1}\left[\frac{5}{2}, 1+m,\right.\right.\right.$$

$$2-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2}, 2+m,$$

$$1-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+(a+b)(1+m)\left(-\frac{1}{5(a+b)}\right.$$

$$3(a-b)\,m\,\text{AppellF1}\left[\frac{5}{2}, 2+m, 1-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\left.\left.\left.\left.\left.\frac{3}{5}(2+m)\,\text{AppellF1}\left[\frac{5}{2}, 3+m, -m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2}, 1+m, -m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left(-(a-b)\,m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.\left.\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{3}{2}, 2+m, -m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, \frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\right)\right)\right)$$

Problem 822: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 77 leaves, 7 steps):

$$-\frac{2\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{b\,d}-\frac{2\,a\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]}{b\,(a+b)\,d}+\frac{2\,\text{Sin}[c+d\,x]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 197 leaves):

$$\frac{1}{2\,b\,d}\left(-\frac{6\,a\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]}{a+b}-\frac{2\,b\left(2\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]-\frac{2\,b\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]}{a+b}\right)}{a}+\right.$$
$$\frac{4\,\text{Sin}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}}+1\Big/\left(a\,b\,\sqrt{\text{Sin}[c+d\,x]^2}\right)2\left(2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]-\right.$$
$$\left.\left.2\,b\,(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+\left(a^2-2\,b^2\right)\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]\right)\text{Sin}[c+d\,x]\right)$$

Problem 823: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 128 leaves, 11 steps):

$$\frac{2\,a\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{b^2\,d}+\frac{2\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,b\,d}+\frac{2\,a^2\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]}{b^2\,(a+b)\,d}+\frac{2\,\text{Sin}[c+d\,x]}{3\,b\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{2\,a\,\text{Sin}[c+d\,x]}{b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 257 leaves):

$$\frac{1}{6\,b^2\,d}\left(\frac{2\left(9\,a^2+2\,b^2\right)\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]}{a+b}+\right.$$
$$8\,b\left(2\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]-\frac{2\,b\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}(c+d\,x),2\right]}{a+b}\right)+\left(3\,\text{Cos}[2\,(c+d\,x)]\left(-4\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+\right.\right.$$
$$\left.4\,b\,(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]-2\left(a^2-2\,b^2\right)\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]\right)\text{Sin}[c+d\,x]\Big)\Big/$$
$$\left.\left(b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\left(-1+2\,\text{Cos}[c+d\,x]^2\right)\right)\right)+\frac{\sqrt{\text{Cos}[c+d\,x]}\left(-\frac{2\,a\,\text{Tan}[c+d\,x]}{b^2}+\frac{2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,b}\right)}{d}$$

Problem 837: Unable to integrate problem.

$$\int\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 244 leaves, 10 steps):

$$-\frac{4\,b\,(a^2-b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{15\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,(9\,a^2-2\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{15\,a^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d}+\frac{2\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

- **Problem 838: Unable to integrate problem.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 192 leaves, 9 steps):

$$\frac{2\,(a^2-b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,b\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

- **Problem 839: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 67 leaves, 4 steps):

$$\frac{2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

Result (type 4, 198 leaves):

$$\left(\sqrt{\text{Cos}[c+d x]}\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{a+b\,\text{Sec}[c+d x]}\right.$$
$$\left(i\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]-i\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+\right.$$
$$\left.\left.\sqrt{\frac{1}{1+\text{Cos}[c+d x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\ \text{Sin}[c+d x]\right)\right)\Big/\left(d\sqrt{\frac{1}{1+\text{Cos}[c+d x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\right)$$

Problem 840: Unable to integrate problem.

$$\int \frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 138 leaves, 8 steps):

$$\frac{2a\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{2b\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{\text{Cos}[c+d x]}}\,dx$$

Problem 841: Attempted integration timed out after 120 seconds.

$$\int \frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 237 leaves, 13 steps):

$$\frac{b\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{a\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Sec}[c+d x]}}-$$
$$\frac{\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d x]}}{d\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}}+\frac{\sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 842: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{7/2} (a+b \text{Sec}[c+d x])^{3/2} \, dx$$

Optimal (type 4, 303 leaves, 11 steps):

$$\frac{2 \left(25 a^4-31 a^2 b^2+6 b^4\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{105 a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{4 b \left(41 a^2-3 b^2\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{105 a^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 \left(25 a^2+3 b^2\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{105 a d}+\frac{16 b \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{35 d}+\frac{2 a \text{Cos}[c+d x]^{5/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{7 d}$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[c+d x]^{7/2} (a+b \text{Sec}[c+d x])^{3/2} \, dx$$

Problem 843: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} \, dx$$

Optimal (type 4, 240 leaves, 10 steps):

$$\frac{2 b \left(a^2-b^2\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{5 a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 \left(3 a^2+b^2\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{5 a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{4 b \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{5 d}+\frac{2 a \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{5 d}$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} \, dx$$

Problem 844: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{3/2} (a+b \text{Sec}[c+d x])^{3/2} \, dx$$

Optimal (type 4, 187 leaves, 9 steps):

$$\frac{2\left(a^2-b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{8\,b\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,a\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 8, 27 leaves) :

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Problem 845: Unable to integrate problem.

$$\int \sqrt{\text{Cos}[c+d\,x]}\;(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 4, 209 leaves, 12 steps) :

$$\frac{2\,a\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,b^2\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,a\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

Result (type 8, 27 leaves) :

$$\int \sqrt{\text{Cos}[c+d\,x]}\;(a+b\,\text{Sec}[c+d\,x])^{3/2}\,dx$$

Problem 846: Unable to integrate problem.

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 249 leaves, 13 steps) :

$$\frac{\left(2 a^2+b^2\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{3 a b \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{b \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}+\frac{b \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{3/2}}{\sqrt{\operatorname{Cos}[c+d x]}} \, dx$$

Problem 847: Unable to integrate problem.

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{3/2}}{\operatorname{Cos}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 299 leaves, 14 steps):

$$\frac{7 a b \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{4 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{\left(3 a^2+4 b^2\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{4 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{5 a \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{4 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}+\frac{b \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{2 d \operatorname{Cos}[c+d x]^{3/2}}+\frac{5 a \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{3/2}}{\operatorname{Cos}[c+d x]^{3/2}} \, dx$$

Problem 848: Unable to integrate problem.

$$\int \operatorname{Cos}[c+d x]^{9/2} (a+b \operatorname{Sec}[c+d x])^{5/2} \, dx$$

Optimal (type 4, 363 leaves, 12 steps):

$$\frac{4\,b\,(57\,a^4-62\,a^2\,b^2+5\,b^4)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{315\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,(147\,a^4+279\,a^2\,b^2-10\,b^4)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{315\,a^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,b\,(163\,a^2+5\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,a\,d}+\frac{2\,(49\,a^2+75\,b^2)\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,d}+$$

$$\frac{38\,a\,b\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{63\,d}+\frac{2\,a^2\,\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

- **Problem 849: Unable to integrate problem.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 303 leaves, 11 steps):

$$\frac{2\,(5\,a^4-2\,a^2\,b^2-3\,b^4)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{21\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,b\,(29\,a^2+3\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{21\,a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,(5\,a^2+9\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{21\,d}+$$

$$\frac{6\,a\,b\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{7\,d}+\frac{2\,a^2\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

- **Problem 850: Unable to integrate problem.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 239 leaves, 10 steps):

$$\frac{16 b \left(a^2-b^2\right) \sqrt{\frac{b+a \cos[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{15 d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+\frac{2 \left(9 a^2+23 b^2\right) \sqrt{\cos[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \sec[c+d x]}}{15 d \sqrt{\frac{b+a \cos[c+d x]}{a+b}}}+$$

$$\frac{22 a b \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]} \sin[c+d x]}{15 d}+\frac{2 a^2 \cos[c+d x]^{3/2} \sqrt{a+b \sec[c+d x]} \sin[c+d x]}{5 d}$$

Result (type 8, 27 leaves) :

$$\int \cos[c+d x]^{5/2} (a+b \sec[c+d x])^{5/2} \, dx$$

Problem 851: Unable to integrate problem.

$$\int \cos[c+d x]^{3/2} (a+b \sec[c+d x])^{5/2} \, dx$$

Optimal (type 4, 262 leaves, 13 steps) :

$$\frac{2 a \left(a^2+2 b^2\right) \sqrt{\frac{b+a \cos[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+\frac{2 b^3 \sqrt{\frac{b+a \cos[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+$$

$$\frac{14 a b \sqrt{\cos[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \sec[c+d x]}}{3 d \sqrt{\frac{b+a \cos[c+d x]}{a+b}}}+\frac{2 a^2 \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]} \sin[c+d x]}{3 d}$$

Result (type 8, 27 leaves) :

$$\int \cos[c+d x]^{3/2} (a+b \sec[c+d x])^{5/2} \, dx$$

Problem 852: Unable to integrate problem.

$$\int \sqrt{\cos[c+d x]} (a+b \sec[c+d x])^{5/2} \, dx$$

Optimal (type 4, 263 leaves, 13 steps) :

$$\frac{b \left(4 a^2+b^2\right) \sqrt{\frac{b+a \cos[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+\frac{5 a b^2 \sqrt{\frac{b+a \cos[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+$$

$$\frac{\left(2 a^2-b^2\right) \sqrt{\cos[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \sec[c+d x]}}{d \sqrt{\frac{b+a \cos[c+d x]}{a+b}}}+\frac{b^2 \sqrt{a+b \sec[c+d x]} \sin[c+d x]}{d \sqrt{\cos[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \sqrt{\text{Cos}[c+d\,x]}\;(a+b\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

- **Problem 853: Unable to integrate problem.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 314 leaves, 14 steps):

$$\frac{a\left(8\,a^2+11\,b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{4\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{b\left(15\,a^2+4\,b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{4\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{9\,a\,b\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{b^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{9\,a\,b\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

- **Problem 854: Unable to integrate problem.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 369 leaves, 15 steps):

$$\frac{b\left(59\,a^2+16\,b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{5\,a\left(a^2+4\,b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{8\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\left(33\,a^2+16\,b^2\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{b^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{13\,a\,b\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{\left(33\,a^2+16\,b^2\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{(a + b\, \text{Sec}[c + d\, x])^{5/2}}{\text{Cos}[c + d\, x]^{3/2}}\, dx$$

Problem 855: Unable to integrate problem.

$$\int \frac{\text{Cos}[c + d\, x]^{5/2}}{\sqrt{a + b\, \text{Sec}[c + d\, x]}}\, dx$$

Optimal (type 4, 249 leaves, 10 steps):

$$-\frac{2\, b\, \left(7\, a^2 + 8\, b^2\right) \sqrt{\frac{b + a\, \text{Cos}[c+d\, x]}{a+b}}\; \text{EllipticF}\left[\frac{1}{2}\, (c + d\, x),\, \frac{2\, a}{a+b}\right]}{15\, a^3\, d\, \sqrt{\text{Cos}[c + d\, x]}\, \sqrt{a + b\, \text{Sec}[c + d\, x]}} + \frac{2\, \left(9\, a^2 + 8\, b^2\right) \sqrt{\text{Cos}[c + d\, x]}\; \text{EllipticE}\left[\frac{1}{2}\, (c + d\, x),\, \frac{2\, a}{a+b}\right] \sqrt{a + b\, \text{Sec}[c + d\, x]}}{15\, a^3\, d\, \sqrt{\frac{b + a\, \text{Cos}[c+d\, x]}{a+b}}} - \frac{8\, b\, \sqrt{\text{Cos}[c + d\, x]}\, \sqrt{a + b\, \text{Sec}[c + d\, x]}\; \text{Sin}[c + d\, x]}{15\, a^2\, d} + \frac{2\, \text{Cos}[c + d\, x]^{3/2}\, \sqrt{a + b\, \text{Sec}[c + d\, x]}\; \text{Sin}[c + d\, x]}{5\, a\, d}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cos}[c + d\, x]^{5/2}}{\sqrt{a + b\, \text{Sec}[c + d\, x]}}\, dx$$

Problem 856: Unable to integrate problem.

$$\int \frac{\text{Cos}[c + d\, x]^{3/2}}{\sqrt{a + b\, \text{Sec}[c + d\, x]}}\, dx$$

Optimal (type 4, 195 leaves, 9 steps):

$$\frac{2\, \left(a^2 + 2\, b^2\right) \sqrt{\frac{b + a\, \text{Cos}[c+d\, x]}{a+b}}\; \text{EllipticF}\left[\frac{1}{2}\, (c + d\, x),\, \frac{2\, a}{a+b}\right]}{3\, a^2\, d\, \sqrt{\text{Cos}[c + d\, x]}\, \sqrt{a + b\, \text{Sec}[c + d\, x]}} - \frac{4\, b\, \sqrt{\text{Cos}[c + d\, x]}\; \text{EllipticE}\left[\frac{1}{2}\, (c + d\, x),\, \frac{2\, a}{a+b}\right] \sqrt{a + b\, \text{Sec}[c + d\, x]}}{3\, a^2\, d\, \sqrt{\frac{b + a\, \text{Cos}[c+d\, x]}{a+b}}} + \frac{2\, \sqrt{\text{Cos}[c + d\, x]}\, \sqrt{a + b\, \text{Sec}[c + d\, x]}\; \text{Sin}[c + d\, x]}{3\, a\, d}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cos}[c + d\, x]^{3/2}}{\sqrt{a + b\, \text{Sec}[c + d\, x]}}\, dx$$

- **Problem 857: Attempted integration timed out after 120 seconds.**

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 142 leaves, 8 steps):

$$-\frac{2\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

Result (type 1, 1 leaves):

???

- **Problem 858: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{1}{\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 67 leaves, 4 steps):

$$\frac{2\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 102 leaves):

$$-\frac{2\,i\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

- **Problem 859: Unable to integrate problem.**

$$\int \frac{1}{\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 68 leaves, 4 steps):

$$\frac{2\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 860: Unable to integrate problem.**

$$\int \frac{1}{\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 246 leaves, 13 steps):

$$\frac{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 861: Unable to integrate problem.**

$$\int \frac{1}{\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 312 leaves, 14 steps):

$$-\frac{a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{4\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\left(3\,a^2+4\,b^2\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{4\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{3\,a\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,b^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{2\,b\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{3\,a\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 862: Unable to integrate problem.

$$\int \frac{\text{Cos}[c+d\,x]^{5/2}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 360 leaves, 11 steps):

$$-\frac{8\,b\,(a^2+4\,b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{5\,a^4\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,(3\,a^4+8\,a^2\,b^2-16\,b^4)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{5\,a^4\,(a^2-b^2)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,b^2\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,b\,(3\,a^2-8\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,a^3\,(a^2-b^2)\,d}+\frac{2\,(a^2-6\,b^2)\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,a^2\,(a^2-b^2)\,d}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cos}[c+d\,x]^{5/2}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Problem 863: Unable to integrate problem.

$$\int \frac{\text{Cos}[c+d\,x]^{3/2}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 289 leaves, 10 steps):

$$\frac{2\,(a^2+8\,b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,b\,(5\,a^2-8\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a^3\,(a^2-b^2)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,b^2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,(a^2-4\,b^2)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,(a^2-b^2)\,d}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cos}[c+d\,x]^{3/2}}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Problem 864: Unable to integrate problem.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 214 leaves, 9 steps):

$$-\frac{4 b \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 \left(a^2-2 b^2\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{a^2 \left(a^2-b^2\right) d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 b^2 \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{\sqrt{\text{Cos}[c+d x]}}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Problem 865: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\text{Cos}[c+d x]} (a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 200 leaves, 9 steps):

$$\frac{2 \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 b \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{a \left(a^2-b^2\right) d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}-\frac{2 b \text{Sin}[c+d x]}{\left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{\sqrt{\text{Cos}[c+d x]} (a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Problem 866: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{\text{Cos}[c+d x]^{3/2} (a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 126 leaves, 6 steps):

$$-\frac{2\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\left(a^2-b^2\right)d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,a\,\text{Sin}[c+d\,x]}{\left(a^2-b^2\right)d\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1845 leaves) :

$$\frac{2\,a\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{\left(a^2-b^2\right)d\,\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-$$

$$\left((b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\sqrt{1+\text{Sec}[c+d\,x]}\left(\text{i}\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-\right.\right.$$

$$\left.\left.\text{i}\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(\left(a^2-b^2\right)\left(-a^2+b^2\right)d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right.$$

$$\left(-\left(\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]\left(\text{i}\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-\right.\right.\right.$$

$$\left.\left.\text{i}\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(2\left(a^2-b^2\right)\text{Cos}[c+d\,x]^{3/2}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\sqrt{1+\text{Sec}[c+d\,x]}\right)+\left(a\sqrt{\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1+\text{Sec}[c+d\,x]}\right.$$

$$\text{Sin}[c+d\,x]\left(\text{i}\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-\text{i}\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(2\left(a^2-b^2\right)\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\right)+$$

$$\Big(\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1+\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]\;\Big(\mathbb{i}\;\text{EllipticE}\left[\mathbb{i}\;\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$\mathbb{i}\;\text{EllipticF}\left[\mathbb{i}\;\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\;\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sin}[c+d\,x]\Big)\Big)\Big/$$

$$\left(2\,(a^2-b^2)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)+\Big(\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1+\text{Sec}[c+d\,x]}\;\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)\Big(\mathbb{i}\;\text{EllipticE}\left[\mathbb{i}\;\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$\mathbb{i}\;\text{EllipticF}\left[\mathbb{i}\;\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\;\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sin}[c+d\,x]\Big)\Big)\Big/$$

$$\left(2\,(a^2-b^2)\,\left(\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}\right)^{3/2}\right)-\Big(\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1+\text{Sec}[c+d\,x]}$$

$$\Big(\mathbb{i}\;\text{EllipticE}\left[\mathbb{i}\;\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-\mathbb{i}\;\text{EllipticF}\left[\mathbb{i}\;\text{ArcSinh}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\;\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sin}[c+d\,x]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)\Big/\left((a^2-b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)-$$

$$\frac{1}{(a^2-b^2)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}}\;\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1+\text{Sec}[c+d\,x]}$$

$$\Big(\text{Cos}[c+d\,x]\,\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}\;\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}+\frac{1}{2}\left(\frac{1}{1+\text{Cos}[c+d\,x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sin}[c+d\,x]^2+$$

$$\frac{\sqrt{\frac{1}{1+\text{Cos}[c+d x]}}\ \text{Sin}[c+d x]\left(-\frac{a\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}+\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])^2}\right)}{2\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}}+$$

$$\left.\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}{2\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)\right)\right)$$

Problem 867: Unable to integrate problem.

$$\int\frac{1}{\text{Cos}[c+d x]^{5/2}\,(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 206 leaves, 10 steps):

$$\frac{2\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]}{b\,d\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}}+$$

$$\frac{2a\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d x]}}{b\left(a^2-b^2\right)d\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}}-\frac{2a^2\,\text{Sin}[c+d x]}{b\left(a^2-b^2\right)d\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{\text{Cos}[c+d x]^{5/2}\,(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Problem 868: Unable to integrate problem.

$$\int\frac{1}{\text{Cos}[c+d x]^{7/2}\,(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 345 leaves, 14 steps):

$$\frac{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{3\,a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(3\,a^2-b^2\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$

$$\frac{2\,a^2\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\left(3\,a^2-b^2\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 27 leaves) :

$$\int\frac{1}{\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

- **Problem 869: Unable to integrate problem.**

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 391 leaves, 11 steps) :

$$\frac{2\,\left(a^4+16\,a^2\,b^2-16\,b^4\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,a^4\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{8\,b\,\left(2\,a^4-7\,a^2\,b^2+4\,b^4\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a^4\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,b^2\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{4\,b^2\,\left(5\,a^2-3\,b^2\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,\left(a^4-13\,a^2\,b^2+8\,b^4\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a^3\,\left(a^2-b^2\right)^2\,d}$$

Result (type 8, 27 leaves) :

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

- **Problem 870: Unable to integrate problem.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 317 leaves, 10 steps):

$$-\frac{2 b \left(9 a^2-8 b^2\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 a^3 \left(a^2-b^2\right) d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{2 \left(3 a^4-15 a^2 b^2+8 b^4\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{3 a^3 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}+\frac{2 b^2 \operatorname{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d \sqrt{\operatorname{Cos}[c+d x]} (a+b \operatorname{Sec}[c+d x])^{3/2}}+\frac{8 b^2 \left(2 a^2-b^2\right) \operatorname{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{\sqrt{\operatorname{Cos}[c+d x]}}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Problem 871: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\operatorname{Cos}[c+d x]} (a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 302 leaves, 10 steps):

$$\frac{2 \left(3 a^2-2 b^2\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 a^2 \left(a^2-b^2\right) d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{4 b \left(3 a^2-b^2\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}-\frac{2 b \operatorname{Sin}[c+d x]}{3 \left(a^2-b^2\right) d \sqrt{\operatorname{Cos}[c+d x]} (a+b \operatorname{Sec}[c+d x])^{3/2}}-\frac{2 b \left(5 a^2-b^2\right) \operatorname{Sin}[c+d x]}{3 a \left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{\sqrt{\operatorname{Cos}[c+d x]} (a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Problem 872: Unable to integrate problem.

$$\int \frac{1}{\operatorname{Cos}[c+d x]^{3/2} (a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 281 leaves, 10 steps):

$$-\frac{2\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{3\,a\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,\left(3\,a^2+b^2\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,a\,\text{Sin}[c+d\,x]}{3\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{4\,\left(a^2+b^2\right)\,\text{Sin}[c+d\,x]}{3\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

- **Problem 873: Unable to integrate problem.**

$$\int\frac{1}{\text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 277 leaves, 10 steps):

$$\frac{2\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{3\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{8\,b\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$

$$\frac{2\,a^2\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,a\,\left(a^2-5\,b^2\right)\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{\text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

- **Problem 874: Unable to integrate problem.**

$$\int\frac{1}{\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 370 leaves, 14 steps):

$$-\frac{2\,a\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,b\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,a\,\left(3\,a^2-7\,b^2\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$

$$\frac{2\,a^2\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{2\,a^2\,\left(3\,a^2-7\,b^2\right)\,\text{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 27 leaves) :

$$\int\frac{1}{\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

- **Problem 878: Result more than twice size of optimal antiderivative.**

$$\int\frac{(d\,\text{Cos}[e+f\,x])^n}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 6, 196 leaves, 7 steps) :

$$\frac{1}{\left(a^2-b^2\right)\,f}a\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1-n),\,1,\,\frac{3}{2},\,\text{Sin}[e+f\,x]^2,\,\frac{a^2\,\text{Sin}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Cos}[e+f\,x]\,(d\,\text{Cos}[e+f\,x])^n\,\left(\text{Cos}[e+f\,x]^2\right)^{\frac{1}{2}\,(-1-n)}\,\text{Sin}[e+f\,x]-$$

$$\frac{b\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{n}{2},\,1,\,\frac{3}{2},\,\text{Sin}[e+f\,x]^2,\,\frac{a^2\,\text{Sin}[e+f\,x]^2}{a^2-b^2}\right]\,(d\,\text{Cos}[e+f\,x])^n\,\left(\text{Cos}[e+f\,x]^2\right)^{-n/2}\,\text{Sin}[e+f\,x]}{\left(a^2-b^2\right)\,f}$$

Result (type 6, 5216 leaves) : Display of huge result suppressed!

- **Problem 879: Result more than twice size of optimal antiderivative.**

$$\int\frac{(d\,\text{Cos}[e+f\,x])^n}{(a+b\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 6, 309 leaves, 10 steps) :

$$\frac{1}{\left(a^2-b^2\right)^2 f} a^2 \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-3-n), 2, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] (d \text{Cos}[e+f x])^n \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2}(-1-n)} \text{Sin}[e+f x]+$$

$$\frac{1}{\left(a^2-b^2\right)^2 f} b^2 \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-n), 2, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] (d \text{Cos}[e+f x])^n \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2}(-1-n)} \text{Sin}[e+f x]-$$

$$\frac{1}{\left(a^2-b^2\right)^2 f} 2 a b \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-2-n), 2, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] (d \text{Cos}[e+f x])^n \left(\text{Cos}[e+f x]^2\right)^{-n/2} \text{Sin}[e+f x]$$

Result (type 6, 10 296 leaves) : Display of huge result suppressed !

Test results for the 306 problems in "4.5.1.3 (d sin)^n (a+b sec)^m.m"

- **Problem 6: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x] (a+a \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 30 leaves, 6 steps) :

$$\frac{a \text{Log}[1-\text{Cos}[c+d x]]}{d}-\frac{a \text{Log}[\text{Cos}[c+d x]]}{d}$$

Result (type 3, 65 leaves) :

$$-\frac{a \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}-\frac{a \text{Log}[\text{Cos}[c+d x]]}{d}+\frac{a \text{Log}\left[\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a \text{Log}[\text{Sin}[c+d x]]}{d}$$

- **Problem 14: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^2 (a+a \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 37 leaves, 7 steps) :

$$\frac{a \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{a \text{Cot}[c+d x]}{d}-\frac{a \text{Csc}[c+d x]}{d}$$

Result (type 3, 106 leaves) :

$$-\frac{a \text{Cot}\left[\frac{1}{2}(c+d x)\right]}{2 d}-\frac{a \text{Cot}[c+d x]}{d}-\frac{a \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{a \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}-\frac{a \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{2 d}$$

- **Problem 15: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^4 (a+a \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 69 leaves, 8 steps) :

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}-\frac{a\,\text{Cot}[c+d\,x]}{d}-\frac{a\,\text{Cot}[c+d\,x]^3}{3\,d}-\frac{a\,\text{Csc}[c+d\,x]}{d}-\frac{a\,\text{Csc}[c+d\,x]^3}{3\,d}$$

Result (type 3, 190 leaves):

$$-\frac{7\,a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]}{12\,d}-\frac{2\,a\,\text{Cot}[c+d\,x]}{3\,d}-\frac{a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{24\,d}-\frac{a\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]^2}{3\,d}-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}-\frac{7\,a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{12\,d}-\frac{a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{24\,d}$$

Problem 16: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d\,x]^6\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 101 leaves, 8 steps):

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}-\frac{a\,\text{Cot}[c+d\,x]}{d}-\frac{2\,a\,\text{Cot}[c+d\,x]^3}{3\,d}-\frac{a\,\text{Cot}[c+d\,x]^5}{5\,d}-\frac{a\,\text{Csc}[c+d\,x]}{d}-\frac{a\,\text{Csc}[c+d\,x]^3}{3\,d}-\frac{a\,\text{Csc}[c+d\,x]^5}{5\,d}$$

Result (type 3, 272 leaves):

$$-\frac{149\,a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]}{240\,d}-\frac{8\,a\,\text{Cot}[c+d\,x]}{15\,d}-\frac{29\,a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{480\,d}-\frac{a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^4}{160\,d}-\frac{4\,a\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]^2}{15\,d}-\frac{a\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]^4}{5\,d}-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}-\frac{149\,a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{240\,d}-\frac{29\,a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{480\,d}-\frac{a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{160\,d}$$

Problem 17: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d\,x]^8\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 131 leaves, 8 steps):

$$\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}-\frac{a\,\text{Cot}[c+d\,x]}{d}-\frac{a\,\text{Cot}[c+d\,x]^3}{d}-\frac{3\,a\,\text{Cot}[c+d\,x]^5}{5\,d}-\frac{a\,\text{Cot}[c+d\,x]^7}{7\,d}-\frac{a\,\text{Csc}[c+d\,x]}{d}-\frac{a\,\text{Csc}[c+d\,x]^3}{3\,d}-\frac{a\,\text{Csc}[c+d\,x]^5}{5\,d}-\frac{a\,\text{Csc}[c+d\,x]^7}{7\,d}$$

Result (type 3, 354 leaves):

$$-\frac{2161\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]}{3360\,d}-\frac{16\,a\,\mathrm{Cot}[c+d\,x]}{35\,d}-\frac{481\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{6720\,d}-\frac{3\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^4}{280\,d}-\frac{a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^6}{896\,d}-\frac{8\,a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^2}{35\,d}-\frac{6\,a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^4}{35\,d}-\frac{a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^6}{7\,d}-\frac{a\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}+\frac{a\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}-\frac{2161\,a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{3360\,d}-\frac{481\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{6720\,d}-\frac{3\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{280\,d}-\frac{a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^6\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{896\,d}$$

- **Problem 18: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[c+d\,x]^{10}\,(a+a\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 165 leaves, 8 steps) :

$$\frac{a\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}-\frac{a\,\mathrm{Cot}[c+d\,x]}{d}-\frac{4\,a\,\mathrm{Cot}[c+d\,x]^3}{3\,d}-\frac{6\,a\,\mathrm{Cot}[c+d\,x]^5}{5\,d}-\frac{4\,a\,\mathrm{Cot}[c+d\,x]^7}{7\,d}-\frac{a\,\mathrm{Cot}[c+d\,x]^9}{9\,d}-\frac{a\,\mathrm{Csc}[c+d\,x]}{d}-\frac{a\,\mathrm{Csc}[c+d\,x]^3}{3\,d}-\frac{a\,\mathrm{Csc}[c+d\,x]^5}{5\,d}-\frac{a\,\mathrm{Csc}[c+d\,x]^7}{7\,d}-\frac{a\,\mathrm{Csc}[c+d\,x]^9}{9\,d}$$

Result (type 3, 436 leaves) :

$$-\frac{53089\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]}{80640\,d}-\frac{128\,a\,\mathrm{Cot}[c+d\,x]}{315\,d}-\frac{12769\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{161280\,d}-\frac{751\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^4}{53760\,d}-\frac{71\,a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^6}{32256\,d}-\frac{a\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^8}{4608\,d}-\frac{64\,a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^2}{315\,d}-\frac{16\,a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^4}{105\,d}-\frac{8\,a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^6}{63\,d}-\frac{a\,\mathrm{Cot}[c+d\,x]\,\mathrm{Csc}[c+d\,x]^8}{9\,d}-\frac{a\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}+\frac{a\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}-\frac{53089\,a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{80640\,d}-\frac{12769\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{161280\,d}-\frac{751\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{53760\,d}-\frac{71\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^6\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{32256\,d}-\frac{a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^8\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{4608\,d}$$

- **Problem 26: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[c+d\,x]^5\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 115 leaves, 5 steps) :

$$-\frac{a^4}{4 d (a-a \operatorname{Cos}[c+d x])^2}-\frac{5 a^3}{4 d (a-a \operatorname{Cos}[c+d x])}+\frac{17 a^2 \operatorname{Log}[1-\operatorname{Cos}[c+d x]]}{8 d}-\frac{2 a^2 \operatorname{Log}[\operatorname{Cos}[c+d x]]}{d}-\frac{a^2 \operatorname{Log}[1+\operatorname{Cos}[c+d x]]}{8 d}+\frac{a^2 \operatorname{Sec}[c+d x]}{d}$$

Result (type 3, 598 leaves) :

$$-\frac{5 \operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{32 d}-\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{64 d}-$$
$$\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{16 d}-\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Log}[\operatorname{Cos}[c+d x]] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{2 d}+$$
$$\frac{17 \operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{16 d}+\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{4 d}+$$
$$\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}\left[\frac{d x}{2}\right]}{4 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}\left[\frac{d x}{2}\right]}{4 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+$$
$$x \operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(-\frac{17}{32} \operatorname{Cot}\left[\frac{c}{2}\right]+\frac{1}{32} (8+9 \operatorname{Cos}[c]) \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c]-\frac{1}{32} \operatorname{Tan}\left[\frac{c}{2}\right]-\frac{\operatorname{Tan}[c]}{2}\right)$$

- **Problem 27: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Csc}[c+d x]^7 (a+a \operatorname{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 160 leaves, 5 steps) :

$$-\frac{a^5}{12 d (a-a \operatorname{Cos}[c+d x])^3}-\frac{3 a^4}{8 d (a-a \operatorname{Cos}[c+d x])^2}-\frac{23 a^3}{16 d (a-a \operatorname{Cos}[c+d x])}+$$
$$\frac{a^3}{16 d (a+a \operatorname{Cos}[c+d x])}+\frac{9 a^2 \operatorname{Log}[1-\operatorname{Cos}[c+d x]]}{4 d}-\frac{2 a^2 \operatorname{Log}[\operatorname{Cos}[c+d x]]}{d}-\frac{a^2 \operatorname{Log}[1+\operatorname{Cos}[c+d x]]}{4 d}+\frac{a^2 \operatorname{Sec}[c+d x]}{d}$$

Result (type 3, 697 leaves) :

$$-\frac{23 \operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{128 d}-\frac{3 \operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{128 d}-$$

$$\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{384 d}-\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{8 d}-$$

$$\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Log}[\operatorname{Cos}[c+d x]] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{2 d}+\frac{9 \operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{8 d}+$$

$$\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2}{4 d}+\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^2}{128 d}+$$

$$\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}\left[\frac{d x}{2}\right]}{4 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}\left[\frac{d x}{2}\right]}{4 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+$$

$$x \operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2\left(-\frac{9}{16} \operatorname{Cot}\left[\frac{c}{2}\right]+\frac{1}{16}(4+5 \operatorname{Cos}[c]) \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c]-\frac{1}{16} \operatorname{Tan}\left[\frac{c}{2}\right]-\frac{\operatorname{Tan}[c]}{2}\right)$$

- **Problem 32: Result more than twice size of optimal antiderivative.**

$$\int (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}[c+d x]^2 \, dx$$

Optimal (type 3, 73 leaves, 9 steps) :

$$-\frac{a^2 x}{2}+\frac{2 a^2 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}-\frac{2 a^2 \operatorname{Sin}[c+d x]}{d}-\frac{a^2 \operatorname{Cos}[c+d x] \operatorname{Sin}[c+d x]}{2 d}+\frac{a^2 \operatorname{Tan}[c+d x]}{d}$$

Result (type 3, 243 leaves) :

$$\frac{1}{16} a^2 (1+\operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4$$

$$\left(-2 x-\frac{8 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{8 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}-\frac{8 \operatorname{Cos}[d x] \operatorname{Sin}[c]}{d}-\right.$$

$$\frac{\operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{d}-\frac{8 \operatorname{Cos}[c] \operatorname{Sin}[d x]}{d}-\frac{\operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{d}+\frac{4 \operatorname{Sin}\left[\frac{d x}{2}\right]}{d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\left.\frac{4 \operatorname{Sin}\left[\frac{d x}{2}\right]}{d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)$$

- **Problem 33: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Csc}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 57 leaves, 11 steps) :

$$\frac{2 a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{2 a^2 \text{Cot}[c+d x]}{d}-\frac{2 a^2 \text{Csc}[c+d x]}{d}+\frac{a^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 401 leaves):

$$-\frac{\text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{2 d}+$$
$$\frac{\text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{2 d}+$$
$$\frac{\text{Cos}[c+d x]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{2 d}+$$
$$\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{4 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{4 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

- **Problem 34: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^4 (a+a \text{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 87 leaves, 8 steps):

$$\frac{2 a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{10 a^2 \text{Tan}[c+d x]}{3 d}-\frac{2 a^2 \text{Tan}[c+d x]}{d (1-\text{Cos}[c+d x])}-\frac{a^4 \text{Tan}[c+d x]}{3 d (a-a \text{Cos}[c+d x])^2}$$

Result (type 3, 228 leaves):

$$\frac{1}{24 d} a^2 (1+\text{Cos}[c+d x])^2 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \left(-\text{Cot}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2-(-8+7 \text{Cos}[c+d x]) \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^3 \text{Sin}\left[\frac{d x}{2}\right]+\right.$$
$$6 \left(-2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\right.$$
$$\left.\left.\text{Sin}[d x] \Big/ \left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)\right)\right)$$

- **Problem 35: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^6 (a+a \text{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 129 leaves, 12 steps):

$$\frac{2 a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{4 a^2 \text{Cot}[c+d x]}{d}-\frac{5 a^2 \text{Cot}[c+d x]^3}{3 d}-$$
$$\frac{2 a^2 \text{Cot}[c+d x]^5}{5 d}-\frac{2 a^2 \text{Csc}[c+d x]}{d}-\frac{2 a^2 \text{Csc}[c+d x]^3}{3 d}-\frac{2 a^2 \text{Csc}[c+d x]^5}{5 d}+\frac{a^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 317 leaves):

$$\frac{1}{7680\,d}a^2\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4(1+\text{Sec}[c+d\,x])^2$$
$$\left(-3840\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+3840\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$\text{Csc}[2\,c]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Csc}[c+d\,x]\,(320\,\text{Sin}[2\,c]-596\,\text{Sin}[d\,x]+864\,\text{Sin}[2\,d\,x]+216\,\text{Sin}[c-d\,x]-416\,\text{Sin}[c+d\,x]+$$
$$624\,\text{Sin}[2\,(c+d\,x)]-416\,\text{Sin}[3\,(c+d\,x)]+104\,\text{Sin}[4\,(c+d\,x)]-596\,\text{Sin}[2\,c+d\,x]-680\,\text{Sin}[3\,c+d\,x]+$$
$$894\,\text{Sin}[c+2\,d\,x]+224\,\text{Sin}[2\,(c+2\,d\,x)]+894\,\text{Sin}[3\,c+2\,d\,x]+480\,\text{Sin}[4\,c+2\,d\,x]-776\,\text{Sin}[c+3\,d\,x]-$$
$$\left.596\,\text{Sin}[2\,c+3\,d\,x]-596\,\text{Sin}[4\,c+3\,d\,x]-120\,\text{Sin}[5\,c+3\,d\,x]+149\,\text{Sin}[3\,c+4\,d\,x]+149\,\text{Sin}[5\,c+4\,d\,x])\right)$$

Problem 36: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d\,x]^8\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 163 leaves, 12 steps):

$$\frac{2\,a^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}-\frac{5\,a^2\,\text{Cot}[c+d\,x]}{d}-\frac{3\,a^2\,\text{Cot}[c+d\,x]^3}{d}-\frac{7\,a^2\,\text{Cot}[c+d\,x]^5}{5\,d}-$$
$$\frac{2\,a^2\,\text{Cot}[c+d\,x]^7}{7\,d}-\frac{2\,a^2\,\text{Csc}[c+d\,x]}{d}-\frac{2\,a^2\,\text{Csc}[c+d\,x]^3}{3\,d}-\frac{2\,a^2\,\text{Csc}[c+d\,x]^5}{5\,d}-\frac{2\,a^2\,\text{Csc}[c+d\,x]^7}{7\,d}+\frac{a^2\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 428 leaves):

$$\frac{1}{13\,762\,560\,d}a^2\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4(1+\text{Sec}[c+d\,x])^2$$
$$\left(-6\,881\,280\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+6\,881\,280\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\right.$$
$$32\,\text{Csc}[2\,c]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Csc}[c+d\,x]^3\,(-9856\,\text{Sin}[2\,c]+17\,288\,\text{Sin}[d\,x]-29\,056\,\text{Sin}[2\,d\,x]-7264\,\text{Sin}[c-d\,x]+14\,208\,\text{Sin}[c+d\,x]-$$
$$19\,536\,\text{Sin}[2\,(c+d\,x)]+7104\,\text{Sin}[3\,(c+d\,x)]+7104\,\text{Sin}[4\,(c+d\,x)]-7104\,\text{Sin}[5\,(c+d\,x)]+1776\,\text{Sin}[6\,(c+d\,x)]+$$
$$17\,288\,\text{Sin}[2\,c+d\,x]+20\,384\,\text{Sin}[3\,c+d\,x]-23\,771\,\text{Sin}[c+2\,d\,x]+7104\,\text{Sin}[2\,(c+2\,d\,x)]-23\,771\,\text{Sin}[3\,c+2\,d\,x]-$$
$$8960\,\text{Sin}[4\,c+2\,d\,x]+19\,984\,\text{Sin}[c+3\,d\,x]+8644\,\text{Sin}[2\,c+3\,d\,x]+8644\,\text{Sin}[4\,c+3\,d\,x]-6160\,\text{Sin}[5\,c+3\,d\,x]+$$
$$8644\,\text{Sin}[3\,c+4\,d\,x]+8644\,\text{Sin}[5\,c+4\,d\,x]+6720\,\text{Sin}[6\,c+4\,d\,x]-12\,144\,\text{Sin}[3\,c+5\,d\,x]-8644\,\text{Sin}[4\,c+5\,d\,x]-$$
$$\left.8644\,\text{Sin}[6\,c+5\,d\,x]-1680\,\text{Sin}[7\,c+5\,d\,x]+3456\,\text{Sin}[4\,c+6\,d\,x]+2161\,\text{Sin}[5\,c+6\,d\,x]+2161\,\text{Sin}[7\,c+6\,d\,x])\right)$$

Problem 37: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d\,x]^{10}\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 201 leaves, 12 steps):

$$\frac{2 a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{6 a^2 \text{Cot}[c+d x]}{d}-\frac{14 a^2 \text{Cot}[c+d x]^3}{3 d}-\frac{16 a^2 \text{Cot}[c+d x]^5}{5 d}-\frac{9 a^2 \text{Cot}[c+d x]^7}{7 d}-\frac{2 a^2 \text{Cot}[c+d x]^9}{9 d}-$$
$$\frac{2 a^2 \text{Csc}[c+d x]}{d}-\frac{2 a^2 \text{Csc}[c+d x]^3}{3 d}-\frac{2 a^2 \text{Csc}[c+d x]^5}{5 d}-\frac{2 a^2 \text{Csc}[c+d x]^7}{7 d}-\frac{2 a^2 \text{Csc}[c+d x]^9}{9 d}+\frac{a^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 1050 leaves) :

$$-\frac{6899 \text{Cos}[c+d x]^2 \text{Cot}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{80640 d}-$$
$$\frac{193 \text{Cos}[c+d x]^2 \text{Cot}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{13440 d}-$$
$$\frac{71 \text{Cos}[c+d x]^2 \text{Cot}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{32256 d}-\frac{\text{Cos}[c+d x]^2 \text{Cot}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{4608 d}-$$
$$\frac{\text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{2 d}+$$
$$\frac{\text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{2 d}+$$
$$\frac{123041 \text{Cos}[c+d x]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{161280 d}+$$
$$\frac{6899 \text{Cos}[c+d x]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{80640 d}+$$
$$\frac{193 \text{Cos}[c+d x]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{13440 d}+$$
$$\frac{71 \text{Cos}[c+d x]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{32256 d}+$$
$$\frac{\text{Cos}[c+d x]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^9 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{4608 d}+$$
$$\frac{803 \text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{7680 d}+\frac{49 \text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{7680 d}+$$
$$\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^9 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{2560 d}+\frac{\text{Cos}[c+d x] \text{Sec}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}[d x]}{4 d}+$$
$$\frac{49 \text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^2 \text{Tan}\left[\frac{c}{2}\right]}{7680 d}+\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^2 \text{Tan}\left[\frac{c}{2}\right]}{2560 d}$$

Problem 46: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Csc}[c+d\,x]^7\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 157 leaves, 5 steps):

$$-\frac{a^6}{6\,d\,(a-a\,\mathrm{Cos}[c+d\,x])^3}-\frac{7\,a^5}{8\,d\,(a-a\,\mathrm{Cos}[c+d\,x])^2}-\frac{31\,a^4}{8\,d\,(a-a\,\mathrm{Cos}[c+d\,x])}+\frac{111\,a^3\,\mathrm{Log}[1-\mathrm{Cos}[c+d\,x]]}{16\,d}-\frac{7\,a^3\,\mathrm{Log}[\mathrm{Cos}[c+d\,x]]}{d}+\frac{a^3\,\mathrm{Log}[1+\mathrm{Cos}[c+d\,x]]}{16\,d}+\frac{3\,a^3\,\mathrm{Sec}[c+d\,x]}{d}+\frac{a^3\,\mathrm{Sec}[c+d\,x]^2}{2\,d}$$

Result (type 3, 799 leaves):

$$-\frac{31\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{128\,d}-\frac{7\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{256\,d}-\frac{\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{384\,d}+\frac{\mathrm{Cos}[c+d\,x]^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{64\,d}-\frac{7\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Log}[\mathrm{Cos}[c+d\,x]]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{8\,d}+\frac{111\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{64\,d}+\frac{3\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{8\,d}+\frac{\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{32\,d\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{3\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{8\,d\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+\frac{\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3}{32\,d\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}-\frac{3\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{8\,d\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+x\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(-\frac{111}{128}\,\mathrm{Cot}\left[\frac{c}{2}\right]+\frac{1}{128}\,(56+55\,\mathrm{Cos}[c])\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]+\frac{1}{128}\,\mathrm{Tan}\left[\frac{c}{2}\right]-\frac{7\,\mathrm{Tan}[c]}{8}\right)$$

Problem 51: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Sin}[c+d\,x]^2\,dx$$

Optimal (type 3, 98 leaves, 11 steps):

$$-\frac{5\,a^3\,x}{2}+\frac{5\,a^3\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}-\frac{3\,a^3\,\mathrm{Sin}[c+d\,x]}{d}-\frac{a^3\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,d}+\frac{3\,a^3\,\mathrm{Tan}[c+d\,x]}{d}+\frac{a^3\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 300 leaves):

$$\frac{1}{32} a^3 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 \left(-10 x-\frac{10 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{10 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}-\frac{12 \text{Cos}[d x] \text{Sin}[c]}{d}-\frac{\text{Cos}[2 d x] \text{Sin}[2 c]}{d}-\frac{12 \text{Cos}[c] \text{Sin}[d x]}{d}-\frac{\text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{1}{d \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{12 \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-\frac{1}{d \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{12 \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)$$

- **Problem 52: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^2 (a+a \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 80 leaves, 9 steps):

$$\frac{9 a^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{4 a^3 \text{Sin}[c+d x]}{d (1-\text{Cos}[c+d x])}+\frac{3 a^3 \text{Tan}[c+d x]}{d}+\frac{a^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 244 leaves):

$$\frac{1}{32 d} a^3 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 \left(-18 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+18 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+16 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{1}{2}(c+d x)\right] \text{Sin}\left[\frac{d x}{2}\right]+\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+(12 \text{Sin}[d x]) \Big/ \left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)$$

- **Problem 53: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^4 (a+a \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 110 leaves, 11 steps):

$$\frac{11 a^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{2 a^3 \text{Sin}[c+d x]}{3 d (1-\text{Cos}[c+d x])^2}-\frac{17 a^3 \text{Sin}[c+d x]}{3 d (1-\text{Cos}[c+d x])}+\frac{3 a^3 \text{Tan}[c+d x]}{d}+\frac{a^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 678 leaves):

$$-\frac{\text{Cos}[c+d x]^3 \text{Cot}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3}{24 d}-$$

$$\frac{11 \text{Cos}[c+d x]^3 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3}{16 d}+$$

$$\frac{11 \text{Cos}[c+d x]^3 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3}{16 d}+$$

$$\frac{17 \text{Cos}[c+d x]^3 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{d x}{2}\right]}{24 d}+$$

$$\frac{\text{Cos}[c+d x]^3 \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{d x}{2}\right]}{24 d}+$$

$$\frac{\text{Cos}[c+d x]^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3}{32 d \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\frac{3 \text{Cos}[c+d x]^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{d x}{2}\right]}{8 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-$$

$$\frac{\text{Cos}[c+d x]^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3}{32 d \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\frac{3 \text{Cos}[c+d x]^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{d x}{2}\right]}{8 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

- **Problem 54: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^6 (a+a \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 165 leaves, 10 steps):

$$\frac{13 a^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{152 a^3 \text{Tan}[c+d x]}{15 d}+\frac{13 a^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}-\frac{a^6 \text{Sec}[c+d x] \text{Tan}[c+d x]}{5 d (a-a \text{Cos}[c+d x])^3}-\frac{11 a^5 \text{Sec}[c+d x] \text{Tan}[c+d x]}{15 d (a-a \text{Cos}[c+d x])^2}-\frac{76 a^6 \text{Sec}[c+d x] \text{Tan}[c+d x]}{15 d \left(a^3-a^3 \text{Cos}[c+d x]\right)}$$

Result (type 3, 353 leaves):

$$-\frac{1}{30720\,d} a^3 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 \text{Sec}[c+d x]^2 \left(24960\,\text{Cos}[c+d x]^2 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+ \text{Csc}\left[\frac{c}{2}\right] \text{Csc}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c] \left(-1235\,\text{Sin}\left[\frac{d x}{2}\right]+3805\,\text{Sin}\left[\frac{3 d x}{2}\right]+4329\,\text{Sin}\left[c-\frac{d x}{2}\right]-1989\,\text{Sin}\left[c+\frac{d x}{2}\right]- 3575\,\text{Sin}\left[2 c+\frac{d x}{2}\right]+475\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+2005\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+2275\,\text{Sin}\left[3 c+\frac{3 d x}{2}\right]-2673\,\text{Sin}\left[c+\frac{5 d x}{2}\right]+ 105\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-1593\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]-975\,\text{Sin}\left[4 c+\frac{5 d x}{2}\right]+1325\,\text{Sin}\left[2 c+\frac{7 d x}{2}\right]-255\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]+ 875\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]+195\,\text{Sin}\left[5 c+\frac{7 d x}{2}\right]-304\,\text{Sin}\left[3 c+\frac{9 d x}{2}\right]+90\,\text{Sin}\left[4 c+\frac{9 d x}{2}\right]-214\,\text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)\right)$$

- **Problem 55: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^8 (a+a\,\text{Sec}[c+d x])^3\, dx$$

Optimal (type 3, 192 leaves, 17 steps):

$$\frac{15 a^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{13 a^3 \text{Cot}[c+d x]}{d}-\frac{7 a^3 \text{Cot}[c+d x]^3}{d}-\frac{3 a^3 \text{Cot}[c+d x]^5}{d}-\frac{4 a^3 \text{Cot}[c+d x]^7}{7 d}- \frac{15 a^3 \text{Csc}[c+d x]}{2 d}-\frac{5 a^3 \text{Csc}[c+d x]^3}{2 d}-\frac{3 a^3 \text{Csc}[c+d x]^5}{2 d}-\frac{15 a^3 \text{Csc}[c+d x]^7}{14 d}+\frac{a^3 \text{Csc}[c+d x]^7 \text{Sec}[c+d x]^2}{2 d}+\frac{3 a^3 \text{Tan}[c+d x]}{d}$$

Result (type 3, 430 leaves):

$$\frac{1}{917504\,d} a^3 \text{Cos}[c+d x] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 (1+\text{Sec}[c+d x])^3 \left(-860160\,\text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+860160\,\text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]- 8\,\text{Csc}[2 c] \text{Csc}\left[\frac{1}{2}(c+d x)\right]^6 \text{Csc}[c+d x] (5264\,\text{Sin}[2 c]-9580\,\text{Sin}[d x]+8480\,\text{Sin}[2 d x]+2776\,\text{Sin}[c-d x]-6080\,\text{Sin}[c+d x]+ 8816\,\text{Sin}[2 (c+d x)]-7904\,\text{Sin}[3 (c+d x)]+4864\,\text{Sin}[4 (c+d x)]-1824\,\text{Sin}[5 (c+d x)]+304\,\text{Sin}[6 (c+d x)]- 9580\,\text{Sin}[2 c+d x]-10024\,\text{Sin}[3 c+d x]+13891\,\text{Sin}[c+2 d x]+7720\,\text{Sin}[2 (c+2 d x)]+13891\,\text{Sin}[3 c+2 d x]+ 10080\,\text{Sin}[4 c+2 d x]-10060\,\text{Sin}[c+3 d x]-12454\,\text{Sin}[2 c+3 d x]-12454\,\text{Sin}[4 c+3 d x]-6580\,\text{Sin}[5 c+3 d x]+ 7664\,\text{Sin}[3 c+4 d x]+7664\,\text{Sin}[5 c+4 d x]+2520\,\text{Sin}[6 c+4 d x]-3420\,\text{Sin}[3 c+5 d x]-2874\,\text{Sin}[4 c+5 d x]- 2874\,\text{Sin}[6 c+5 d x]-420\,\text{Sin}[7 c+5 d x]+640\,\text{Sin}[4 c+6 d x]+479\,\text{Sin}[5 c+6 d x]+479\,\text{Sin}[7 c+6 d x])\right)$$

- **Problem 56: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^{10} (a+a\,\text{Sec}[c+d x])^3\, dx$$

Optimal (type 3, 232 leaves, 17 steps):

$$\frac{17 a^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{16 a^3 \text{Cot}[c+d x]}{d}-\frac{34 a^3 \text{Cot}[c+d x]^3}{3 d}-\frac{36 a^3 \text{Cot}[c+d x]^5}{5 d}-\frac{19 a^3 \text{Cot}[c+d x]^7}{7 d}-\frac{4 a^3 \text{Cot}[c+d x]^9}{9 d}-\frac{17 a^3 \text{Csc}[c+d x]}{2 d}-\frac{17 a^3 \text{Csc}[c+d x]^3}{6 d}-\frac{17 a^3 \text{Csc}[c+d x]^5}{10 d}-\frac{17 a^3 \text{Csc}[c+d x]^7}{14 d}-\frac{17 a^3 \text{Csc}[c+d x]^9}{18 d}+\frac{a^3 \text{Csc}[c+d x]^9 \text{Sec}[c+d x]^2}{2 d}+\frac{3 a^3 \text{Tan}[c+d x]}{d}$$

Result (type 3, 1000 leaves) :

$$-\frac{9833 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{80640 d}-\frac{979 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{53760 d}-\frac{5 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{2016 d}-\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{4608 d}-\frac{17 \operatorname{Cos}[c+d x]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{16 d}+\frac{17 \operatorname{Cos}[c+d x]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{16 d}+\frac{197147 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{161280 d}+\frac{9833 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{80640 d}+\frac{979 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{53760 d}+\frac{5 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{2016 d}+\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^9 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{4608 d}-\frac{35 \operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{1536 d}-\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^9 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{1536 d}+\frac{\operatorname{Cos}[c+d x] \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}[d x]}{16 d}+\frac{\operatorname{Cos}[c+d x]^2 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 (\operatorname{Sin}[c]+6 \operatorname{Sin}[d x])}{16 d}-\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Tan}\left[\frac{c}{2}\right]}{1536 d}$$

- **Problem 70: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Csc}[c+d x]^4}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 3, 55 leaves, 7 steps) :

$$\frac{\text{Cot}[c+d\,x]^3}{3\,a\,d}+\frac{\text{Cot}[c+d\,x]^5}{5\,a\,d}-\frac{\text{Csc}[c+d\,x]^5}{5\,a\,d}$$

Result (type 3, 116 leaves) :

$$-\frac{1}{960\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Csc}[c]\,\text{Csc}[c+d\,x]^3\,\text{Sec}[c+d\,x]\,(240\,\text{Sin}[c]-96\,\text{Sin}[d\,x]-54\,\text{Sin}[c+d\,x]-18\,\text{Sin}[2\,(c+d\,x)]+18\,\text{Sin}[3\,(c+d\,x)]+9\,\text{Sin}[4\,(c+d\,x)]-32\,\text{Sin}[c+2\,d\,x]+32\,\text{Sin}[2\,c+3\,d\,x]+16\,\text{Sin}[3\,c+4\,d\,x])$$

Problem 71: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Csc}[c+d\,x]^6}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 73 leaves, 7 steps) :

$$\frac{\text{Cot}[c+d\,x]^3}{3\,a\,d}+\frac{2\,\text{Cot}[c+d\,x]^5}{5\,a\,d}+\frac{\text{Cot}[c+d\,x]^7}{7\,a\,d}-\frac{\text{Csc}[c+d\,x]^7}{7\,a\,d}$$

Result (type 3, 158 leaves) :

$$\frac{1}{53\,760\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Csc}[c]\,\text{Csc}[c+d\,x]^5\,\text{Sec}[c+d\,x]\,(-8960\,\text{Sin}[c]+2560\,\text{Sin}[d\,x]+1500\,\text{Sin}[c+d\,x]+375\,\text{Sin}[2\,(c+d\,x)]-750\,\text{Sin}[3\,(c+d\,x)]-300\,\text{Sin}[4\,(c+d\,x)]+150\,\text{Sin}[5\,(c+d\,x)]+75\,\text{Sin}[6\,(c+d\,x)]+640\,\text{Sin}[c+2\,d\,x]-1280\,\text{Sin}[2\,c+3\,d\,x]-512\,\text{Sin}[3\,c+4\,d\,x]+256\,\text{Sin}[4\,c+5\,d\,x]+128\,\text{Sin}[5\,c+6\,d\,x])$$

Problem 72: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Csc}[c+d\,x]^8}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 91 leaves, 7 steps) :

$$\frac{\text{Cot}[c+d\,x]^3}{3\,a\,d}+\frac{3\,\text{Cot}[c+d\,x]^5}{5\,a\,d}+\frac{3\,\text{Cot}[c+d\,x]^7}{7\,a\,d}+\frac{\text{Cot}[c+d\,x]^9}{9\,a\,d}-\frac{\text{Csc}[c+d\,x]^9}{9\,a\,d}$$

Result (type 3, 200 leaves) :

$$-\frac{1}{5\,160\,960\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Csc}[c]\,\text{Csc}[c+d\,x]^7\,\text{Sec}[c+d\,x]\,(645\,120\,\text{Sin}[c]-143\,360\,\text{Sin}[d\,x]-85\,750\,\text{Sin}[c+d\,x]-17\,150\,\text{Sin}[2\,(c+d\,x)]+51\,450\,\text{Sin}[3\,(c+d\,x)]+17\,150\,\text{Sin}[4\,(c+d\,x)]-17\,150\,\text{Sin}[5\,(c+d\,x)]-7350\,\text{Sin}[6\,(c+d\,x)]+2450\,\text{Sin}[7\,(c+d\,x)]+1225\,\text{Sin}[8\,(c+d\,x)]-28\,672\,\text{Sin}[c+2\,d\,x]+86\,016\,\text{Sin}[2\,c+3\,d\,x]+28\,672\,\text{Sin}[3\,c+4\,d\,x]-28\,672\,\text{Sin}[4\,c+5\,d\,x]-12\,288\,\text{Sin}[5\,c+6\,d\,x]+4096\,\text{Sin}[6\,c+7\,d\,x]+2048\,\text{Sin}[7\,c+8\,d\,x])$$

Problem 73: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Csc}[c+d\,x]^{10}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 109 leaves, 7 steps) :

$$\frac{\text{Cot}[c+d x]^3}{3 a d}+\frac{4\,\text{Cot}[c+d x]^5}{5 a d}+\frac{6\,\text{Cot}[c+d x]^7}{7 a d}+\frac{4\,\text{Cot}[c+d x]^9}{9 a d}+\frac{\text{Cot}[c+d x]^{11}}{11 a d}-\frac{\text{Csc}[c+d x]^{11}}{11 a d}$$

Result (type 3, 242 leaves) :

$$\frac{1}{454164480\, a\, d\, (1+\text{Sec}[c+d x])}\text{Csc}[c]\,\text{Csc}[c+d x]^9\,\text{Sec}[c+d x] \left(-45416448\,\text{Sin}[c]+8257536\,\text{Sin}[d x]+5000940\,\text{Sin}[c+d x]+833490\,\text{Sin}[2 (c+d x)]-3333960\,\text{Sin}[3 (c+d x)]-952560\,\text{Sin}[4 (c+d x)]+1428840\,\text{Sin}[5 (c+d x)]+535815\,\text{Sin}[6 (c+d x)]-357210\,\text{Sin}[7 (c+d x)]-158760\,\text{Sin}[8 (c+d x)]+39690\,\text{Sin}[9 (c+d x)]+19845\,\text{Sin}[10 (c+d x)]+1376256\,\text{Sin}[c+2 d x]-5505024\,\text{Sin}[2 c+3 d x]-1572864\,\text{Sin}[3 c+4 d x]+2359296\,\text{Sin}[4 c+5 d x]+884736\,\text{Sin}[5 c+6 d x]-589824\,\text{Sin}[6 c+7 d x]-262144\,\text{Sin}[7 c+8 d x]+65536\,\text{Sin}[8 c+9 d x]+32768\,\text{Sin}[9 c+10 d x]\right)$$

■ **Problem 99: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Csc}[c+d x]^5}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 3, 128 leaves, 6 steps) :

$$\frac{3\,\text{ArcTanh}[\text{Cos}[c+d x]]}{128 a^3 d}-\frac{1}{128 a d (a-a\,\text{Cos}[c+d x])^2}-\frac{a^2}{40 d (a+a\,\text{Cos}[c+d x])^5}+\frac{3 a}{64 d (a+a\,\text{Cos}[c+d x])^4}-\frac{1}{64 a d (a+a\,\text{Cos}[c+d x])^2}-\frac{3}{128 d \left(a^3+a^3\,\text{Cos}[c+d x]\right)}$$

Result (type 3, 412 leaves) :

$$-\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]^3}{32 d (a+a\,\text{Sec}[c+d x])^3}-\frac{3\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^3}{32 d (a+a\,\text{Sec}[c+d x])^3}-\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cot}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^3}{64 d (a+a\,\text{Sec}[c+d x])^3}+\frac{3\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]^3}{16 d (a+a\,\text{Sec}[c+d x])^3}-\frac{3\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Log}\left[\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]^3}{16 d (a+a\,\text{Sec}[c+d x])^3}+\frac{3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]^3}{128 d (a+a\,\text{Sec}[c+d x])^3}-\frac{\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^3}{160 d (a+a\,\text{Sec}[c+d x])^3}+\frac{x\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[c+d x]^3 \left(\frac{3}{32}\text{Cot}\left[\frac{c}{2}\right]-\frac{3}{32}\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]+\frac{3}{32}\text{Tan}\left[\frac{c}{2}\right]\right)}{(a+a\,\text{Sec}[c+d x])^3}$$

■ **Problem 119: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^2}{(e\,\text{Sin}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 234 leaves, 16 steps) :

$$\frac{2 a^2 \operatorname{ArcTan}\left[\frac{\sqrt{e \operatorname{Sin}[c+d x]}}{\sqrt{e}}\right]}{d e^{5/2}}+\frac{2 a^2 \operatorname{ArcTanh}\left[\frac{\sqrt{e \operatorname{Sin}[c+d x]}}{\sqrt{e}}\right]}{d e^{5/2}}-\frac{4 a^2}{3 d e (e \operatorname{Sin}[c+d x])^{3/2}}-\frac{2 a^2 \operatorname{Cos}[c+d x]}{3 d e (e \operatorname{Sin}[c+d x])^{3/2}}-\frac{2 a^2 \operatorname{Sec}[c+d x]}{3 d e (e \operatorname{Sin}[c+d x])^{3/2}}+\frac{7 a^2 \operatorname{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\operatorname{Sin}[c+d x]}}{3 d e^2 \sqrt{e \operatorname{Sin}[c+d x]}}+\frac{5 a^2 \operatorname{Sec}[c+d x] \sqrt{e \operatorname{Sin}[c+d x]}}{3 d e^3}$$

Result (type 1, 1 leaves):

???

Problem 121: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(e \operatorname{Sin}[c+d x])^{5/2}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 104 leaves, 7 steps):

$$-\frac{4 e^2 \operatorname{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{e \operatorname{Sin}[c+d x]}}{5 a d \sqrt{\operatorname{Sin}[c+d x]}}+\frac{2 e (e \operatorname{Sin}[c+d x])^{3/2}}{3 a d}-\frac{2 e \operatorname{Cos}[c+d x] (e \operatorname{Sin}[c+d x])^{3/2}}{5 a d}$$

Result (type 5, 232 leaves):

$$\left(2 \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x] (e \operatorname{Sin}[c+d x])^{5/2}\right.$$
$$\left(\left(2 e^{-i d x} \sqrt{2-2 e^{2 i (c+d x)}} \left(3 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, e^{2 i (c+d x)}\right]+e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, e^{2 i (c+d x)}\right]\right) \operatorname{Sec}[c]\right) \middle/ \right.$$
$$\left(\sqrt{-i e^{-i (c+d x)} \left(-1+e^{2 i (c+d x)}\right)}\right)+\sqrt{\operatorname{Sin}[c+d x]} (10 \operatorname{Cos}[d x] \operatorname{Sin}[c]-3 \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]+$$
$$\left.\left.10 \operatorname{Cos}[c] \operatorname{Sin}[d x]-3 \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]-12 \operatorname{Tan}[c])\right)\right) \middle/ \left(15 a d (1+\operatorname{Sec}[c+d x]) \operatorname{Sin}[c+d x]^{5/2}\right)$$

Problem 123: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{e \operatorname{Sin}[c+d x]}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 95 leaves, 7 steps):

$$-\frac{2 e}{a d \sqrt{e \operatorname{Sin}[c+d x]}}+\frac{2 e \operatorname{Cos}[c+d x]}{a d \sqrt{e \operatorname{Sin}[c+d x]}}+\frac{4 \operatorname{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{e \operatorname{Sin}[c+d x]}}{a d \sqrt{\operatorname{Sin}[c+d x]}}$$

Result (type 5, 249 leaves):

$$\left(2\left(3-9\,e^{2\,i\,c}+6\,e^{i\,(c+d\,x)}-9\,e^{2\,i\,(c+d\,x)}+3\,e^{2\,i\,(2\,c+d\,x)}+6\,e^{i\,(3\,c+d\,x)}+12\,e^{2\,i\,c}\,\sqrt{1-e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]+4\,e^{2\,i\,(c+d\,x)}\,\sqrt{1-e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},e^{2\,i\,(c+d\,x)}\right]\right)\sqrt{e\,\text{Sin}[c+d\,x]}\right)\Big/\left(3\,a\,d\,\left(1+i\,e^{i\,c}\right)\left(i+e^{i\,c}\right)\left(-1+e^{i\,(c+d\,x)}\right)\left(1+e^{i\,(c+d\,x)}\right)\right)$$

- **Problem 125: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])\,(e\,\text{Sin}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 135 leaves, 8 steps):

$$-\frac{2\,e}{5\,a\,d\,(e\,\text{Sin}[c+d\,x])^{5/2}}+\frac{2\,e\,\text{Cos}[c+d\,x]}{5\,a\,d\,(e\,\text{Sin}[c+d\,x])^{5/2}}-\frac{4\,\text{Cos}[c+d\,x]}{5\,a\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{4\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{5\,a\,d\,e^2\,\sqrt{\text{Sin}[c+d\,x]}}$$

Result (type 5, 175 leaves):

$$-\left(e^{-i\,(3\,c+2\,d\,x)}\left(1+e^{2\,i\,c}\right)\left(\sqrt{1-e^{2\,i\,(c+d\,x)}}\left(1+2\,e^{i\,(c+d\,x)}+2\,e^{2\,i\,(c+d\,x)}\right)+\left(-1+e^{i\,(c+d\,x)}\right)\left(1+e^{i\,(c+d\,x)}\right)^3\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(5\,a\,d\,\sqrt{1-e^{2\,i\,(c+d\,x)}}\,(e\,\text{Sin}[c+d\,x])^{3/2}\right)$$

- **Problem 128: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\text{Sin}[c+d\,x])^{5/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 187 leaves, 14 steps):

$$\frac{4\,e^3}{a^2\,d\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{2\,e^3\,\text{Cos}[c+d\,x]}{a^2\,d\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{2\,e^3\,\text{Cos}[c+d\,x]^3}{a^2\,d\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{44\,e^2\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{5\,a^2\,d\,\sqrt{\text{Sin}[c+d\,x]}}+\frac{4\,e\,(e\,\text{Sin}[c+d\,x])^{3/2}}{3\,a^2\,d}-\frac{12\,e\,\text{Cos}[c+d\,x]\,(e\,\text{Sin}[c+d\,x])^{3/2}}{5\,a^2\,d}$$

Result (type 5, 451 leaves):

$$\frac{1}{(a+a\,\text{Sec}[c+d\,x])^2}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}[c+d\,x]^2\,\text{Sec}[c+d\,x]^2\left(\frac{16\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}-\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\left(8\,\text{Sin}\left[\frac{c}{2}\right]+3\,\text{Sin}\left[\frac{3c}{2}\right]\right)}{5\,d}-\frac{4\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\right.$$
$$\left.\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+\frac{16\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}-\frac{4\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\right)(e\,\text{Sin}[c+d\,x])^{5/2}+\left(44\,i\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\right.$$
$$\left(-\frac{2\,i\,e^{-i\,d\,x}\sqrt{2-2\,e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]}{d\sqrt{-i\,e^{-i\,(c+d\,x)}\left(-1+e^{2\,i\,(c+d\,x)}\right)}}-\frac{2\,i\,e^{i\,d\,x}\sqrt{2-2\,e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},e^{2\,i\,(c+d\,x)}\right]}{3\,d\sqrt{-i\,e^{-i\,(c+d\,x)}\left(-1+e^{2\,i\,(c+d\,x)}\right)}}\right)$$
$$\left.\text{Sec}[c+d\,x]^2\,(e\,\text{Sin}[c+d\,x])^{5/2}\right)\Big/\left(5\,(a+a\,\text{Sec}[c+d\,x])^2\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\text{Sin}[c+d\,x]^{5/2}\right)$$

- **Problem 130: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{e\,\text{Sin}[c+d\,x]}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 188 leaves, 15 steps):

$$\frac{4\,e^3}{5\,a^2\,d\,(e\,\text{Sin}[c+d\,x])^{5/2}}-\frac{2\,e^3\,\text{Cos}[c+d\,x]}{5\,a^2\,d\,(e\,\text{Sin}[c+d\,x])^{5/2}}-\frac{2\,e^3\,\text{Cos}[c+d\,x]^3}{5\,a^2\,d\,(e\,\text{Sin}[c+d\,x])^{5/2}}-$$
$$\frac{4\,e}{a^2\,d\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{16\,e\,\text{Cos}[c+d\,x]}{5\,a^2\,d\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{28\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{5\,a^2\,d\sqrt{\text{Sin}[c+d\,x]}}$$

Result (type 5, 222 leaves):

$$\frac{1}{15\,a^2\,d\,(1+\text{Sec}[c+d\,x])^2}4\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Sec}[c+d\,x]^2\sqrt{e\,\text{Sin}[c+d\,x]}$$
$$\left(\left(56\,i\,e^{2\,i\,c}\left(3\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]+e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},e^{2\,i\,(c+d\,x)}\right]\right)\right)\Big/\left(\left(1+e^{2\,i\,c}\right)\sqrt{1-e^{2\,i\,(c+d\,x)}}\right)+\right.$$
$$\left.\frac{3}{4}\,\text{Sec}[c]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\left(49\,\text{Sin}\left[\frac{1}{2}(c-d\,x)\right]+35\,\text{Sin}\left[\frac{1}{2}(3\,c+d\,x)\right]-23\,\text{Sin}\left[\frac{1}{2}(c+3\,d\,x)\right]+5\,\text{Sin}\left[\frac{1}{2}(5\,c+3\,d\,x)\right]\right)\right)$$

- **Problem 132: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])^2\,(e\,\text{Sin}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 224 leaves, 17 steps):

$$\frac{4e^3}{9a^2 d\,(e\,\text{Sin}[c+dx])^{9/2}} - \frac{2e^3\,\text{Cos}[c+dx]}{9a^2 d\,(e\,\text{Sin}[c+dx])^{9/2}} - \frac{2e^3\,\text{Cos}[c+dx]^3}{9a^2 d\,(e\,\text{Sin}[c+dx])^{9/2}} - \frac{4e}{5a^2 d\,(e\,\text{Sin}[c+dx])^{5/2}} + \frac{16e\,\text{Cos}[c+dx]}{45a^2 d\,(e\,\text{Sin}[c+dx])^{5/2}} - \frac{4\,\text{Cos}[c+dx]}{15a^2 d e\sqrt{e\,\text{Sin}[c+dx]}} - \frac{4\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+dx\right),2\right]\sqrt{e\,\text{Sin}[c+dx]}}{15a^2 d e^2\sqrt{\text{Sin}[c+dx]}}$$

Result (type 5, 222 leaves) :

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^4\left(\frac{96\,i\left(1-e^{2i(c+dx)}\right)^{3/2}\left(-\sqrt{1-e^{2i(c+dx)}}+\left(1+e^{2ic}\right)\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2i(c+dx)}\right]\right)}{\left(1+e^{2ic}\right)\left(1+e^{2i(c+dx)}\right)^2} - 2\,(28\,\text{Cos}[c]+31\,\text{Cos}[dx]+16\,\text{Cos}[2c+dx]+12\,\text{Cos}[c+2dx]+3\,\text{Cos}[2c+3dx])\,\text{Sec}[c]\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]^2\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(45a^2 d\,(1+\text{Sec}[c+dx])^2\,(e\,\text{Sin}[c+dx])^{3/2}\right)$$

- **Problem 134: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[c+dx])^3\,(e\,\text{Sin}[c+dx])^m\,dx$$

Optimal (type 5, 247 leaves, 9 steps) :

$$\frac{a^3\,\text{Cos}[c+dx]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Sin}[c+dx]^2\right](e\,\text{Sin}[c+dx])^{1+m}}{d e\,(1+m)\sqrt{\text{Cos}[c+dx]^2}} + \frac{3a^3\,\text{Hypergeometric2F1}\left[1,\frac{1+m}{2},\frac{3+m}{2},\text{Sin}[c+dx]^2\right](e\,\text{Sin}[c+dx])^{1+m}}{d e\,(1+m)} + \frac{a^3\,\text{Hypergeometric2F1}\left[2,\frac{1+m}{2},\frac{3+m}{2},\text{Sin}[c+dx]^2\right](e\,\text{Sin}[c+dx])^{1+m}}{d e\,(1+m)} + \frac{3a^3\sqrt{\text{Cos}[c+dx]^2}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Sin}[c+dx]^2\right]\text{Sec}[c+dx]\,(e\,\text{Sin}[c+dx])^{1+m}}{d e\,(1+m)}$$

Result (type 8, 25 leaves) :

$$\int (a+a\,\text{Sec}[c+dx])^3\,(e\,\text{Sin}[c+dx])^m\,dx$$

- **Problem 135: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[c+dx])^2\,(e\,\text{Sin}[c+dx])^m\,dx$$

Optimal (type 5, 195 leaves, 7 steps) :

$$\frac{a^2 \operatorname{Cos}[c+d x] \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] (e \operatorname{Sin}[c+d x])^{1+m}}{d e (1+m) \sqrt{\operatorname{Cos}[c+d x]^2}}+$$

$$\frac{2 a^2 \text{ Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] (e \operatorname{Sin}[c+d x])^{1+m}}{d e (1+m)}+$$

$$\frac{a^2 \sqrt{\operatorname{Cos}[c+d x]^2} \text{ Hypergeometric2F1}\left[\frac{3}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] \operatorname{Sec}[c+d x] (e \operatorname{Sin}[c+d x])^{1+m}}{d e (1+m)}$$

Result (type 8, 25 leaves) :

$$\int (a+a \operatorname{Sec}[c+d x])^2 (e \operatorname{Sin}[c+d x])^m \, dx$$

Problem 136: Unable to integrate problem.

$$\int (a+a \operatorname{Sec}[c+d x]) (e \operatorname{Sin}[c+d x])^m \, dx$$

Optimal (type 5, 119 leaves, 5 steps) :

$$\frac{a \operatorname{Cos}[c+d x] \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] (e \operatorname{Sin}[c+d x])^{1+m}}{d e (1+m) \sqrt{\operatorname{Cos}[c+d x]^2}}+$$

$$\frac{a \text{ Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] (e \operatorname{Sin}[c+d x])^{1+m}}{d e (1+m)}$$

Result (type 8, 23 leaves) :

$$\int (a+a \operatorname{Sec}[c+d x]) (e \operatorname{Sin}[c+d x])^m \, dx$$

Problem 137: Unable to integrate problem.

$$\int \frac{(e \operatorname{Sin}[c+d x])^m}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 5, 100 leaves, 5 steps) :

$$-\frac{e (e \operatorname{Sin}[c+d x])^{-1+m}}{a d (1-m)}+\frac{e \operatorname{Cos}[c+d x] \text{ Hypergeometric2F1}\left[-\frac{1}{2}, \frac{1}{2} (-1+m), \frac{1+m}{2}, \operatorname{Sin}[c+d x]^2\right] (e \operatorname{Sin}[c+d x])^{-1+m}}{a d (1-m) \sqrt{\operatorname{Cos}[c+d x]^2}}$$

Result (type 8, 25 leaves) :

$$\int \frac{(e \operatorname{Sin}[c+d x])^m}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Problem 138: Unable to integrate problem.

$$\int \frac{(e\,\text{Sin}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 5, 207 leaves, 9 steps):

$$\frac{2\,e^3\,(e\,\text{Sin}[c+d\,x])^{-3+m}}{a^2\,d\,(3-m)}-\frac{e^3\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[-\frac{3}{2},\frac{1}{2}\,(-3+m),\frac{1}{2}\,(-1+m),\text{Sin}[c+d\,x]^2\right]\,(e\,\text{Sin}[c+d\,x])^{-3+m}}{a^2\,d\,(3-m)\,\sqrt{\text{Cos}[c+d\,x]^2}}-$$
$$\frac{e^3\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}\,(-3+m),\frac{1}{2}\,(-1+m),\text{Sin}[c+d\,x]^2\right]\,(e\,\text{Sin}[c+d\,x])^{-3+m}}{a^2\,d\,(3-m)\,\sqrt{\text{Cos}[c+d\,x]^2}}-\frac{2\,e\,(e\,\text{Sin}[c+d\,x])^{-1+m}}{a^2\,d\,(1-m)}$$

Result (type 8, 25 leaves):

$$\int \frac{(e\,\text{Sin}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 139: Unable to integrate problem.

$$\int \frac{(e\,\text{Sin}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 5, 236 leaves, 12 steps):

$$-\frac{4\,e^5\,(e\,\text{Sin}[c+d\,x])^{-5+m}}{a^3\,d\,(5-m)}+\frac{e^5\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[-\frac{5}{2},\frac{1}{2}\,(-5+m),\frac{1}{2}\,(-3+m),\text{Sin}[c+d\,x]^2\right]\,(e\,\text{Sin}[c+d\,x])^{-5+m}}{a^3\,d\,(5-m)\,\sqrt{\text{Cos}[c+d\,x]^2}}+$$
$$\frac{3\,e^5\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[-\frac{3}{2},\frac{1}{2}\,(-5+m),\frac{1}{2}\,(-3+m),\text{Sin}[c+d\,x]^2\right]\,(e\,\text{Sin}[c+d\,x])^{-5+m}}{a^3\,d\,(5-m)\,\sqrt{\text{Cos}[c+d\,x]^2}}+$$
$$\frac{7\,e^3\,(e\,\text{Sin}[c+d\,x])^{-3+m}}{a^3\,d\,(3-m)}-\frac{3\,e\,(e\,\text{Sin}[c+d\,x])^{-1+m}}{a^3\,d\,(1-m)}$$

Result (type 8, 25 leaves):

$$\int \frac{(e\,\text{Sin}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Problem 140: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Sec}[c+d\,x])^{3/2}\,(e\,\text{Sin}[c+d\,x])^m\,dx$$

Optimal (type 6, 106 leaves, 5 steps):

$$\frac{1}{d}2\,a\,e\,\text{AppellF1}\left[-\frac{1}{2},\frac{1-m}{2},\frac{1}{2}(-2-m),\frac{1}{2},\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right]$$
$$(1-\text{Cos}[c+d\,x])^{\frac{1-m}{2}}(1+\text{Cos}[c+d\,x])^{-m/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(e\,\text{Sin}[c+d\,x])^{-1+m}$$

Result (type 6, 7867 leaves): Display of huge result suppressed!

- **Problem 141: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(e\,\text{Sin}[c+d\,x])^m\,dx$$

Optimal (type 6, 107 leaves, 5 steps):

$$-\frac{1}{d}2\,e\,\text{AppellF1}\left[\frac{1}{2},\frac{1-m}{2},-\frac{m}{2},\frac{3}{2},\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right]$$
$$(1-\text{Cos}[c+d\,x])^{\frac{1-m}{2}}\text{Cos}[c+d\,x]\,(1+\text{Cos}[c+d\,x])^{-m/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(e\,\text{Sin}[c+d\,x])^{-1+m}$$

Result (type 6, 5279 leaves): Display of huge result suppressed!

- **Problem 142: Result more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\text{Sin}[c+d\,x])^m}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 6, 115 leaves, 5 steps):

$$-\frac{1}{3\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$
$$2\,e\,\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},\frac{2-m}{2},\frac{5}{2},\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right](1-\text{Cos}[c+d\,x])^{\frac{1-m}{2}}\text{Cos}[c+d\,x]\,(1+\text{Cos}[c+d\,x])^{1-\frac{m}{2}}(e\,\text{Sin}[c+d\,x])^{-1+m}$$

Result (type 6, 2679 leaves):

$$\left(\sqrt{2}\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.$$
$$\left.\text{Cos}[c+d\,x]\sqrt{1+\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]^m\,(e\,\text{Sin}[c+d\,x])^m\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/$$
$$\left(d\,(1+m)\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.\right.$$
$$\left(2\,(1+m)\,\text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},2+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$
$$\left.\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},1+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)$$
$$\left(\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1+\text{Sec}[c+d\,x]}\right.\right.$$

$$\text{Sin}[c+d\,x]^m\Big) \Big/ \Big(\sqrt{2}\ (1+m)\ \Big((3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] -$$

$$\Big(2\ (1+m)\ \text{AppellF1}\Big[\frac{3+m}{2}, -\frac{1}{2}, 2+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] +$$

$$\text{AppellF1}\Big[\frac{3+m}{2}, \frac{1}{2}, 1+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big)\Big) +$$

$$\Big(\sqrt{2}\ m\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\ \text{Cos}[c+d\,x]^2\ \sqrt{1+\text{Sec}[c+d\,x]}$$

$$\text{Sin}[c+d\,x]^{-1+m}\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]\Big) \Big/ \Big((1+m)\ \Big((3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] -$$

$$\Big(2\ (1+m)\ \text{AppellF1}\Big[\frac{3+m}{2}, -\frac{1}{2}, 2+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] +$$

$$\text{AppellF1}\Big[\frac{3+m}{2}, \frac{1}{2}, 1+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big)\Big) +$$

$$\Big((3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\ \text{Sec}[c+d\,x]\ \text{Sin}[c+d\,x]^{1+m}\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]\Big) \Big/$$

$$\Big(\sqrt{2}\ (1+m)\ \sqrt{1+\text{Sec}[c+d\,x]}\ \Big((3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] -$$

$$\Big(2\ (1+m)\ \text{AppellF1}\Big[\frac{3+m}{2}, -\frac{1}{2}, 2+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] +$$

$$\text{AppellF1}\Big[\frac{3+m}{2}, \frac{1}{2}, 1+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big)\Big) -$$

$$\Big(\sqrt{2}\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\ \sqrt{1+\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]^{1+m}\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]\Big) \Big/$$

$$\Big((1+m)\ \Big((3+m)\ \text{AppellF1}\Big[\frac{1+m}{2}, -\frac{1}{2}, 1+m, \frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] -$$

$$\Big(2\ (1+m)\ \text{AppellF1}\Big[\frac{3+m}{2}, -\frac{1}{2}, 2+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big] +$$

$$\text{AppellF1}\Big[\frac{3+m}{2}, \frac{1}{2}, 1+m, \frac{5+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big)\Big) +$$

$$\Big(\sqrt{2}\ (3+m)\ \text{Cos}[c+d\,x]\ \sqrt{1+\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]^m\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]\ \Big(-1/(3+m)\ (1+m)^2\ \text{AppellF1}\Big[1+\frac{1+m}{2}, -\frac{1}{2},$$

$$2+m, 1+\frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big] - 1/(2\ (3+m))\ (1+m)$$

$$\text{AppellF1}\Big[1+\frac{1+m}{2}, \frac{1}{2}, 1+m, 1+\frac{3+m}{2}, \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\Big]\ \text{Sec}\Big[\frac{1}{2}\ (c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}\ (c+d\,x)\Big]\Big]\Big) \Big/$$

$$\left((1+m)\ \left((3+m)\ \text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.\right.$$

$$\left(2\ (1+m)\ \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},2+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},1+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(\sqrt{2}\ (3+m)\ \text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Cos}[c+d\,x]\ \sqrt{1+\text{Sec}[c+d\,x]}\right.$$

$$\text{Sin}[c+d\,x]^m\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\ \left(-\left(2\ (1+m)\ \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},2+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$

$$\left.\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},1+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+(3+m)$$

$$\left(-\frac{1}{3+m}(1+m)^2\ \text{AppellF1}\left[1+\frac{1+m}{2},-\frac{1}{2},2+m,1+\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\frac{1}{2\ (3+m)}(1+m)\ \text{AppellF1}\left[1+\frac{1+m}{2},\frac{1}{2},1+m,1+\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\ \left(-\frac{1}{5+m}(1+m)\ (3+m)\ \text{AppellF1}\left[1+\frac{3+m}{2},\frac{1}{2},2+m,1+\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{2\ (5+m)}(3+m)\ \text{AppellF1}\left[1+\frac{3+m}{2},\frac{3}{2},1+m,1+\right.$$

$$\left.\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+2\ (1+m)\ \left(-\frac{1}{5+m}(2+m)\ (3+m)\ \text{AppellF1}\left[\right.\right.$$

$$\left.1+\frac{3+m}{2},-\frac{1}{2},3+m,1+\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{2\ (5+m)}(3+m)$$

$$\left.\left.\left.\left.\left.\text{AppellF1}\left[1+\frac{3+m}{2},\frac{1}{2},2+m,1+\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left((1+m)\ \left((3+m)\ \text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.\right.$$

$$\left(2\ (1+m)\ \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},2+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{AppellF1}\left[\right.\right.$$

$$\left.\left.\left.\left.\left.\frac{3+m}{2},\frac{1}{2},1+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\right)$$

- **Problem 143: Result more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\text{Sin}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 6, 120 leaves, 5 steps):

$$-\frac{1}{5\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,2\,e\,\text{AppellF1}\left[\frac{5}{2},\frac{1-m}{2},\frac{4-m}{2},\frac{7}{2},\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right]\,(1-\text{Cos}[c+d\,x])^{\frac{1-m}{2}}\,\text{Cos}[c+d\,x]^2\,(1+\text{Cos}[c+d\,x])^{1-\frac{m}{2}}\,(e\,\text{Sin}[c+d\,x])^{-1+m}$$

Result (type 6, 5702 leaves): Display of huge result suppressed!

Problem 144: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Sec}[c+d\,x])^n\,(e\,\text{Sin}[c+d\,x])^m\,dx$$

Optimal (type 6, 130 leaves, 5 steps):

$$-\frac{1}{d\,(1-n)}e\,\text{AppellF1}\left[1-n,\frac{1-m}{2},\frac{1}{2}\,(1-m-2\,n),2-n,\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right]\,(1-\text{Cos}[c+d\,x])^{\frac{1-m}{2}}\,\text{Cos}[c+d\,x]\,(1+\text{Cos}[c+d\,x])^{\frac{1}{2}\,(1-m-2\,n)}\,(a+a\,\text{Sec}[c+d\,x])^n\,(e\,\text{Sin}[c+d\,x])^{-1+m}$$

Result (type 6, 2135 leaves):

$$\left(2^n\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},n,1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^n\,(a\,(1+\text{Sec}[c+d\,x]))^n\,\text{Sin}[c+d\,x]^{1+m}\,(e\,\text{Sin}[c+d\,x])^m\right)\Big/$$
$$\left(d\,(1+m)\,\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},n,1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.\right.$$
$$2\left((1+m)\,\text{AppellF1}\left[\frac{3+m}{2},n,2+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.$$
$$\left.\left.n\,\text{AppellF1}\left[\frac{3+m}{2},1+n,1+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$
$$\left(\left(\left(2^n\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},n,1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^n\right.\right.\right.$$
$$\left.\text{Sin}[c+d\,x]^m\right)\Big/\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},n,1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.$$
$$2\left((1+m)\,\text{AppellF1}\left[\frac{3+m}{2},n,2+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.$$
$$\left.\left.n\,\text{AppellF1}\left[\frac{3+m}{2},1+n,1+m,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$
$$\left(2^n\,(3+m)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^n\,\text{Sin}[c+d\,x]^{1+m}\,\left(-1/(3+m)\,(1+m)^2\,\text{AppellF1}\left[1+\frac{1+m}{2},n,2+m,1+\frac{3+m}{2},\right.\right.\right.$$

$$\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+1\,/\,(3+m)\,(1+m)\,n$$

$$\text{AppellF1}\Big[1+\frac{1+m}{2},\,1+n,\,1+m,\,1+\frac{3+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\Big)\Big)\Big/$$

$$\Big((1+m)\,\Big((3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\,n,\,1+m,\,\frac{3+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-$$

$$2\,\Big((1+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,n,\,2+m,\,\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-$$

$$n\,\text{AppellF1}\Big[\frac{3+m}{2},\,1+n,\,1+m,\,\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)\Big)-$$

$$\Big(2^n\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\,n,\,1+m,\,\frac{3+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n$$

$$\text{Sin}[c+d\,x]^{1+m}\,\Big(-2\,\Big((1+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,n,\,2+m,\,\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-$$

$$n\,\text{AppellF1}\Big[\frac{3+m}{2},\,1+n,\,1+m,\,\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+(3+m)\,\Big(-\frac{1}{3+m}$$

$$(1+m)^2\,\text{AppellF1}\Big[1+\frac{1+m}{2},\,n,\,2+m,\,1+\frac{3+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\frac{1}{3+m}$$

$$(1+m)\,n\,\text{AppellF1}\Big[1+\frac{1+m}{2},\,1+n,\,1+m,\,1+\frac{3+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\Big)-$$

$$2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\Big((1+m)\,\Big(-\frac{1}{5+m}(2+m)\,(3+m)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\,n,\,3+m,\,1+\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\frac{1}{5+m}(3+m)\,n\,\text{AppellF1}\Big[1+\frac{3+m}{2},\,1+n,\,2+m,\,1+\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\Big)-n\,\Big(-\frac{1}{5+m}(1+m)\,(3+m)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\,1+n,$$

$$2+m,\,1+\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\frac{1}{5+m}(3+m)\,(1+n)$$

$$\text{AppellF1}\Big[1+\frac{3+m}{2},\,2+n,\,1+m,\,1+\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big((1+m)\,\Big((3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\,n,\,1+m,\,\frac{3+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-$$

$$2\,\Big((1+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,n,\,2+m,\,\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-n$$

$$\text{AppellF1}\Big[\frac{3+m}{2},\,1+n,\,1+m,\,\frac{5+m}{2},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)^2\Big)+$$

$$\left(2^n (3+m)\, n\, \text{AppellF1}\left[\frac{1+m}{2}, n, 1+m, \frac{3+m}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^{-1+n} \text{Sin}[c+d x]^{1+m} \left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right] \text{Sec}[c+d x]\, \text{Sin}\left[\frac{1}{2}(c+d x)\right] + \text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\, \text{Tan}[c+d x]\right)\right) \Big/ \left((1+m)\left((3+m)\, \text{AppellF1}\left[\frac{1+m}{2}, n, 1+m, \frac{3+m}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] - 2\left((1+m)\, \text{AppellF1}\left[\frac{3+m}{2}, n, 2+m, \frac{5+m}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] - n\, \text{AppellF1}\left[\frac{3+m}{2}, 1+n, 1+m, \frac{5+m}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)$$

Problem 145: Unable to integrate problem.

$$\int (a+a\, \text{Sec}[c+d x])^n\, \text{Sin}[c+d x]^7\, dx$$

Optimal (type 5, 180 leaves, 4 steps):

$$-\frac{(3-n)(8-n)(16-n)\, \text{Hypergeometric2F1}[6, 4+n, 5+n, 1+\text{Sec}[c+d x]]\, (a+a\, \text{Sec}[c+d x])^{4+n}}{42\, a^4\, d\, (1-n)(4+n)} - \frac{\text{Cos}[c+d x]^7 (1-\text{Sec}[c+d x])^2 (a+a\, \text{Sec}[c+d x])^{4+n}}{a^4\, d\, (1-n)} + \frac{\text{Cos}[c+d x]^7 (a+a\, \text{Sec}[c+d x])^{4+n} \left(6(8-n) - \left(108-25 n+n^2\right) \text{Sec}[c+d x]\right)}{42\, a^4\, d\, (1-n)}$$

Result (type 8, 23 leaves):

$$\int (a+a\, \text{Sec}[c+d x])^n\, \text{Sin}[c+d x]^7\, dx$$

Problem 148: Result more than twice size of optimal antiderivative.

$$\int (a+a\, \text{Sec}[c+d x])^n\, \text{Sin}[c+d x]\, dx$$

Optimal (type 5, 42 leaves, 2 steps):

$$\frac{\text{Hypergeometric2F1}[2, 1+n, 2+n, 1+\text{Sec}[c+d x]]\, (a+a\, \text{Sec}[c+d x])^{1+n}}{a\, d\, (1+n)}$$

Result (type 5, 95 leaves):

$$\frac{1}{d(1+n)} 2^{1+n} (-\text{Cos}[c+d x])^{1+n}\, \text{Hypergeometric2F1}\left[n, 1+n, 2+n, 2\, \text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\right] \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^{1+n} (1+\text{Sec}[c+d x])^{-n} (a(1+\text{Sec}[c+d x]))^n$$

- **Problem 152: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (a + a\,\text{Sec}[c + d\,x])^n\,\text{Sin}[c + d\,x]^4\,dx$$

Optimal (type 6, 230 leaves, 11 steps):

$$-\left(\text{AppellF1}\left[1-n,-\frac{1}{2},\frac{1}{2}-n,2-n,\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right](1+\text{Cos}[c+d\,x])^{\frac{1}{2}-n}(n-n\,\text{Cos}[c+d\,x])\,\text{Cot}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^n\right)\Big/\left(d\,(1-n)\,\sqrt{1-\text{Cos}[c+d\,x]}\right)-\frac{\text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d}+\frac{1}{d}2^{\frac{1}{2}+n}\,\text{AppellF1}\left[\frac{1}{2},-4+n,\frac{1}{2}-n,\frac{3}{2},1-\text{Cos}[c+d\,x],\frac{1}{2}(1-\text{Cos}[c+d\,x])\right]\text{Cos}[c+d\,x]^n\,(1+\text{Cos}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]$$

Result (type 6, 7115 leaves): Display of huge result suppressed!

- **Problem 153: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (a + a\,\text{Sec}[c + d\,x])^n\,\text{Sin}[c + d\,x]^2\,dx$$

Optimal (type 6, 95 leaves, 6 steps):

$$-\frac{1}{d\,(1-n)}\text{AppellF1}\left[1-n,-\frac{1}{2},-\frac{1}{2}-n,2-n,\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right]\sqrt{1-\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])^{\frac{1}{2}-n}\,\text{Cot}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^n$$

Result (type 6, 4297 leaves):

$$\left(2^{3+n}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^n(1+\text{Sec}[c+d\,x])^{-n}\,(a\,(1+\text{Sec}[c+d\,x]))^n\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right.$$
$$\left(\text{Cos}[2\,(c+d\,x)]\left(-\frac{1}{4}(1+\text{Sec}[c+d\,x])^n-\frac{1}{2}(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^2-\frac{1}{4}(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^4\right)+\right.$$
$$\frac{1}{4}\,i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{2}\,i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^2\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{4}\,i\,(1+\text{Sec}[c+d\,x])^n$$
$$\text{Sin}[c+d\,x]^4\,\text{Sin}[2\,(c+d\,x)]+\text{Cos}[c+d\,x]^4\left(-\frac{1}{4}\text{Cos}[2\,(c+d\,x)]\,(1+\text{Sec}[c+d\,x])^n+\frac{1}{4}\,i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[2\,(c+d\,x)]\right)+$$
$$\text{Cos}[c+d\,x]^3\,(-i\,\text{Cos}[2\,(c+d\,x)]\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]-(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\,\text{Sin}[2\,(c+d\,x)])+$$
$$\text{Cos}[c+d\,x]^2\left(\text{Cos}[2\,(c+d\,x)]\left(\frac{1}{2}(1+\text{Sec}[c+d\,x])^n+\frac{3}{2}(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^2\right)-\right.$$
$$\left.\frac{1}{2}\,i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[2\,(c+d\,x)]-\frac{3}{2}\,i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^2\,\text{Sin}[2\,(c+d\,x)]\right)+$$
$$\text{Cos}[c+d\,x]\left(\text{Cos}[2\,(c+d\,x)]\left(i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]+i\,(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^3\right)+\right.$$
$$\left.\left.(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\,\text{Sin}[2\,(c+d\,x)]+(1+\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]^3\,\text{Sin}[2\,(c+d\,x)]\right)\right)\right)\Big/$$
$$\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-2\,\text{AppellF1}\left[\frac{3}{2},n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.\right.$$

$$\left.\left.n\,\text{AppellF1}\left[\frac{3}{2},1+n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\text{AppellF1}\left[\frac{1}{2},n,3,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big/\left(\text{AppellF1}\left[\frac{1}{2},n,3,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\frac{2}{3}\left(-3\,\text{AppellF1}\left[\frac{3}{2},n,4,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\left.\left.\left.\left.n\,\text{AppellF1}\left[\frac{3}{2},1+n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\Big/$$

$$\left(d\left(2^{2+n}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^6\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right.\right.\right.\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-2\,\text{AppellF1}\left[\frac{3}{2},n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+\right.\right.\right.\right.$$

$$\left.\left.\left.d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\text{AppellF1}\left[\frac{1}{2},n,3,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big/\left(\text{AppellF1}\left[\frac{1}{2},n,3,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\frac{2}{3}\left(-3\,\text{AppellF1}\left[\frac{3}{2},n,4,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)-5\times 2^{2+n}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n$$

$$\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-2\,\text{AppellF1}\left[\frac{3}{2},n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\text{AppellF1}\left[\frac{1}{2},n,3,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big/\left(\text{AppellF1}\left[\frac{1}{2},n,3,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\frac{2}{3}\left(-3\,\text{AppellF1}\left[\frac{3}{2},n,4,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+2^{3+n}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n$$

$$\text{Sin}\left[\frac{1}{2}(c+d x)\right]\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/\right.$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + 2\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big) +$$

$$\Big(3\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\Big(-\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + 2\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big) -$$

$$\Big(-\text{AppellF1}\Big[\frac{3}{2}, n, 4, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big/$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2}, n, 3, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + \frac{2}{3}\,\Big(-3\,\text{AppellF1}\Big[\frac{3}{2}, n, 4, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big) -$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\Big(2\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)$$

$$\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] + 3\,\Big(-\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2$$

$$\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] + \frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big) +$$

$$2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\Big(-2\,\Big(-\frac{9}{5}\,\text{AppellF1}\Big[\frac{5}{2}, n, 4, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{3}{5}\,n\,\text{AppellF1}\Big[\frac{5}{2}, 1+n, 3, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big) +$$

$$n\,\Big(-\frac{6}{5}\,\text{AppellF1}\Big[\frac{5}{2}, 1+n, 3, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{3}{5}\,(1+n)\,\text{AppellF1}\Big[\frac{5}{2}, 2+n, 2, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + 2\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^2 +$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2}, n, 3, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\Big(-\text{AppellF1}\Big[\frac{3}{2}, n, 4, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] + \frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] + \frac{2}{3}\,\Big(-3\,\text{AppellF1}\Big[\frac{3}{2}, n, 4, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{2}{3}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\Big(-3\,\Big(-\frac{12}{5}\,\text{AppellF1}\Big[\frac{5}{2}, n, 5, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{3}{5}\,n\,\text{AppellF1}\Big[\frac{5}{2}, 1+n, 4, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big) +$$

$$n\,\Big(-\frac{9}{5}\,\text{AppellF1}\Big[\frac{5}{2}, 1+n, 4, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big] +$$

$$\frac{3}{5}\,(1+n)\,\text{AppellF1}\Big[\frac{5}{2}, 2+n, 3, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2}, n, 3, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + \frac{2}{3}\,\Big(-3\,\text{AppellF1}\Big[\frac{3}{2}, n, 4, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^2\Big) +$$

$$2^{3+n}\,n\,\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^5\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^{-1+n}\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]$$

$$\Big(\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + 2\,\Big(-2\,\text{AppellF1}\Big[\frac{3}{2}, n, 3, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big) -$$

$$\text{AppellF1}\Big[\frac{1}{2}, n, 3, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Big/\Big(\text{AppellF1}\Big[\frac{1}{2}, n, 3, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$\frac{2}{3}\,\Big(-3\,\text{AppellF1}\Big[\frac{3}{2}, n, 4, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$n\,\text{AppellF1}\left[\frac{3}{2},1+n,3,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)\right)\right)$$

- **Problem 156: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]^{3/2}\,dx$$

Optimal (type 6, 105 leaves, 5 steps):

$$-\left(\text{AppellF1}\left[1-n,-\frac{1}{4},-\frac{1}{4}-n,2-n,\text{Cos}[c+d x],-\text{Cos}[c+d x]\right]\text{Cos}[c+d x]\,(1+\text{Cos}[c+d x])^{-\frac{1}{4}-n}\,(a+a\,\text{Sec}[c+d x])^n\sqrt{\text{Sin}[c+d x]}\right)\Big/$$
$$\left(d\,(1-n)\,(1-\text{Cos}[c+d x])^{1/4}\right)$$

Result (type 6, 4151 leaves):

$$\left(5\times 2^{1+n}\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n(1+\text{Sec}[c+d x])^{-n}\right.$$
$$(a\,(1+\text{Sec}[c+d x]))^n\,\text{Sin}[c+d x]^{5/2}\left(-\frac{1}{2}\text{Cos}[2\,(c+d x)]\,(1+\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]^{3/2}+\right.$$
$$\text{Sin}[c+d x]^{3/2}\left(\frac{1}{2}(1+\text{Sec}[c+d x])^n-\frac{1}{2}\,i\,(1+\text{Sec}[c+d x])^n\,\text{Sin}[2\,(c+d x)]\right)+\text{Cos}[c+d x]$$
$$\left(-\frac{1}{2}\,i\,\text{Cos}[2\,(c+d x)]\,(1+\text{Sec}[c+d x])^n\sqrt{\text{Sin}[c+d x]}+\sqrt{\text{Sin}[c+d x]}\left(\frac{1}{2}\,i\,(1+\text{Sec}[c+d x])^n+\frac{1}{2}(1+\text{Sec}[c+d x])^n\,\text{Sin}[2\,(c+d x)]\right)\right)\right)$$
$$\left(\left(\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\right.$$
$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{4},n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.\right.$$
$$\left.\left.2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$
$$\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big/\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$
$$2\left(-5\,\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$
$$\left.\left.\left.2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\Big/$$
$$\left(d\left(25\times 2^n\,\text{Cos}[c+d x]\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n\text{Sin}[c+d x]^{3/2}\right.\right.$$

$$\Big(\Big(\text{AppellF1}\Big[\frac{1}{4}, n, \frac{3}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) \Big/$$

$$\Big(5\,\text{AppellF1}\Big[\frac{1}{4}, n, \frac{3}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big(-3\,\text{AppellF1}\Big[\frac{5}{4}, n, \frac{5}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\,n\,\text{AppellF1}\Big[\frac{5}{4}, 1+n, \frac{3}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big) \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) -$$

$$\text{AppellF1}\Big[\frac{1}{4}, n, \frac{5}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \Big/ \Big(5\,\text{AppellF1}\Big[\frac{1}{4}, n, \frac{5}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] +$$

$$2\Big(-5\,\text{AppellF1}\Big[\frac{5}{4}, n, \frac{7}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] +$$

$$2\,n\,\text{AppellF1}\Big[\frac{5}{4}, 1+n, \frac{5}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big) \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big) -$$

$$5\times 2^{1+n}\,\text{Cot}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Csc}\Big[\frac{1}{2}(c+d x)\Big]^2 \Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Sec}[c+d x]\Big)^n \text{Sin}[c+d x]^{5/2}$$

$$\Big(\Big(\text{AppellF1}\Big[\frac{1}{4}, n, \frac{3}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) \Big/$$

$$\Big(5\,\text{AppellF1}\Big[\frac{1}{4}, n, \frac{3}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big(-3\,\text{AppellF1}\Big[\frac{5}{4}, n, \frac{5}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\,n\,\text{AppellF1}\Big[\frac{5}{4}, 1+n, \frac{3}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big) \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) -$$

$$\text{AppellF1}\Big[\frac{1}{4}, n, \frac{5}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \Big/ \Big(5\,\text{AppellF1}\Big[\frac{1}{4}, n, \frac{5}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] +$$

$$2\Big(-5\,\text{AppellF1}\Big[\frac{5}{4}, n, \frac{7}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\,n\,\text{AppellF1}\Big[\frac{5}{4}, 1+n, \frac{5}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big) \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big) + 5\times 2^{1+n}\,\text{Cot}\Big[\frac{1}{2}(c+d x)\Big]^2 \Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Sec}[c+d x]\Big)^n$$

$$\text{Sin}[c+d x]^{5/2} \Big(\Big(\text{AppellF1}\Big[\frac{1}{4}, n, \frac{3}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big) \Big/$$

$$\Big(5\,\text{AppellF1}\Big[\frac{1}{4}, n, \frac{3}{2}, \frac{5}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big(-3\,\text{AppellF1}\Big[\frac{5}{4}, n, \frac{5}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\,n\,\text{AppellF1}\Big[\frac{5}{4}, 1+n, \frac{3}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big) \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) +$$

$$\Big(\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \Big(-\frac{3}{10}\,\text{AppellF1}\Big[\frac{5}{4}, n, \frac{5}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(c+d x)\Big] +$$

$$\frac{1}{5}\,n\,\text{AppellF1}\Big[\frac{5}{4}, 1+n, \frac{3}{2}, \frac{9}{4}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)\Big) \Big/$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{4},n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(-\frac{1}{2}\,\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\frac{1}{5}\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-5\,\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(2\left(-3\,\text{AppellF1}\left[\frac{5}{4},n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]+5\left(-\frac{3}{10}\,\text{AppellF1}\left[\frac{5}{4},n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\frac{1}{5}\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-3\left(-\frac{25}{18}\,\text{AppellF1}\left[\frac{9}{4},n,\frac{7}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$\left.\frac{5}{9}\,n\,\text{AppellF1}\left[\frac{9}{4},1+n,\frac{5}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$2\,n\left(-\frac{5}{6}\,\text{AppellF1}\left[\frac{9}{4},1+n,\frac{5}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\left.\left.\left.\frac{5}{9}\,(1+n)\,\text{AppellF1}\left[\frac{9}{4},2+n,\frac{3}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)\Big/$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{4},n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2+$$

$$\left(\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(2\left(-5\,\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.\right.\right.$$

$$\left.2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$5\left(-\frac{1}{2}\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\frac{1}{5}n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-5\left(-\frac{35}{18}\text{AppellF1}\left[\frac{9}{4},n,\frac{9}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$\left.\frac{5}{9}n\,\text{AppellF1}\left[\frac{9}{4},1+n,\frac{7}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$2n\left(-\frac{25}{18}\text{AppellF1}\left[\frac{9}{4},1+n,\frac{7}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{5}{9}(1+n)\,\text{AppellF1}\left[\frac{9}{4},2+n,\frac{5}{2},\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-5\,\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)+$$

$$5\times 2^{1+n}n\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{-1+n}\text{Sin}[c+d x]^{5/2}$$

$$\left(\left(\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\right.$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{3}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(-3\,\text{AppellF1}\left[\frac{5}{4},n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big/\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{5}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$2\left(-5\,\text{AppellF1}\left[\frac{5}{4},n,\frac{7}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\left.\left.\left.2n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{5}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)$$

$$\left.\left.\left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)\right)\right)$$

- **Problem 157: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d x])^n\sqrt{\text{Sin}[c+d x]}\,dx$$

Optimal (type 6, 105 leaves, 5 steps):

$$-\frac{1}{d\,(1-n)\,\sqrt{\text{Sin}[c+d\,x]}}\,\text{AppellF1}\Big[1-n,\ \frac{1}{4},\ \frac{1}{4}-n,\ 2-n,\ \text{Cos}[c+d\,x],\ -\text{Cos}[c+d\,x]\Big]\,(1-\text{Cos}[c+d\,x])^{1/4}\,\text{Cos}[c+d\,x]\,(1+\text{Cos}[c+d\,x])^{\frac{1}{4}-n}\,(a+a\,\text{Sec}[c+d\,x])^{n}$$

Result (type 6, 1758 leaves):

$$\Big(7\times 2^{1+n}\,\text{AppellF1}\Big[\frac{3}{4},\ n,\ \frac{3}{2},\ \frac{7}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\,(a\,(1+\text{Sec}[c+d\,x]))^n\,\text{Sin}[c+d\,x]^2\Big)\Big/$$

$$\Big(d\,\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\ n,\ \frac{3}{2},\ \frac{7}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+6\,\Big(-3\,\text{AppellF1}\Big[\frac{7}{4},\ n,\ \frac{5}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+$$

$$2\,n\,\text{AppellF1}\Big[\frac{7}{4},\ 1+n,\ \frac{3}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)$$

$$\Big(\Big(21\times 2^{n}\,\text{AppellF1}\Big[\frac{3}{4},\ n,\ \frac{3}{2},\ \frac{7}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Cos}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\,\sqrt{\text{Sin}[c+d\,x]}\Big)\Big/$$

$$\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\ n,\ \frac{3}{2},\ \frac{7}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+6\,\Big(-3\,\text{AppellF1}\Big[\frac{7}{4},\ n,\ \frac{5}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+2\,n\,\text{AppellF1}\Big[\frac{7}{4},\ 1+n,\ \frac{3}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)+\Big(7\times 2^{1+n}$$

$$\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\,\text{Sin}[c+d\,x]^{3/2}\,\Big(-\frac{9}{14}\,\text{AppellF1}\Big[\frac{7}{4},\ n,\ \frac{5}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2$$

$$\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\frac{3}{7}\,n\,\text{AppellF1}\Big[\frac{7}{4},\ 1+n,\ \frac{3}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\Big)\Big/$$

$$\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\ n,\ \frac{3}{2},\ \frac{7}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+6\,\Big(-3\,\text{AppellF1}\Big[\frac{7}{4},\ n,\ \frac{5}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+2\,n\,\text{AppellF1}\Big[\frac{7}{4},\ 1+n,\ \frac{3}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)-$$

$$\Big(7\times 2^{1+n}\,\text{AppellF1}\Big[\frac{3}{4},\ n,\ \frac{3}{2},\ \frac{7}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\,\text{Sin}[c+d\,x]^{3/2}$$

$$\Big(6\,\Big(-3\,\text{AppellF1}\Big[\frac{7}{4},\ n,\ \frac{5}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+$$

$$2\,n\,\text{AppellF1}\Big[\frac{7}{4},\ 1+n,\ \frac{3}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$21\,\Big(-\frac{9}{14}\,\text{AppellF1}\Big[\frac{7}{4},\ n,\ \frac{5}{2},\ \frac{11}{4},\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\ -\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$\frac{3}{7}\,n\,\text{AppellF1}\left[\frac{7}{4},1+n,\frac{3}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)+$$

$$6\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(-3\left(-\frac{35}{22}\text{AppellF1}\left[\frac{11}{4},n,\frac{7}{2},\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{7}{11}\,n\,\text{AppellF1}\left[\frac{11}{4},1+n,\frac{5}{2},\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,n\left(-\frac{21}{22}\text{AppellF1}\left[\frac{11}{4},1+n,\frac{5}{2},\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{7}{11}(1+n)\,\text{AppellF1}\left[\frac{11}{4},2+n,\frac{3}{2},\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(21\,\text{AppellF1}\left[\frac{3}{4},n,\frac{3}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+6\left(-3\,\text{AppellF1}\left[\frac{7}{4},n,\frac{5}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{7}{4},1+n,\frac{3}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)^2+$$

$$\Bigg(7\times 2^{1+n}\,n\,\text{AppellF1}\left[\frac{3}{4},n,\frac{3}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{-1+n}\text{Sin}[c+d\,x]^{3/2}$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\Bigg(21\,\text{AppellF1}\left[\frac{3}{4},n,\frac{3}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$6\left(-3\,\text{AppellF1}\left[\frac{7}{4},n,\frac{5}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.2\,n\,\text{AppellF1}\left[\frac{7}{4},1+n,\frac{3}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)$$

- **Problem 158: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^n}{\sqrt{\text{Sin}[c+d\,x]}}\,dx$$

Optimal (type 6, 105 leaves, 5 steps) :

$$-\frac{1}{d\,(1-n)\,\text{Sin}[c+d\,x]^{3/2}}$$

$$\text{AppellF1}\left[1-n,\frac{3}{4},\frac{3}{4}-n,2-n,\text{Cos}[c+d\,x],-\text{Cos}[c+d\,x]\right](1-\text{Cos}[c+d\,x])^{3/4}\,\text{Cos}[c+d\,x]\,(1+\text{Cos}[c+d\,x])^{\frac{3}{4}-n}\,(a+a\,\text{Sec}[c+d\,x])^n$$

Result (type 6, 1735 leaves) :

$$\left(5\times 2^{1+n}\,\text{AppellF1}\left[\frac{1}{4},n,\frac{1}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^n(a\,(1+\text{Sec}[c+d\,x]))^n\right)\Bigg/$$

$$\Big(d\,\Big(5\,\text{AppellF1}[\tfrac{1}{4},n,\tfrac{1}{2},\tfrac{5}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-2\,\Big(\text{AppellF1}[\tfrac{5}{4},n,\tfrac{3}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-$$

$$2\,n\,\text{AppellF1}[\tfrac{5}{4},1+n,\tfrac{1}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\Big)\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2\Big)$$

$$\Big(\Big(5\times 2^n\,\text{AppellF1}[\tfrac{1}{4},n,\tfrac{1}{2},\tfrac{5}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Cos}[c+d\,x]\,\Big(\text{Cos}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Sec}[c+d\,x]\Big)^n\Big)\Big/$$

$$\Big(\sqrt{\text{Sin}[c+d\,x]}\,\Big(5\,\text{AppellF1}[\tfrac{1}{4},n,\tfrac{1}{2},\tfrac{5}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-2\,\Big(\text{AppellF1}[\tfrac{5}{4},n,\tfrac{3}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,$$

$$-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-2\,n\,\text{AppellF1}[\tfrac{5}{4},1+n,\tfrac{1}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\Big)\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2\Big)\Big)+\Big(5\times 2^{1+n}$$

$$\Big(\text{Cos}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Sec}[c+d\,x]\Big)^n\sqrt{\text{Sin}[c+d\,x]}\,\Big(-\tfrac{1}{10}\,\text{AppellF1}[\tfrac{5}{4},n,\tfrac{3}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2$$

$$\text{Tan}[\tfrac{1}{2}(c+d\,x)]+\tfrac{1}{5}\,n\,\text{AppellF1}[\tfrac{5}{4},1+n,\tfrac{1}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]\Big)\Big)\Big/$$

$$\Big(5\,\text{AppellF1}[\tfrac{1}{4},n,\tfrac{1}{2},\tfrac{5}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-2\,\Big(\text{AppellF1}[\tfrac{5}{4},n,\tfrac{3}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-$$

$$2\,n\,\text{AppellF1}[\tfrac{5}{4},1+n,\tfrac{1}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\Big)\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2\Big)-$$

$$\Big(5\times 2^{1+n}\,\text{AppellF1}[\tfrac{1}{4},n,\tfrac{1}{2},\tfrac{5}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\Big(\text{Cos}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Sec}[c+d\,x]\Big)^n$$

$$\sqrt{\text{Sin}[c+d\,x]}\,\Big(-2\,\Big(\text{AppellF1}[\tfrac{5}{4},n,\tfrac{3}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]-$$

$$2\,n\,\text{AppellF1}[\tfrac{5}{4},1+n,\tfrac{1}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\Big)\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]+$$

$$5\,\Big(-\tfrac{1}{10}\,\text{AppellF1}[\tfrac{5}{4},n,\tfrac{3}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]+$$

$$\tfrac{1}{5}\,n\,\text{AppellF1}[\tfrac{5}{4},1+n,\tfrac{1}{2},\tfrac{9}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]\Big)-$$

$$2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2\,\Big(-\tfrac{5}{6}\,\text{AppellF1}[\tfrac{9}{4},n,\tfrac{5}{2},\tfrac{13}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]+$$

$$\tfrac{5}{9}\,n\,\text{AppellF1}[\tfrac{9}{4},1+n,\tfrac{3}{2},\tfrac{13}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]-$$

$$2\,n\,\Big(-\tfrac{5}{18}\,\text{AppellF1}[\tfrac{9}{4},1+n,\tfrac{3}{2},\tfrac{13}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]+$$

$$\tfrac{5}{9}\,(1+n)\,\text{AppellF1}[\tfrac{9}{4},2+n,\tfrac{1}{2},\tfrac{13}{4},\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{1}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{5}{4},n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]-2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{1}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2+$$

$$\left(5\times 2^{1+n}\,n\,\text{AppellF1}\left[\frac{1}{4},n,\frac{1}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]\right)^{-1+n}\sqrt{\text{Sin}[c+dx]}\left(-\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]\,\text{Tan}[c+dx]\right)\right)\Big/$$

$$\left(5\,\text{AppellF1}\left[\frac{1}{4},n,\frac{1}{2},\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{5}{4},n,\frac{3}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]-2\,n\,\text{AppellF1}\left[\frac{5}{4},1+n,\frac{1}{2},\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\Bigg)\Bigg)$$

Problem 159: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Sec}[c+dx])^n}{\text{Sin}[c+dx]^{3/2}}\,dx$$

Optimal (type 6, 105 leaves, 5 steps):

$$-\frac{1}{d\,(1-n)\,\text{Sin}[c+dx]^{5/2}}\text{AppellF1}\left[1-n,\frac{5}{4},\frac{5}{4}-n,2-n,\text{Cos}[c+dx],-\text{Cos}[c+dx]\right](1-\text{Cos}[c+dx])^{5/4}\,\text{Cos}[c+dx]\,(1+\text{Cos}[c+dx])^{\frac{5}{4}-n}\,(a+a\,\text{Sec}[c+dx])^n$$

Result (type 6, 1743 leaves):

$$-\Bigg(\Bigg(\left(3\times 2^{1+n}\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\text{Csc}[c+dx]^2\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]\right)^n(a\,(1+\text{Sec}[c+dx]))^n\right)\Big/$$

$$\left(d\left(3\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]+2\left(\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)$$

$$\Bigg(\left(3\times 2^n\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\text{Cos}[c+dx]\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]\right)^n\right)\Big/$$

$$\left(\text{Sin}[c+dx]^{3/2}\left(3\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]+2\left(\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)-$$

$$\Bigg(3\times 2^{1+n}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^n\Bigg(-\frac{1}{6}\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg)\Big/$$

$$\Bigg(\sqrt{\text{Sin}[c+d\,x]}\,\Bigg(3\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Bigg(\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(3\times 2^{1+n}\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^n$$

$$\Bigg(2\Bigg(\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,n$$

$$\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$3\Bigg(-\frac{1}{6}\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{3}n$$

$$\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(-\frac{3}{14}\text{AppellF1}\left[\frac{7}{4},n,\frac{3}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{7}n\,\text{AppellF1}\left[\frac{7}{4},1+n,\frac{1}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$2\,n\Bigg(\frac{3}{14}\text{AppellF1}\left[\frac{7}{4},1+n,\frac{1}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{3}{7}(1+n)\,\text{AppellF1}\left[\frac{7}{4},2+n,-\frac{1}{2},\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(\sqrt{\text{Sin}[c+d\,x]}\,\Bigg(3\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Bigg(\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,n\,\text{AppellF1}\left[\frac{3}{4},1+n,-\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)^2\Bigg)-$$

$$\Bigg(3\times 2^{1+n}\,n\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{-1+n}$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Bigg)\Big/$$

$$\Bigg(\sqrt{\text{Sin}[c+d\,x]}\,\Bigg(3\,\text{AppellF1}\left[-\frac{1}{4},n,-\frac{1}{2},\frac{3}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Bigg(\text{AppellF1}\left[\frac{3}{4},n,\frac{1}{2},\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2 n \text{AppellF1}\left[\frac{3}{4}, 1+n, -\frac{1}{2}, \frac{7}{4}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\right)$$

- **Problem 164: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x] (a+b \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 26 leaves, 5 steps):

$$-\frac{a \text{ArcTanh}[\text{Cos}[c+d x]]}{d}+\frac{b \text{Log}[\text{Tan}[c+d x]]}{d}$$

Result (type 3, 65 leaves):

$$-\frac{a \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}-\frac{b \text{Log}[\text{Cos}[c+d x]]}{d}+\frac{a \text{Log}\left[\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b \text{Log}[\text{Sin}[c+d x]]}{d}$$

- **Problem 171: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^2 (a+b \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 37 leaves, 7 steps):

$$\frac{b \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{a \text{Cot}[c+d x]}{d}-\frac{b \text{Csc}[c+d x]}{d}$$

Result (type 3, 106 leaves):

$$-\frac{b \text{Cot}\left[\frac{1}{2}(c+d x)\right]}{2 d}-\frac{a \text{Cot}[c+d x]}{d}-\frac{b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}-\frac{b \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{2 d}$$

- **Problem 172: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^4 (a+b \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 69 leaves, 8 steps):

$$\frac{b \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{a \text{Cot}[c+d x]}{d}-\frac{a \text{Cot}[c+d x]^3}{3 d}-\frac{b \text{Csc}[c+d x]}{d}-\frac{b \text{Csc}[c+d x]^3}{3 d}$$

Result (type 3, 190 leaves):

$$-\frac{7 b \text{Cot}\left[\frac{1}{2}(c+d x)\right]}{12 d}-\frac{2 a \text{Cot}[c+d x]}{3 d}-\frac{b \text{Cot}\left[\frac{1}{2}(c+d x)\right] \text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{24 d}-$$
$$\frac{a \text{Cot}[c+d x] \text{Csc}[c+d x]^2}{3 d}-\frac{b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+$$
$$\frac{b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}-\frac{7 b \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{12 d}-\frac{b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{24 d}$$

Problem 173: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d x]^6 (a+b \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 101 leaves, 8 steps):

$$\frac{b \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{a \text{Cot}[c+d x]}{d}-\frac{2 a \text{Cot}[c+d x]^3}{3 d}-\frac{a \text{Cot}[c+d x]^5}{5 d}-\frac{b \text{Csc}[c+d x]}{d}-\frac{b \text{Csc}[c+d x]^3}{3 d}-\frac{b \text{Csc}[c+d x]^5}{5 d}$$

Result (type 3, 272 leaves):

$$-\frac{149 b \text{Cot}\left[\frac{1}{2} (c+d x)\right]}{240 d}-\frac{8 a \text{Cot}[c+d x]}{15 d}-\frac{29 b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{480 d}-\frac{b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^4}{160 d}-$$
$$\frac{4 a \text{Cot}[c+d x] \text{Csc}[c+d x]^2}{15 d}-\frac{a \text{Cot}[c+d x] \text{Csc}[c+d x]^4}{5 d}-\frac{b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+$$
$$\frac{b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}-\frac{149 b \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{240 d}-\frac{29 b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{480 d}-\frac{b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{160 d}$$

Problem 178: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d x]^3 (a+b \text{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 114 leaves, 6 steps):

$$-\frac{\left(2 a b+\left(a^2+b^2\right) \text{Cos}[c+d x]\right) \text{Csc}[c+d x]^2}{2 d}+\frac{(a+b) (a+3 b) \text{Log}[1-\text{Cos}[c+d x]]}{4 d}-$$
$$\frac{2 a b \text{Log}[\text{Cos}[c+d x]]}{d}-\frac{(a-3 b) (a-b) \text{Log}[1+\text{Cos}[c+d x]]}{4 d}+\frac{b^2 \text{Sec}[c+d x]}{d}$$

Result (type 3, 329 leaves):

$$-\frac{1}{2\,d\,\left(\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2-\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}$$

$$\mathrm{Csc}[c+d\,x]^4\left(2\,a^2-2\,b^2+2\left(a^2+3\,b^2\right)\mathrm{Cos}[2\,(c+d\,x)]-a^2\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\,a\,b\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right]-3\,b^2\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right]-4\,a\,b\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}[\mathrm{Cos}[c+d\,x]]+a^2\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\,a\,b\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+3\,b^2\,\mathrm{Cos}[3\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\mathrm{Cos}[c+d\,x]\left(8\,a\,b+\left(a^2-4\,a\,b+3\,b^2\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\,a\,b\,\mathrm{Log}[\mathrm{Cos}[c+d\,x]]-a^2\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-4\,a\,b\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-3\,b^2\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\right)$$

- **Problem 182: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[c+d\,x]^2\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 59 leaves, 8 steps):

$$\frac{2\,a\,b\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}-\frac{\left(a^2+b^2\right)\mathrm{Cot}[c+d\,x]}{d}-\frac{2\,a\,b\,\mathrm{Csc}[c+d\,x]}{d}+\frac{b^2\,\mathrm{Tan}[c+d\,x]}{d}$$

Result (type 3, 138 leaves):

$$-\left(\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^3\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\left(4\,a\,b\,\mathrm{Cos}[c+d\,x]+\left(a^2+2\,b^2\right)\mathrm{Cos}[2\,(c+d\,x)]+a\left(a+2\,b\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\right)\mathrm{Sin}[2\,(c+d\,x)]\right)\right)\Big/\left(4\,d\left(-1+\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)$$

- **Problem 183: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[c+d\,x]^4\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,dx$$

Optimal (type 3, 100 leaves, 9 steps):

$$\frac{2\,a\,b\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}-\frac{\left(a^2+2\,b^2\right)\mathrm{Cot}[c+d\,x]}{d}-\frac{\left(a^2+b^2\right)\mathrm{Cot}[c+d\,x]^3}{3\,d}-\frac{2\,a\,b\,\mathrm{Csc}[c+d\,x]}{d}-\frac{2\,a\,b\,\mathrm{Csc}[c+d\,x]^3}{3\,d}+\frac{b^2\,\mathrm{Tan}[c+d\,x]}{d}$$

Result (type 3, 259 leaves):

$$\frac{1}{96\, d\left(-1+\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)}\text{Csc}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3$$
$$\Big(-3 a^2-14 a b \text{Cos}[c+d x]-2\left(a^2+4 b^2\right) \text{Cos}[2(c+d x)]+6 a b \text{Cos}[3(c+d x)]+a^2 \text{Cos}[4(c+d x)]+4 b^2 \text{Cos}[4(c+d x)]-$$
$$6 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[2(c+d x)]+6 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[2(c+d x)]+$$
$$3 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[4(c+d x)]-3 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[4(c+d x)]\Big)$$

- **Problem 184: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^6 (a+b \text{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 143 leaves, 9 steps):

$$\frac{2 a b \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{\left(a^2+3 b^2\right) \text{Cot}[c+d x]}{d}-\frac{\left(2 a^2+3 b^2\right) \text{Cot}[c+d x]^3}{3 d}-$$
$$\frac{\left(a^2+b^2\right) \text{Cot}[c+d x]^5}{5 d}-\frac{2 a b \text{Csc}[c+d x]}{d}-\frac{2 a b \text{Csc}[c+d x]^3}{3 d}-\frac{2 a b \text{Csc}[c+d x]^5}{5 d}+\frac{b^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 368 leaves):

$$-\frac{1}{7680\, d\left(-1+\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)}$$
$$\text{Csc}\left[\frac{1}{2}(c+d x)\right]^7 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \Big(40 a^2+196 a b \text{Cos}[c+d x]+20\left(a^2+6 b^2\right) \text{Cos}[2(c+d x)]-130 a b \text{Cos}[3(c+d x)]-$$
$$16 a^2 \text{Cos}[4(c+d x)]-96 b^2 \text{Cos}[4(c+d x)]+30 a b \text{Cos}[5(c+d x)]+4 a^2 \text{Cos}[6(c+d x)]+24 b^2 \text{Cos}[6(c+d x)]+$$
$$75 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[2(c+d x)]-75 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[2(c+d x)]-$$
$$60 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[4(c+d x)]+60 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[4(c+d x)]+$$
$$15 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[6(c+d x)]-15 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sin}[6(c+d x)]\Big)$$

- **Problem 189: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 162 leaves, 6 steps):

$$-\frac{a^2\left(b\left(3+\frac{b^2}{a^2}\right)+a\left(1+\frac{3b^2}{a^2}\right)\text{Cos}[c+dx]\right)\text{Csc}[c+dx]^2}{2d}+\frac{(a+b)^2(a+4b)\,\text{Log}[1-\text{Cos}[c+dx]]}{4d}-\frac{b\left(3a^2+2b^2\right)\text{Log}[\text{Cos}[c+dx]]}{d}-\frac{(a-4b)(a-b)^2\,\text{Log}[1+\text{Cos}[c+dx]]}{4d}+\frac{3ab^2\,\text{Sec}[c+dx]}{d}+\frac{b^3\,\text{Sec}[c+dx]^2}{2d}$$

Result (type 3, 669 leaves):

$$\frac{3ab^2\,\text{Cos}[c+dx]^3(a+b\,\text{Sec}[c+dx])^3}{d(b+a\,\text{Cos}[c+dx])^3}+\frac{\left(-a^3-3a^2b-3ab^2-b^3\right)\text{Cos}[c+dx]^3\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2(a+b\,\text{Sec}[c+dx])^3}{8d(b+a\,\text{Cos}[c+dx])^3}+$$
$$\frac{\left(-a^3+6a^2b-9ab^2+4b^3\right)\text{Cos}[c+dx]^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right](a+b\,\text{Sec}[c+dx])^3}{2d(b+a\,\text{Cos}[c+dx])^3}+$$
$$\frac{\left(-3a^2b-2b^3\right)\text{Cos}[c+dx]^3\,\text{Log}[\text{Cos}[c+dx]](a+b\,\text{Sec}[c+dx])^3}{d(b+a\,\text{Cos}[c+dx])^3}+$$
$$\frac{\left(a^3+6a^2b+9ab^2+4b^3\right)\text{Cos}[c+dx]^3\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right](a+b\,\text{Sec}[c+dx])^3}{2d(b+a\,\text{Cos}[c+dx])^3}+$$
$$\frac{\left(a^3-3a^2b+3ab^2-b^3\right)\text{Cos}[c+dx]^3\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2(a+b\,\text{Sec}[c+dx])^3}{8d(b+a\,\text{Cos}[c+dx])^3}+$$
$$\frac{b^3\,\text{Cos}[c+dx]^3(a+b\,\text{Sec}[c+dx])^3}{4d(b+a\,\text{Cos}[c+dx])^3\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{3ab^2\,\text{Cos}[c+dx]^3(a+b\,\text{Sec}[c+dx])^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{d(b+a\,\text{Cos}[c+dx])^3\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+$$
$$\frac{b^3\,\text{Cos}[c+dx]^3(a+b\,\text{Sec}[c+dx])^3}{4d(b+a\,\text{Cos}[c+dx])^3\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}-\frac{3ab^2\,\text{Cos}[c+dx]^3(a+b\,\text{Sec}[c+dx])^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{d(b+a\,\text{Cos}[c+dx])^3\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}$$

- **Problem 190: Result more than twice size of optimal antiderivative.**

$$\int(a+b\,\text{Sec}[c+dx])^3\,\text{Sin}[c+dx]^6\,dx$$

Optimal (type 3, 299 leaves, 21 steps):

$$\frac{5a^3x}{16}-\frac{45}{8}ab^2x+\frac{3a^2b\,\text{ArcTanh}[\text{Sin}[c+dx]]}{d}-\frac{5b^3\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}-$$
$$\frac{3a^2b\,\text{Sin}[c+dx]}{d}+\frac{5b^3\,\text{Sin}[c+dx]}{2d}-\frac{5a^3\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{16d}-\frac{a^2b\,\text{Sin}[c+dx]^3}{d}+\frac{5b^3\,\text{Sin}[c+dx]^3}{6d}-$$
$$\frac{5a^3\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]^3}{24d}-\frac{3a^2b\,\text{Sin}[c+dx]^5}{5d}-\frac{a^3\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]^5}{6d}+\frac{45ab^2\,\text{Tan}[c+dx]}{8d}-$$
$$\frac{15ab^2\,\text{Sin}[c+dx]^2\,\text{Tan}[c+dx]}{8d}-\frac{3ab^2\,\text{Sin}[c+dx]^4\,\text{Tan}[c+dx]}{4d}+\frac{b^3\,\text{Sin}[c+dx]^3\,\text{Tan}[c+dx]^2}{2d}$$

Result (type 3, 818 leaves):

$$\frac{5 a \left(a^2-18 b^2\right) (c+d x) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3}{16 d (b+a \text{Cos}[c+d x])^3}+\frac{\left(-6 a^2 b+5 b^3\right) \text{Cos}[c+d x]^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3}{2 d (b+a \text{Cos}[c+d x])^3}+\frac{\left(6 a^2 b-5 b^3\right) \text{Cos}[c+d x]^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3}{2 d (b+a \text{Cos}[c+d x])^3}+\frac{b^3 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3}{4 d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{3 a b^2 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}-\frac{b^3 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3}{4 d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{3 a b^2 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{3 b \left(-11 a^2+6 b^2\right) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[c+d x]}{8 d (b+a \text{Cos}[c+d x])^3}-\frac{3 a \left(5 a^2-32 b^2\right) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[2 (c+d x)]}{64 d (b+a \text{Cos}[c+d x])^3}-\frac{b \left(-21 a^2+4 b^2\right) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[3 (c+d x)]}{48 d (b+a \text{Cos}[c+d x])^3}+\frac{3 a \left(a^2-2 b^2\right) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[4 (c+d x)]}{64 d (b+a \text{Cos}[c+d x])^3}-\frac{3 a^2 b \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[5 (c+d x)]}{80 d (b+a \text{Cos}[c+d x])^3}-\frac{a^3 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[6 (c+d x)]}{192 d (b+a \text{Cos}[c+d x])^3}$$

- **Problem 191: Result more than twice size of optimal antiderivative.**

$$\int (a+b \text{Sec}[c+d x])^3 \text{Sin}[c+d x]^4 \, dx$$

Optimal (type 3, 236 leaves, 8 steps):

$$\frac{3}{8} a \left(a^2-12 b^2\right) x+\frac{3 b \left(2 a^2-b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{b \left(17 a^2-b^2\right) \text{Sin}[c+d x]}{2 d}-\frac{a \left(21 a^2-2 b^2\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{8 d}-\frac{\left(6 a^2-b^2\right) (b+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{4 b d}-\frac{\left(4 a^2-b^2\right) (b+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{4 b^2 d}+\frac{a (b+a \text{Cos}[c+d x])^4 \text{Tan}[c+d x]}{b^2 d}+\frac{(b+a \text{Cos}[c+d x])^4 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b d}$$

Result (type 3, 696 leaves):

$$\frac{3 a \left(a^2-12 b^2\right) (c+d x) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3}{8 d (b+a \text{Cos}[c+d x])^3}+\frac{3 \left(-2 a^2 b+b^3\right) \text{Cos}[c+d x]^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3}{2 d (b+a \text{Cos}[c+d x])^3}-\frac{3 \left(-2 a^2 b+b^3\right) \text{Cos}[c+d x]^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3}{2 d (b+a \text{Cos}[c+d x])^3}+\frac{b^3 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3}{4 d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{3 a b^2 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}-\frac{b^3 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3}{4 d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{3 a b^2 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{b \left(-15 a^2+4 b^2\right) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[c+d x]}{4 d (b+a \text{Cos}[c+d x])^3}-\frac{a \left(a^2-3 b^2\right) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[2 (c+d x)]}{4 d (b+a \text{Cos}[c+d x])^3}+\frac{a^2 b \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[3 (c+d x)]}{4 d (b+a \text{Cos}[c+d x])^3}+\frac{a^3 \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^3 \text{Sin}[4 (c+d x)]}{32 d (b+a \text{Cos}[c+d x])^3}$$

Problem 192: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{Sec}[c+d x])^3 \text{Sin}[c+d x]^2 \, dx$$

Optimal (type 3, 138 leaves, 8 steps):

$$\frac{1}{2} a \left(a^2-6 b^2\right) x+\frac{b \left(6 a^2-b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{15 a^2 b \text{Sin}[c+d x]}{2 d}-\frac{5 a^3 \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 d}+\frac{3 a (b+a \text{Cos}[c+d x])^2 \text{Tan}[c+d x]}{2 d}+\frac{(b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 327 leaves):

$$\frac{1}{4 d} \text{Sec}[c+d x]^2 \left(a^3 c-6 a b^2 c+a^3 d x-6 a b^2 d x-6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\text{Cos}[2 (c+d x)] \left(a \left(a^2-6 b^2\right) (c+d x)+\left(-6 a^2 b+b^3\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-b \left(-6 a^2+b^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+\left(-3 a^2 b+2 b^3\right) \text{Sin}[c+d x]-\frac{1}{2} a^3 \text{Sin}[2 (c+d x)]+6 a b^2 \text{Sin}[2 (c+d x)]-3 a^2 b \text{Sin}[3 (c+d x)]-\frac{1}{4} a^3 \text{Sin}[4 (c+d x)]\right)$$

Problem 193: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d x]^2 (a+b \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 133 leaves, 15 steps):

$$\frac{3 a^2 b \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{3 b^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{a^3 \text{Cot}[c+d x]}{d}-\frac{3 a b^2 \text{Cot}[c+d x]}{d}-\frac{3 a^2 b \text{Csc}[c+d x]}{d}-\frac{3 b^3 \text{Csc}[c+d x]}{2 d}+\frac{b^3 \text{Csc}[c+d x] \text{Sec}[c+d x]^2}{2 d}+\frac{3 a b^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 406 leaves):

$$-\frac{1}{16 d \left(-1+\text{Cot}\left[\frac{1}{2} (c+d x)\right]^2\right)^2} \text{Csc}\left[\frac{1}{2} (c+d x)\right]^5 \text{Sec}\left[\frac{1}{2} (c+d x)\right] \left(12 a^2 b+2 b^3+6 a \left(a^2+2 b^2\right) \text{Cos}[c+d x]+6 \left(2 a^2 b+b^3\right) \text{Cos}[2 (c+d x)]+2 a^3 \text{Cos}[3 (c+d x)]+12 a b^2 \text{Cos}[3 (c+d x)]+\right.$$
$$6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[c+d x]+3 b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[c+d x]-$$
$$6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[c+d x]-3 b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[c+d x]+$$
$$6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[3 (c+d x)]+3 b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[3 (c+d x)]-$$
$$\left.6 a^2 b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[3 (c+d x)]-3 b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sin}[3 (c+d x)]\right)$$

Problem 194: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 205 leaves, 17 steps):

$$\frac{3 a^2 b \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{5 b^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{a^3 \text{Cot}[c+d x]}{d}-\frac{6 a b^2 \text{Cot}[c+d x]}{d}-\frac{a^3 \text{Cot}[c+d x]^3}{3 d}-\frac{a b^2 \text{Cot}[c+d x]^3}{d}-\frac{3 a^2 b \text{Csc}[c+d x]}{d}-\frac{5 b^3 \text{Csc}[c+d x]}{2 d}-\frac{a^2 b \text{Csc}[c+d x]^3}{d}-\frac{5 b^3 \text{Csc}[c+d x]^3}{6 d}+\frac{b^3 \text{Csc}[c+d x]^3 \text{Sec}[c+d x]^2}{2 d}+\frac{3 a b^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 610 leaves):

$$-\frac{1}{768\,d\left(-1+\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}$$

$$\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^7\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\Big(84\,a^2\,b+22\,b^3+32\,a\,(a^2+3\,b^2)\,\text{Cos}[c+d\,x]+8\,(6\,a^2\,b+5\,b^3)\,\text{Cos}[2\,(c+d\,x)]+4\,a^3\,\text{Cos}[3\,(c+d\,x)]+$$
$$48\,a\,b^2\,\text{Cos}[3\,(c+d\,x)]-36\,a^2\,b\,\text{Cos}[4\,(c+d\,x)]-30\,b^3\,\text{Cos}[4\,(c+d\,x)]-4\,a^3\,\text{Cos}[5\,(c+d\,x)]-48\,a\,b^2\,\text{Cos}[5\,(c+d\,x)]+$$
$$36\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]+30\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]-$$
$$36\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]-30\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]+$$
$$18\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]+15\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]-$$
$$18\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]-15\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]-$$
$$18\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]-15\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]+$$
$$18\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]+15\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]\Big)$$

- **Problem 195: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d\,x]^6\,(a+b\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 279 leaves, 17 steps) :

$$\frac{3\,a^2\,b\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{7\,b^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{a^3\,\text{Cot}[c+d\,x]}{d}-\frac{9\,a\,b^2\,\text{Cot}[c+d\,x]}{d}-\frac{2\,a^3\,\text{Cot}[c+d\,x]^3}{3\,d}-$$
$$\frac{3\,a\,b^2\,\text{Cot}[c+d\,x]^3}{d}-\frac{a^3\,\text{Cot}[c+d\,x]^5}{5\,d}-\frac{3\,a\,b^2\,\text{Cot}[c+d\,x]^5}{5\,d}-\frac{3\,a^2\,b\,\text{Csc}[c+d\,x]}{d}-\frac{7\,b^3\,\text{Csc}[c+d\,x]}{2\,d}-\frac{a^2\,b\,\text{Csc}[c+d\,x]^3}{d}-$$
$$\frac{7\,b^3\,\text{Csc}[c+d\,x]^3}{6\,d}-\frac{3\,a^2\,b\,\text{Csc}[c+d\,x]^5}{5\,d}-\frac{7\,b^3\,\text{Csc}[c+d\,x]^5}{10\,d}+\frac{b^3\,\text{Csc}[c+d\,x]^5\,\text{Sec}[c+d\,x]^2}{2\,d}+\frac{3\,a\,b^2\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 812 leaves) :

$$-\frac{1}{61440\,d\left(-1+\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}$$
$$\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^9\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\left(1176\,a^2\,b+412\,b^3+80\,a\left(5\,a^2+18\,b^2\right)\text{Cos}[c+d\,x]+66\left(6\,a^2\,b+7\,b^3\right)\text{Cos}[2\,(c+d\,x)]+\right.$$
$$16\,a^3\,\text{Cos}[3\,(c+d\,x)]+288\,a\,b^2\,\text{Cos}[3\,(c+d\,x)]-600\,a^2\,b\,\text{Cos}[4\,(c+d\,x)]-700\,b^3\,\text{Cos}[4\,(c+d\,x)]-48\,a^3\,\text{Cos}[5\,(c+d\,x)]-$$
$$864\,a\,b^2\,\text{Cos}[5\,(c+d\,x)]+180\,a^2\,b\,\text{Cos}[6\,(c+d\,x)]+210\,b^3\,\text{Cos}[6\,(c+d\,x)]+16\,a^3\,\text{Cos}[7\,(c+d\,x)]+288\,a\,b^2\,\text{Cos}[7\,(c+d\,x)]+$$
$$450\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]+525\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]-$$
$$450\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]-525\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[c+d\,x]+$$
$$90\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]+105\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]-$$
$$90\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]-105\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[3\,(c+d\,x)]-$$
$$270\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]-315\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]+$$
$$270\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]+315\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[5\,(c+d\,x)]+$$
$$90\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[7\,(c+d\,x)]+105\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[7\,(c+d\,x)]-$$
$$\left.90\,a^2\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[7\,(c+d\,x)]-105\,b^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sin}[7\,(c+d\,x)]\right)$$

- **Problem 202: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[c+d\,x]^5}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 179 leaves, 7 steps):

$$\frac{\left(4\,a^2\,b-a\left(3\,a^2+b^2\right)\text{Cos}[c+d\,x]\right)\text{Csc}[c+d\,x]^2}{8\left(a^2-b^2\right)^2 d}+\frac{(b-a\,\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]^4}{4\left(a^2-b^2\right)d}+$$
$$\frac{a\,(3\,a+b)\,\text{Log}[1-\text{Cos}[c+d\,x]]}{16\,(a+b)^3\,d}-\frac{a\,(3\,a-b)\,\text{Log}[1+\text{Cos}[c+d\,x]]}{16\,(a-b)^3\,d}+\frac{a^4\,b\,\text{Log}[b+a\,\text{Cos}[c+d\,x]]}{\left(a^2-b^2\right)^3 d}$$

Result (type 3, 409 leaves):

$$\frac{(-3a-b)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}{32\,(a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}-$$
$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]}{64\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+\frac{\left(3\,a^2-a\,b\right)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\mathrm{Sec}[c+d\,x]}{8\,(-a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}-$$
$$\frac{a^4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]\,\mathrm{Sec}[c+d\,x]}{\left(-a^2+b^2\right)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+\frac{\left(3\,a^2+a\,b\right)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\mathrm{Sec}[c+d\,x]}{8\,(a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+$$
$$\frac{(3a-b)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}{32\,(-a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}-\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]}{64\,(-a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

Problem 226: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\mathrm{Csc}[c+d\,x]^3}{(a+b\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 229 leaves, 5 steps):

$$-\frac{b^3}{2\left(a^2-b^2\right)^2 d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}+\frac{b^2\left(3\,a^2+b^2\right)}{\left(a^2-b^2\right)^3 d\,(b+a\,\mathrm{Cos}[c+d\,x])}+\frac{\left(b\left(3\,a^2+b^2\right)-a\left(a^2+3\,b^2\right)\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}[c+d\,x]^2}{2\left(a^2-b^2\right)^3 d}+$$
$$\frac{(a-2b)\,\mathrm{Log}[1-\mathrm{Cos}[c+d\,x]]}{4\,(a+b)^4\,d}-\frac{(a+2b)\,\mathrm{Log}[1+\mathrm{Cos}[c+d\,x]]}{4\,(a-b)^4\,d}+\frac{b\left(3\,a^4+8\,a^2\,b^2+b^4\right)\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]}{\left(a^2-b^2\right)^4 d}$$

Result (type 3, 332 leaves):

$$-\frac{2\,i\left(3\,a^4\,b+8\,a^2\,b^3+b^5\right)(c+d\,x)}{(a-b)^4\,(a+b)^4\,d}-\frac{i\,(-a-2b)\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]}{2\,(-a+b)^4\,d}-\frac{i\,(a-2b)\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]}{2\,(a+b)^4\,d}-$$
$$\frac{b^3}{2\,(-a+b)^2\,(a+b)^2\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}-\frac{b^2\left(3\,a^2+b^2\right)}{(-a+b)^3\,(a+b)^3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])}-\frac{\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{8\,(a+b)^3\,d}+$$
$$\frac{(-a-2b)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]}{4\,(-a+b)^4\,d}+\frac{\left(3\,a^4\,b+8\,a^2\,b^3+b^5\right)\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]}{\left(-a^2+b^2\right)^4 d}+\frac{(a-2b)\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]}{4\,(a+b)^4\,d}-\frac{\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{8\,(-a+b)^3\,d}$$

Problem 227: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Csc}[c+d\,x]^5}{(a+b\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 313 leaves, 7 steps):

$$-\frac{a^2 b^3}{2\left(a^2-b^2\right)^3 d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}+\frac{3\,a^2 b^2\left(a^2+b^2\right)}{\left(a^2-b^2\right)^4 d\,(b+a\,\mathrm{Cos}[c+d\,x])}+$$

$$\frac{\left(4\,b\left(3\,a^4+8\,a^2 b^2+b^4\right)-3\,a\left(a^4+10\,a^2 b^2+5\,b^4\right)\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}[c+d\,x]^2}{8\left(a^2-b^2\right)^4 d}+\frac{\left(b\left(3\,a^2+b^2\right)-a\left(a^2+3\,b^2\right)\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}[c+d\,x]^4}{4\left(a^2-b^2\right)^3 d}+$$

$$\frac{3\,a\,(a-3\,b)\,\mathrm{Log}[1-\mathrm{Cos}[c+d\,x]]}{16\,(a+b)^5 d}-\frac{3\,a\,(a+3\,b)\,\mathrm{Log}[1+\mathrm{Cos}[c+d\,x]]}{16\,(a-b)^5 d}+\frac{3\,a^2 b\left(a^4+5\,a^2 b^2+2\,b^4\right)\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]}{\left(a^2-b^2\right)^5 d}$$

Result (type 3, 780 leaves) :

$$\frac{a^2 b^3\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^3}{2\,(-a+b)^3\,(a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}+\frac{3\,a^2 b^2\,(-i\,a+b)\,(i\,a+b)\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^3}{(-a+b)^4\,(a+b)^4\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$

$$\frac{6\,i\left(a^6 b+5\,a^4 b^3+2\,a^2 b^5\right)(c+d\,x)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]^3}{(a-b)^5\,(a+b)^5\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}+\frac{3\,i\left(-a^2+3\,a\,b\right)\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]^3}{8\,(a+b)^5\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$

$$\frac{3\,i\left(a^2+3\,a\,b\right)\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]^3}{8\,(-a+b)^5\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}+\frac{3\,(-a+b)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]^3}{32\,(a+b)^4\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^4\mathrm{Sec}[c+d\,x]^3}{64\,(a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}+\frac{3\left(a^2+3\,a\,b\right)(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\mathrm{Sec}[c+d\,x]^3}{16\,(-a+b)^5\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$

$$\frac{3\left(a^6 b+5\,a^4 b^3+2\,a^2 b^5\right)(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]\,\mathrm{Sec}[c+d\,x]^3}{\left(-a^2+b^2\right)^5 d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$

$$\frac{3\left(-a^2+3\,a\,b\right)(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\mathrm{Sec}[c+d\,x]^3}{16\,(a+b)^5\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}+$$

$$\frac{3\,(a+b)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]^3}{32\,(-a+b)^4\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-\frac{(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\mathrm{Sec}[c+d\,x]^3}{64\,(-a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}$$

- **Problem 228: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sin}[c+d\,x]^6}{(a+b\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 539 leaves, 11 steps) :

$$\frac{\left(5 a^6-180 a^4 b^2+600 a^2 b^4-448 b^6\right) x}{16 a^9}-\frac{\sqrt{a-b}\, b \sqrt{a+b}\, \left(6 a^4-47 a^2 b^2+56 b^4\right) \text{ArcTanh}\left[\frac{\sqrt{a-b}\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^9 d}+$$
$$\frac{b \left(213 a^4-985 a^2 b^2+840 b^4\right) \text{Sin}[c+d x]}{30 a^8 d}-\frac{\left(43 a^4-244 a^2 b^2+224 b^4\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{16 a^7 d}+$$
$$\frac{\left(45 a^4-291 a^2 b^2+280 b^4\right) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{30 a^6 b d}-\frac{\left(24 a^4-169 a^2 b^2+168 b^4\right) \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{24 a^5 b^2 d}-$$
$$\frac{\text{Cos}[c+d x]^4 \text{Sin}[c+d x]}{4 b d (b+a \text{Cos}[c+d x])^2}+\frac{a \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{10 b^2 d (b+a \text{Cos}[c+d x])^2}+\frac{\left(9 a^4-60 a^2 b^2+56 b^4\right) \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{60 a^3 b^2 d (b+a \text{Cos}[c+d x])^2}+$$
$$\frac{4 b \text{Cos}[c+d x]^6 \text{Sin}[c+d x]}{15 a^2 d (b+a \text{Cos}[c+d x])^2}-\frac{\text{Cos}[c+d x]^7 \text{Sin}[c+d x]}{6 a d (b+a \text{Cos}[c+d x])^2}+\frac{\left(15 a^4-110 a^2 b^2+112 b^4\right) \text{Cos}[c+d x]^4 \text{Sin}[c+d x]}{20 a^4 b^2 d (b+a \text{Cos}[c+d x])}$$

Result (type 3, 2091 leaves) :

$$-\left((b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x]^3 \left(8 (c+d x)+\frac{2 b \left(15 a^4-20 a^2 b^2+8 b^4\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\left(a^2-b^2\right)^{5/2}}+\right.\right.$$
$$\left.\left.\frac{a b \left(3 a^2-4 b^2\right) \text{Sin}[c+d x]}{(a-b) (a+b) (b+a \text{Cos}[c+d x])^2}-\frac{3 a \left(2 a^4-7 a^2 b^2+4 b^4\right) \text{Sin}[c+d x]}{(a-b)^2 (a+b)^2 (b+a \text{Cos}[c+d x])}\right)\right) \Big/ \left(64 a^3 d (a+b \text{Sec}[c+d x])^3\right)+$$
$$\frac{3 (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x]^3 \left(\frac{6 a b \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}}+\frac{\left(b \left(a^2+2 b^2\right)+a \left(2 a^2+b^2\right) \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{(b+a \text{Cos}[c+d x])^2}\right)}{256 (a-b)^2 (a+b)^2 d (a+b \text{Sec}[c+d x])^3}+$$
$$\frac{1}{1024 a^7 d (a+b \text{Sec}[c+d x])^3}$$
$$3 (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x]^3 \left(\frac{12 b \left(105 a^8-840 a^6 b^2+2016 a^4 b^4-1920 a^2 b^6+640 b^8\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\left(a^2-b^2\right)^{5/2}}+\right.$$
$$\frac{1}{\left(a^2-b^2\right)^2 (b+a \text{Cos}[c+d x])^2}\left(48 a^{10} c-960 a^8 b^2 c+1776 a^6 b^4 c+2976 a^4 b^6 c-7680 a^2 b^8 c+3840 b^{10} c+48 a^{10} d x-960 a^8 b^2 d x+\right.$$

$1776\, a^6 b^4 d x + 2976\, a^4 b^6 d x - 7680\, a^2 b^8 d x + 3840\, b^{10} d x + 192\, a b \left(a^2 - b^2\right)^2 \left(a^4 - 20\, a^2 b^2 + 40\, b^4\right) (c + d x) \text{Cos}[c + d x] +$
$48 \left(a^3 - a b^2\right)^2 \left(a^4 - 20\, a^2 b^2 + 40\, b^4\right) (c + d x) \text{Cos}[2 (c + d x)] + 114\, a^9 b \text{Sin}[c + d x] + 788\, a^7 b^3 \text{Sin}[c + d x] - 5696\, a^5 b^5 \text{Sin}[c + d x] +$
$8640\, a^3 b^7 \text{Sin}[c + d x] - 3840\, a b^9 \text{Sin}[c + d x] - 36\, a^{10} \text{Sin}[2 (c + d x)] + 1221\, a^8 b^2 \text{Sin}[2 (c + d x)] - 5182\, a^6 b^4 \text{Sin}[2 (c + d x)] +$
$6880\, a^4 b^6 \text{Sin}[2 (c + d x)] - 2880\, a^2 b^8 \text{Sin}[2 (c + d x)] + 120\, a^9 b \text{Sin}[3 (c + d x)] - 560\, a^7 b^3 \text{Sin}[3 (c + d x)] +$
$760\, a^5 b^5 \text{Sin}[3 (c + d x)] - 320\, a^3 b^7 \text{Sin}[3 (c + d x)] - 8\, a^{10} \text{Sin}[4 (c + d x)] + 56\, a^8 b^2 \text{Sin}[4 (c + d x)] - 88\, a^6 b^4 \text{Sin}[4 (c + d x)] +$
$40\, a^4 b^6 \text{Sin}[4 (c + d x)] - 8\, a^9 b \text{Sin}[5 (c + d x)] + 16\, a^7 b^3 \text{Sin}[5 (c + d x)] - 8\, a^5 b^5 \text{Sin}[5 (c + d x)] + 2\, a^{10} \text{Sin}[6 (c + d x)] -$
$\left.\left. 4\, a^8 b^2 \text{Sin}[6 (c + d x)] + 2\, a^6 b^4 \text{Sin}[6 (c + d x)]\right)\right) + \frac{1}{256 (a + b \text{Sec}[c + d x])^3} (b + a \text{Cos}[c + d x])^3 \text{Sec}[c + d x]^3$

$\left(-\left(b \left(-693\, a^{10} + 9240\, a^8 b^2 - 36\,960\, a^6 b^4 + 63\,360\, a^4 b^6 - 49\,280\, a^2 b^8 + 14\,336\, b^{10}\right) \text{ArcTanh}\left[\frac{(-a + b) \text{Tan}\left[\frac{1}{2} (c + d x)\right]}{\sqrt{a^2 - b^2}}\right]\right) \Big/\right.$
$\left(a^9 \sqrt{a^2 - b^2} \left(-a^2 + b^2\right)^2 d\right) - \frac{1}{60\, a^9 \left(a^2 - b^2\right)^2 d (b + a \text{Cos}[c + d x])^2}$
$\left(-1200\, a^{12} (c + d x) + 43\,200\, a^{10} b^2 (c + d x) - 198\,000\, a^8 b^4 (c + d x) + 83\,040\, a^6 b^6 (c + d x) + 691\,200\, a^4 b^8 (c + d x) - 1\,048\,320\, a^2 b^{10} (c + d x) +\right.$
$430\,080\, b^{12} (c + d x) - 4800\, a^{11} b (c + d x) \text{Cos}[c + d x] + 182\,400\, a^9 b^3 (c + d x) \text{Cos}[c + d x] - 1\,156\,800\, a^7 b^5 (c + d x) \text{Cos}[c + d x] +$
$2\,645\,760\, a^5 b^7 (c + d x) \text{Cos}[c + d x] - 2\,526\,720\, a^3 b^9 (c + d x) \text{Cos}[c + d x] + 860\,160\, a b^{11} (c + d x) \text{Cos}[c + d x] -$
$1200\, a^{12} (c + d x) \text{Cos}[2 (c + d x)] + 45\,600\, a^{10} b^2 (c + d x) \text{Cos}[2 (c + d x)] - 289\,200\, a^8 b^4 (c + d x) \text{Cos}[2 (c + d x)] +$
$661\,440\, a^6 b^6 (c + d x) \text{Cos}[2 (c + d x)] - 631\,680\, a^4 b^8 (c + d x) \text{Cos}[2 (c + d x)] + 215\,040\, a^2 b^{10} (c + d x) \text{Cos}[2 (c + d x)] -$
$4530\, a^{11} b \text{Sin}[c + d x] - 11\,060\, a^9 b^3 \text{Sin}[c + d x] + 332\,800\, a^7 b^5 \text{Sin}[c + d x] - 1\,042\,880\, a^5 b^7 \text{Sin}[c + d x] + 1\,155\,840\, a^3 b^9 \text{Sin}[c + d x] -$
$430\,080\, a b^{11} \text{Sin}[c + d x] + 900\, a^{12} \text{Sin}[2 (c + d x)] - 49\,125\, a^{10} b^2 \text{Sin}[2 (c + d x)] + 362\,830\, a^8 b^4 \text{Sin}[2 (c + d x)] -$
$903\,680\, a^6 b^6 \text{Sin}[2 (c + d x)] + 911\,680\, a^4 b^8 \text{Sin}[2 (c + d x)] - 322\,560\, a^2 b^{10} \text{Sin}[2 (c + d x)] - 4344\, a^{11} b \text{Sin}[3 (c + d x)] +$
$37\,808\, a^9 b^3 \text{Sin}[3 (c + d x)] - 98\,424\, a^7 b^5 \text{Sin}[3 (c + d x)] + 100\,800\, a^5 b^7 \text{Sin}[3 (c + d x)] - 35\,840\, a^3 b^9 \text{Sin}[3 (c + d x)] +$
$200\, a^{12} \text{Sin}[4 (c + d x)] - 3256\, a^{10} b^2 \text{Sin}[4 (c + d x)] + 10\,392\, a^8 b^4 \text{Sin}[4 (c + d x)] - 11\,816\, a^6 b^6 \text{Sin}[4 (c + d x)] +$
$4480\, a^4 b^8 \text{Sin}[4 (c + d x)] + 392\, a^{11} b \text{Sin}[5 (c + d x)] - 1680\, a^9 b^3 \text{Sin}[5 (c + d x)] + 2184\, a^7 b^5 \text{Sin}[5 (c + d x)] - 896\, a^5 b^7 \text{Sin}[5 (c + d x)] -$
$50\, a^{12} \text{Sin}[6 (c + d x)] + 324\, a^{10} b^2 \text{Sin}[6 (c + d x)] - 498\, a^8 b^4 \text{Sin}[6 (c + d x)] + 224\, a^6 b^6 \text{Sin}[6 (c + d x)] - 64\, a^{11} b \text{Sin}[7 (c + d x)] +$
$\left.\left. 128\, a^9 b^3 \text{Sin}[7 (c + d x)] - 64\, a^7 b^5 \text{Sin}[7 (c + d x)] + 20\, a^{12} \text{Sin}[8 (c + d x)] - 40\, a^{10} b^2 \text{Sin}[8 (c + d x)] + 20\, a^8 b^4 \text{Sin}[8 (c + d x)]\right)\right)$

- **Problem 229: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[c + d x]^4}{(a + b \text{Sec}[c + d x])^3} \, dx$$

Optimal (type 3, 333 leaves, 9 steps):

$$\frac{3\left(a^4-24 a^2 b^2+40 b^4\right) x}{8 a^7}-\frac{3 b\left(2 a^4-11 a^2 b^2+10 b^4\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^7 \sqrt{a-b} \sqrt{a+b}\, d}+$$
$$\frac{b\left(13 a^2-30 b^2\right) \operatorname{Sin}[c+d x]}{2 a^6 d}-\frac{3\left(7 a^2-20 b^2\right) \operatorname{Cos}[c+d x] \operatorname{Sin}[c+d x]}{8 a^5 d}+\frac{\left(3 a^2-10 b^2\right) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{2 a^4 b d}-$$
$$\frac{\left(4 a^2-15 b^2\right) \operatorname{Cos}[c+d x]^3 \operatorname{Sin}[c+d x]}{4 a^3 b^2 d}-\frac{\left(a^2-b^2\right) \operatorname{Cos}[c+d x]^4 \operatorname{Sin}[c+d x]}{2 a^2 b d(b+a \operatorname{Cos}[c+d x])^2}+\frac{\left(2 a^2-7 b^2\right) \operatorname{Cos}[c+d x]^4 \operatorname{Sin}[c+d x]}{2 a^2 b^2 d(b+a \operatorname{Cos}[c+d x])}$$

Result (type 3, 1320 leaves) :

$$-\left(3(b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^3\left(8(c+d x)+\frac{2 b\left(15 a^4-20 a^2 b^2+8 b^4\right) \operatorname{ArcTanh}\left[\frac{(-a+b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\left(a^2-b^2\right)^{5/2}}+\right.\right.$$
$$\left.\left.\frac{a b\left(3 a^2-4 b^2\right) \operatorname{Sin}[c+d x]}{(a-b)(a+b)(b+a \operatorname{Cos}[c+d x])^2}-\frac{3 a\left(2 a^4-7 a^2 b^2+4 b^4\right) \operatorname{Sin}[c+d x]}{(a-b)^2(a+b)^2(b+a \operatorname{Cos}[c+d x])}\right)\right) \Big/ \left(128 a^3 d(a+b \operatorname{Sec}[c+d x])^3\right)+$$
$$\frac{3(b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^3\left(\frac{6 a b \operatorname{ArcTanh}\left[\frac{(-a+b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}}+\frac{\left(b\left(a^2+2 b^2\right)+a\left(2 a^2+b^2\right) \operatorname{Cos}[c+d x]\right) \operatorname{Sin}[c+d x]}{(b+a \operatorname{Cos}[c+d x])^2}\right)}{128(a-b)^2(a+b)^2 d(a+b \operatorname{Sec}[c+d x])^3}-$$
$$\left((b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^3\left(-24\left(a^2-8 b^2\right)(c+d x)+\frac{6 b\left(-35 a^6+140 a^4 b^2-168 a^2 b^4+64 b^6\right) \operatorname{ArcTanh}\left[\frac{(-a+b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\left(a^2-b^2\right)^{5/2}}-\right.\right.$$
$$\left.\left.96 a b \operatorname{Sin}[c+d x]+\frac{a b\left(-5 a^4+20 a^2 b^2-16 b^4\right) \operatorname{Sin}[c+d x]}{(a-b)(a+b)(b+a \operatorname{Cos}[c+d x])^2}+\frac{a\left(10 a^6-115 a^4 b^2+220 a^2 b^4-112 b^6\right) \operatorname{Sin}[c+d x]}{(a-b)^2(a+b)^2(b+a \operatorname{Cos}[c+d x])}+8 a^2 \operatorname{Sin}[2(c+d x)]\right)\right) \Big/$$
$$\left(128 a^5 d(a+b \operatorname{Sec}[c+d x])^3\right)+\frac{1}{256 a^7 d(a+b \operatorname{Sec}[c+d x])^3}(b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^3$$

$$\left(\frac{12\, b\, \left(105\, a^8 - 840\, a^6\, b^2 + 2016\, a^4\, b^4 - 1920\, a^2\, b^6 + 640\, b^8\right)\, \text{ArcTanh}\left[\frac{(-a+b)\, \text{Tan}\left[\frac{1}{2}\, (c+d\, x)\right]}{\sqrt{a^2-b^2}}\right]}{\left(a^2-b^2\right)^{5/2}} + \frac{1}{\left(a^2-b^2\right)^2\, (b + a\, \text{Cos}[c+d\, x])^2}\right.$$

$$\left(48\, a^{10}\, c - 960\, a^8\, b^2\, c + 1776\, a^6\, b^4\, c + 2976\, a^4\, b^6\, c - 7680\, a^2\, b^8\, c + 3840\, b^{10}\, c + 48\, a^{10}\, d\, x - 960\, a^8\, b^2\, d\, x + 1776\, a^6\, b^4\, d\, x + 2976\, a^4\, b^6\, d\, x - 7680\, a^2\, b^8\, d\, x + 3840\, b^{10}\, d\, x + 192\, a\, b\, \left(a^2-b^2\right)^2\, \left(a^4 - 20\, a^2\, b^2 + 40\, b^4\right)\, (c+d\, x)\, \text{Cos}[c+d\, x] + 48\, \left(a^3 - a\, b^2\right)^2\, \left(a^4 - 20\, a^2\, b^2 + 40\, b^4\right)\, (c+d\, x)\, \text{Cos}[2\, (c+d\, x)] + 114\, a^9\, b\, \text{Sin}[c+d\, x] + 788\, a^7\, b^3\, \text{Sin}[c+d\, x] - 5696\, a^5\, b^5\, \text{Sin}[c+d\, x] + 8640\, a^3\, b^7\, \text{Sin}[c+d\, x] - 3840\, a\, b^9\, \text{Sin}[c+d\, x] - 36\, a^{10}\, \text{Sin}[2\, (c+d\, x)] + 1221\, a^8\, b^2\, \text{Sin}[2\, (c+d\, x)] - 5182\, a^6\, b^4\, \text{Sin}[2\, (c+d\, x)] + 6880\, a^4\, b^6\, \text{Sin}[2\, (c+d\, x)] - 2880\, a^2\, b^8\, \text{Sin}[2\, (c+d\, x)] + 120\, a^9\, b\, \text{Sin}[3\, (c+d\, x)] - 560\, a^7\, b^3\, \text{Sin}[3\, (c+d\, x)] + 760\, a^5\, b^5\, \text{Sin}[3\, (c+d\, x)] - 320\, a^3\, b^7\, \text{Sin}[3\, (c+d\, x)] - 8\, a^{10}\, \text{Sin}[4\, (c+d\, x)] + 56\, a^8\, b^2\, \text{Sin}[4\, (c+d\, x)] - 88\, a^6\, b^4\, \text{Sin}[4\, (c+d\, x)] + 40\, a^4\, b^6\, \text{Sin}[4\, (c+d\, x)] - 8\, a^9\, b\, \text{Sin}[5\, (c+d\, x)] + \left.16\, a^7\, b^3\, \text{Sin}[5\, (c+d\, x)] - 8\, a^5\, b^5\, \text{Sin}[5\, (c+d\, x)] + 2\, a^{10}\, \text{Sin}[6\, (c+d\, x)] - 4\, a^8\, b^2\, \text{Sin}[6\, (c+d\, x)] + 2\, a^6\, b^4\, \text{Sin}[6\, (c+d\, x)]\right)\right)$$

- **Problem 233: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(e\, \text{Sin}[c+d\, x])^{7/2}}{a + b\, \text{Sec}[c+d\, x]}\, dx$$

Optimal (type 4, 516 leaves, 15 steps):

$$-\frac{b\, \left(a^2-b^2\right)^{5/4}\, e^{7/2}\, \text{ArcTan}\left[\frac{\sqrt{a}\, \sqrt{e\, \text{Sin}[c+d\, x]}}{\left(a^2-b^2\right)^{1/4}\, \sqrt{e}}\right]}{a^{9/2}\, d} - \frac{b\, \left(a^2-b^2\right)^{5/4}\, e^{7/2}\, \text{ArcTanh}\left[\frac{\sqrt{a}\, \sqrt{e\, \text{Sin}[c+d\, x]}}{\left(a^2-b^2\right)^{1/4}\, \sqrt{e}}\right]}{a^{9/2}\, d} +$$

$$\frac{2\, \left(5\, a^4 - 28\, a^2\, b^2 + 21\, b^4\right)\, e^4\, \text{EllipticF}\left[\frac{1}{2}\, \left(c - \frac{\pi}{2} + d\, x\right),\, 2\right]\, \sqrt{\text{Sin}[c+d\, x]}}{21\, a^5\, d\, \sqrt{e\, \text{Sin}[c+d\, x]}} +$$

$$\frac{b^2\, \left(a^2-b^2\right)^2\, e^4\, \text{EllipticPi}\left[\frac{2\, a}{a-\sqrt{a^2-b^2}},\, \frac{1}{2}\, \left(c - \frac{\pi}{2} + d\, x\right),\, 2\right]\, \sqrt{\text{Sin}[c+d\, x]}}{a^5\, \left(a^2 - b^2 - a\, \sqrt{a^2-b^2}\right)\, d\, \sqrt{e\, \text{Sin}[c+d\, x]}} +$$

$$\frac{b^2\, \left(a^2-b^2\right)^2\, e^4\, \text{EllipticPi}\left[\frac{2\, a}{a+\sqrt{a^2-b^2}},\, \frac{1}{2}\, \left(c - \frac{\pi}{2} + d\, x\right),\, 2\right]\, \sqrt{\text{Sin}[c+d\, x]}}{a^5\, \left(a^2 - b^2 + a\, \sqrt{a^2-b^2}\right)\, d\, \sqrt{e\, \text{Sin}[c+d\, x]}} +$$

$$\frac{2\, e^3\, \left(21\, b\, \left(a^2-b^2\right) - a\, \left(5\, a^2 - 7\, b^2\right)\, \text{Cos}[c+d\, x]\right)\, \sqrt{e\, \text{Sin}[c+d\, x]}}{21\, a^4\, d} + \frac{2\, e\, (7\, b - 5\, a\, \text{Cos}[c+d\, x])\, (e\, \text{Sin}[c+d\, x])^{5/2}}{35\, a^2\, d}$$

Result (type 6, 2249 leaves):

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])}\,(b+a\,\text{Cos}[c+d\,x])\left(-\frac{\left(23\,a^2-28\,b^2\right)\text{Cos}[c+d\,x]}{42\,a^3}-\frac{b\,\text{Cos}[2\,(c+d\,x)]}{5\,a^2}+\frac{\text{Cos}[3\,(c+d\,x)]}{14\,a}\right)\text{Csc}[c+d\,x]^3\,\text{Sec}[c+d\,x]\,(e\,\text{Sin}[c+d\,x])^{7/2}-$$

$$\frac{1}{420\,a^3\,d\,(a+b\,\text{Sec}[c+d\,x])\,\text{Sin}[c+d\,x]^{7/2}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,(e\,\text{Sin}[c+d\,x])^{7/2}$$

$$\left(\frac{1}{(b+a\,\text{Cos}[c+d\,x])\left(1-\text{Sin}[c+d\,x]^2\right)}\,2\left(-100\,a^3+98\,a\,b^2\right)\text{Cos}[c+d\,x]^2\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{3/4}}b\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]-\text{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$

$$\left.\left.\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]+\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]\right)-$$

$$\left(5\,a\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\,\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\Bigg/\left(\left(5\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\sqrt{1-\text{Sin}[c+d\,x]^2}}\,2\left(89\,a^2\,b-70\,b^3\right)\text{Cos}[c+d\,x]\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)$$

$$\left(-\frac{1}{\left(a^2-b^2\right)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]\right)+$$

$$\left(5\,b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\right)\Bigg/\left(\sqrt{1-\text{Sin}[c+d\,x]^2}\left(5\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left(a^2-b^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\Big)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\Big)\Big)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d x])\left(1-2\,\text{Sin}[c+d x]^2\right)\sqrt{1-\text{Sin}[c+d x]^2}}\left(-231\,a^2 b+210\,b^3\right)\text{Cos}[c+d x]\,\text{Cos}[2\,(c+d x)]$$

$$\left(b+a\sqrt{1-\text{Sin}[c+d x]^2}\right)\left(\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\left(a^2-2\,b^2\right)\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}-\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\left(a^2-2\,b^2\right)\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}+\right.$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)\left(a^2-2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\,a\,\text{Sin}[c+d x]\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}-$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)\left(a^2-2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\,a\,\text{Sin}[c+d x]\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}+\frac{4\sqrt{\text{Sin}[c+d x]}}{a}+$$

$$\left(10\,b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d x]^2}\left(5\left(a^2-b^2\right)\text{AppellF1}\left[\right.\right.\right.$$

$$\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)+$$

$$\left(36\,b\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\text{Sin}[c+d x]^{5/2}\right)\Big/\left(5\sqrt{1-\text{Sin}[c+d x]^2}\left(9\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)\right)\right)$$

- **Problem 234: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\text{Sin}[c+d x])^{5/2}}{a+b\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 4, 430 leaves, 14 steps):

$$\frac{b\left(a^2-b^2\right)^{3/4} e^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}\sqrt{e}}\right]}{a^{7/2}\,d}-\frac{b\left(a^2-b^2\right)^{3/4} e^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}\sqrt{e}}\right]}{a^{7/2}\,d}-$$

$$\frac{b^2\left(a^2-b^2\right) e^3\,\text{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{a^4\left(a-\sqrt{a^2-b^2}\right) d\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{b^2\left(a^2-b^2\right) e^3\,\text{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{a^4\left(a+\sqrt{a^2-b^2}\right) d\,\sqrt{e\,\text{Sin}[c+d\,x]}}+$$

$$\frac{2\left(3\,a^2-5\,b^2\right) e^2\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{5\,a^3\,d\,\sqrt{\text{Sin}[c+d\,x]}}+\frac{2\,e\,(5\,b-3\,a\,\text{Cos}[c+d\,x])\,(e\,\text{Sin}[c+d\,x])^{3/2}}{15\,a^2\,d}$$

Result (type 6, 1247 leaves) :

$$-\frac{1}{5\,a^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}[c+d\,x]^{5/2}}\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]$$

$$(e\,\mathrm{Sin}[c+d\,x])^{5/2}\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Sin}[c+d\,x]^2\right)}\,2\,\left(-3\,a^2+5\,b^2\right)\,\mathrm{Cos}[c+d\,x]^2\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\,\sqrt{2}\,a^{3/2}\,\left(-a^2+b^2\right)^{1/4}}\,b\,\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\right.\right.\right.$$

$$\left.\left.\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$

$$\left(7\,a\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(3\,\left(7\,\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\,\left(b^2+a^2\,\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{6\,(b+a\,\mathrm{Cos}[c+d\,x])\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\,a\,b\,\mathrm{Cos}[c+d\,x]\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\,\left(\frac{1}{\sqrt{a}\,\left(a^2-b^2\right)^{1/4}}\right.$$

$$(3+3\,i)\,\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{a}\right.\right.$$

$$\left.\left.\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\,\left(7\,\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\,\left(b^2+a^2\,\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)+$$

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c+d\,x]^2\,\mathrm{Sec}[c+d\,x]\,(e\,\mathrm{Sin}[c+d\,x])^{5/2}\left(\frac{2\,b\,\mathrm{Sin}[c+d\,x]}{3\,a^2}-\frac{\mathrm{Sin}[2\,(c+d\,x)]}{5\,a}\right)}{d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

- **Problem 235: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(e \operatorname{Sin}[c+d x])^{3/2}}{a+b \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 444 leaves, 14 steps):

$$-\frac{b \left(a^2-b^2\right)^{1/4} e^{3/2} \operatorname{ArcTan}\left[\frac{\sqrt{a} \sqrt{e \operatorname{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{a^{5/2} d}-\frac{b \left(a^2-b^2\right)^{1/4} e^{3/2} \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{e \operatorname{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{a^{5/2} d}+$$
$$\frac{2 \left(a^2-3 b^2\right) e^2 \operatorname{EllipticF}\left[\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\operatorname{Sin}[c+d x]}}{3 a^3 d \sqrt{e \operatorname{Sin}[c+d x]}}+\frac{b^2 \left(a^2-b^2\right) e^2 \operatorname{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}}, \frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\operatorname{Sin}[c+d x]}}{a^3 \left(a^2-b^2-a \sqrt{a^2-b^2}\right) d \sqrt{e \operatorname{Sin}[c+d x]}}+$$
$$\frac{b^2 \left(a^2-b^2\right) e^2 \operatorname{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}}, \frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\operatorname{Sin}[c+d x]}}{a^3 \left(a^2-b^2+a \sqrt{a^2-b^2}\right) d \sqrt{e \operatorname{Sin}[c+d x]}}+\frac{2 e (3 b-a \operatorname{Cos}[c+d x]) \sqrt{e \operatorname{Sin}[c+d x]}}{3 a^2 d}$$

Result (type 6, 2159 leaves):

$$-\frac{2 (b+a \operatorname{Cos}[c+d x]) \operatorname{Csc}[c+d x] (e \operatorname{Sin}[c+d x])^{3/2}}{3 a d (a+b \operatorname{Sec}[c+d x])}+\frac{1}{6 a d (a+b \operatorname{Sec}[c+d x]) \operatorname{Sin}[c+d x]^{3/2}}$$
$$(b+a \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x] (e \operatorname{Sin}[c+d x])^{3/2} \left(\frac{1}{(b+a \operatorname{Cos}[c+d x]) \left(1-\operatorname{Sin}[c+d x]^2\right)} 4 a \operatorname{Cos}[c+d x]^2 \left(b+a \sqrt{1-\operatorname{Sin}[c+d x]^2}\right)\right.$$
$$\left(\frac{1}{4 \sqrt{2} \sqrt{a} \left(-a^2+b^2\right)^{3/4}} b \left(-2 \operatorname{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{a} \sqrt{\operatorname{Sin}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2 \operatorname{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{a} \sqrt{\operatorname{Sin}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]-\operatorname{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$
$$\left.\left.\sqrt{2} \sqrt{a} \left(-a^2+b^2\right)^{1/4} \sqrt{\operatorname{Sin}[c+d x]}+a \operatorname{Sin}[c+d x]\right]+\operatorname{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2} \sqrt{a} \left(-a^2+b^2\right)^{1/4} \sqrt{\operatorname{Sin}[c+d x]}+a \operatorname{Sin}[c+d x]\right]\right)-$$
$$\left(5 a \left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{4}, -\frac{1}{2}, 1, \frac{5}{4}, \operatorname{Sin}[c+d x]^2, \frac{a^2 \operatorname{Sin}[c+d x]^2}{a^2-b^2}\right] \sqrt{\operatorname{Sin}[c+d x]} \sqrt{1-\operatorname{Sin}[c+d x]^2}\right) \Big/$$
$$\left(\left(5 \left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{4}, -\frac{1}{2}, 1, \frac{5}{4}, \operatorname{Sin}[c+d x]^2, \frac{a^2 \operatorname{Sin}[c+d x]^2}{a^2-b^2}\right]+2 \left(2 a^2 \operatorname{AppellF1}\left[\frac{5}{4}, -\frac{1}{2}, 2, \frac{9}{4}, \operatorname{Sin}[c+d x]^2,\right.\right.\right.\right.$$
$$\left.\left.\left.\frac{a^2 \operatorname{Sin}[c+d x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right) \operatorname{AppellF1}\left[\frac{5}{4}, \frac{1}{2}, 1, \frac{9}{4}, \operatorname{Sin}[c+d x]^2, \frac{a^2 \operatorname{Sin}[c+d x]^2}{a^2-b^2}\right]\right) \operatorname{Sin}[c+d x]^2\right)$$

$$\left.\left.\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)\right)-\frac{1}{(b+a\,\text{Cos}[c+d x])\sqrt{1-\text{Sin}[c+d x]^2}}\,2\,b\,\text{Cos}[c+d x]\left(b+a\sqrt{1-\text{Sin}[c+d x]^2}\right)$$

$$\left(-\frac{1}{\left(a^2-b^2\right)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\,a\,\text{Sin}[c+d x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\,a\,\text{Sin}[c+d x]\right]\right)+$$

$$\left(5\,b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d x]^2}\left(5\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)\right)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d x])\left(1-2\,\text{Sin}[c+d x]^2\right)\sqrt{1-\text{Sin}[c+d x]^2}}\,3\,b\,\text{Cos}[c+d x]\,\text{Cos}[2\,(c+d x)]\left(b+a\sqrt{1-\text{Sin}[c+d x]^2}\right)$$

$$\left(\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\left(a^2-2\,b^2\right)\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}-\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\left(a^2-2\,b^2\right)\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}+\right.$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)\left(a^2-2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\,a\,\text{Sin}[c+d x]\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}-$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)\left(a^2-2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\,a\,\text{Sin}[c+d x]\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}+\frac{4\sqrt{\text{Sin}[c+d x]}}{a}+$$

$$\left(10\,b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d x]^2}\left(5\left(a^2-b^2\right)\text{AppellF1}\left[\right.\right.\right.$$

$$\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)+$$

$$\left(36\,b\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\text{Sin}[c+d x]^{5/2}\right)\Big/\left(5\sqrt{1-\text{Sin}[c+d x]^2}\left(9\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2 a^2\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\Bigg)\Bigg)$$

Problem 236: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{e\,\text{Sin}[c+d x]}}{a+b\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 4, 356 leaves, 13 steps):

$$\frac{b\sqrt{e}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}\sqrt{e}}\right]}{a^{3/2}\left(a^2-b^2\right)^{1/4} d}-\frac{b\sqrt{e}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}\sqrt{e}}\right]}{a^{3/2}\left(a^2-b^2\right)^{1/4} d}-\frac{b^2 e\,\text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\right]\sqrt{\text{Sin}[c+d x]}}{a^2\left(a-\sqrt{a^2-b^2}\right) d\sqrt{e\,\text{Sin}[c+d x]}}-\frac{b^2 e\,\text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\right]\sqrt{\text{Sin}[c+d x]}}{a^2\left(a+\sqrt{a^2-b^2}\right) d\sqrt{e\,\text{Sin}[c+d x]}}+\frac{2\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\right]\sqrt{e\,\text{Sin}[c+d x]}}{a\,d\sqrt{\text{Sin}[c+d x]}}$$

Result (type 6, 548 leaves):

$$\frac{1}{d\left(b+a\,\text{Cos}[c+d x]\right)\sqrt{\text{Sin}[c+d x]}}2\left(b+a\sqrt{\text{Cos}[c+d x]^2}\right)\sqrt{e\,\text{Sin}[c+d x]}\left(\frac{1}{4\sqrt{2}\,a^{3/2}\left(-a^2+b^2\right)^{1/4}}b\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+a\,\text{Sin}[c+d x]\right]-\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+a\,\text{Sin}[c+d x]\right]\right)-\left(7 a\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\sqrt{\text{Cos}[c+d x]^2}\,\text{Sin}[c+d x]^{3/2}\right)\Big/\left(3\left(-a^2+b^2+a^2\,\text{Sin}[c+d x]^2\right)\left(7\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2 a^2\,\text{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\right)\right)$$

Problem 237: Result unnecessarily involves higher level functions.

$$\int \frac{1}{(a+b\,\mathrm{Sec}[c+d\,x])\sqrt{e\,\mathrm{Sin}[c+d\,x]}}\,dx$$

Optimal (type 4, 370 leaves, 13 steps):

$$-\frac{b\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{\sqrt{a}\,(a^2-b^2)^{3/4}\,d\,\sqrt{e}}-\frac{b\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{\sqrt{a}\,(a^2-b^2)^{3/4}\,d\,\sqrt{e}}+\frac{2\,\mathrm{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+$$
$$\frac{b^2\,\mathrm{EllipticPi}\left[\frac{2a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a\left(a^2-b^2-a\sqrt{a^2-b^2}\right)d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+\frac{b^2\,\mathrm{EllipticPi}\left[\frac{2a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a\left(a^2-b^2+a\sqrt{a^2-b^2}\right)d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}$$

Result (type 6, 546 leaves):

$$\frac{1}{d\,(b+a\,\mathrm{Cos}[c+d\,x])\sqrt{e\,\mathrm{Sin}[c+d\,x]}}\,2\left(b+a\sqrt{\mathrm{Cos}[c+d\,x]^2}\right)\sqrt{\mathrm{Sin}[c+d\,x]}$$
$$\left(\frac{1}{4\sqrt{2}\sqrt{a}\,(-a^2+b^2)^{3/4}}b\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{(-a^2+b^2)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{(-a^2+b^2)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$
$$\left.\left.\sqrt{2}\sqrt{a}\,(-a^2+b^2)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\sqrt{a}\,(-a^2+b^2)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$
$$\left(5\,a\,(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\mathrm{Cos}[c+d\,x]^2}\sqrt{\mathrm{Sin}[c+d\,x]}\right)\Big/$$
$$\left(\left(-a^2+b^2+a^2\,\mathrm{Sin}[c+d\,x]^2\right)\left(5\,(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\right.\right.\right.\right.$$
$$\left.\left.\left.\left.\left.\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+(-a^2+b^2)\,\mathrm{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\right)\right)$$

Problem 238: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 430 leaves, 14 steps):

$$\frac{\sqrt{a}\ b\ \text{ArcTan}\left[\frac{\sqrt{a}\ \sqrt{e\ \text{Sin}[c+d\ x]}}{(a^2-b^2)^{1/4}\ \sqrt{e}}\right]}{(a^2-b^2)^{5/4}\ d\ e^{3/2}}-\frac{\sqrt{a}\ b\ \text{ArcTanh}\left[\frac{\sqrt{a}\ \sqrt{e\ \text{Sin}[c+d\ x]}}{(a^2-b^2)^{1/4}\ \sqrt{e}}\right]}{(a^2-b^2)^{5/4}\ d\ e^{3/2}}+$$

$$\frac{2\ (b-a\ \text{Cos}[c+d\ x])}{(a^2-b^2)\ d\ e\ \sqrt{e\ \text{Sin}[c+d\ x]}}-\frac{b^2\ \text{EllipticPi}\left[\frac{2\ a}{a-\sqrt{a^2-b^2}},\ \frac{1}{2}\left(c-\frac{\pi}{2}+d\ x\right),\ 2\right]\sqrt{\text{Sin}[c+d\ x]}}{(a^2-b^2)\left(a-\sqrt{a^2-b^2}\right)d\ e\ \sqrt{e\ \text{Sin}[c+d\ x]}}-$$

$$\frac{b^2\ \text{EllipticPi}\left[\frac{2\ a}{a+\sqrt{a^2-b^2}},\ \frac{1}{2}\left(c-\frac{\pi}{2}+d\ x\right),\ 2\right]\sqrt{\text{Sin}[c+d\ x]}}{(a^2-b^2)\left(a+\sqrt{a^2-b^2}\right)d\ e\ \sqrt{e\ \text{Sin}[c+d\ x]}}-\frac{2\ a\ \text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\ x\right),\ 2\right]\sqrt{e\ \text{Sin}[c+d\ x]}}{(a^2-b^2)\ d\ e^2\ \sqrt{\text{Sin}[c+d\ x]}}$$

Result (type 6, 1229 leaves) :

$$-\frac{1}{(a-b)\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}$$

$$a\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[c+d\,x]^{3/2}\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Sin}[c+d\,x]^2\right)}\,2\,a\,\mathrm{Cos}[c+d\,x]^2\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\,a^{3/2}\left(-a^2+b^2\right)^{1/4}}\,b\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\right.\right.\right.$$

$$\left.\left.\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$

$$\left(7\,a\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(3\left(7\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{6\,(b+a\,\mathrm{Cos}[c+d\,x])\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\,b\,\mathrm{Cos}[c+d\,x]\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\left(\frac{1}{\sqrt{a}\,\left(a^2-b^2\right)^{1/4}}\right.$$

$$(3+3\,i)\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{a}\right.\right.$$

$$\left.\left.\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\right)\Big/$$

$$\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\left(7\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\right.\right.\right.\right.$$

$$\left.\left.\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)$$

$$\left.\left.\left.\left.\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)\right)-\frac{2\,(b-a\,\mathrm{Cos}[c+d\,x])\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Tan}[c+d\,x]}{\left(-a^2+b^2\right)d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}$$

- **Problem 239: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 452 leaves, 14 steps):

$$-\frac{a^{3/2}\,b\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{(a^2-b^2)^{7/4}\,d\,e^{5/2}}-\frac{a^{3/2}\,b\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{(a^2-b^2)^{7/4}\,d\,e^{5/2}}+$$

$$\frac{2\,(b-a\,\mathrm{Cos}[c+d\,x])}{3\,(a^2-b^2)\,d\,e\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}+\frac{2\,a\,\mathrm{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{3\,(a^2-b^2)\,d\,e^2\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+$$

$$\frac{a\,b^2\,\mathrm{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)\left(a^2-b^2-a\sqrt{a^2-b^2}\right)d\,e^2\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+\frac{a\,b^2\,\mathrm{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)\left(a^2-b^2+a\sqrt{a^2-b^2}\right)d\,e^2\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}$$

Result (type 6, 1233 leaves):

$$-\frac{1}{3\,(a-b)\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{5/2}}$$

$$a\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[c+d\,x]^{5/2}\left(-\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,(1-\mathrm{Sin}[c+d\,x]^2)}\,2\,a\,\mathrm{Cos}[c+d\,x]^2\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\left(b\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{(-a^2+b^2)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{(-a^2+b^2)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\,(-a^2+b^2)^{1/4}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,(-a^2+b^2)^{1/4}\,\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{2}\,\sqrt{a}\,(-a^2+b^2)^{3/4}\right)-\left(5\,a\,(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\mathrm{Sin}[c+d\,x]}\right.$$

$$\left.\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(\left(5\,(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.(-a^2+b^2)\,\mathrm{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\,(-1+\mathrm{Sin}[c+d\,x]^2)\right)\right)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\,4\,b\,\mathrm{Cos}[c+d\,x]\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\left(-\frac{1}{(a^2-b^2)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\right.$$
$$\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{a}\,(a^2-b^2)^{1/4}\right.\right.$$
$$\left.\left.\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$
$$\left(5\,b\,(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\mathrm{Sin}[c+d\,x]}\right)\Big/$$
$$\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\left(5\,(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\right.\right.\right.\right.$$
$$\left.\left.\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+(a^2-b^2)\,\mathrm{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)$$
$$\left.\left.\left.\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)-\frac{2\,(b-a\,\mathrm{Cos}[c+d\,x])\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Tan}[c+d\,x]}{3\,(-a^2+b^2)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{5/2}}$$

- **Problem 240: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 511 leaves, 15 steps):

$$\frac{a^{5/2}\,b\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{(a^2-b^2)^{9/4}\,d\,e^{7/2}}-\frac{a^{5/2}\,b\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{(a^2-b^2)^{9/4}\,d\,e^{7/2}}+\frac{2\,(b-a\,\mathrm{Cos}[c+d\,x])}{5\,(a^2-b^2)\,d\,e\,(e\,\mathrm{Sin}[c+d\,x])^{5/2}}+$$
$$\frac{2\left(5\,a^2\,b-a\,(3\,a^2+2\,b^2)\,\mathrm{Cos}[c+d\,x]\right)}{5\,(a^2-b^2)^2\,d\,e^3\sqrt{e\,\mathrm{Sin}[c+d\,x]}}-\frac{a^2\,b^2\,\mathrm{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^2\left(a-\sqrt{a^2-b^2}\right)d\,e^3\sqrt{e\,\mathrm{Sin}[c+d\,x]}}-$$
$$\frac{a^2\,b^2\,\mathrm{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^2\left(a+\sqrt{a^2-b^2}\right)d\,e^3\sqrt{e\,\mathrm{Sin}[c+d\,x]}}-\frac{2\,a\,(3\,a^2+2\,b^2)\,\mathrm{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{5\,(a^2-b^2)^2\,d\,e^4\sqrt{\mathrm{Sin}[c+d\,x]}}$$

Result (type 6, 1324 leaves):

$$-\frac{1}{5\,(a-b)^2\,(a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{7/2}}$$

$$a\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[c+d\,x]^{7/2}\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\left(1-\mathrm{Sin}[c+d\,x]^2\right)}\,2\left(3\,a^3+2\,a\,b^2\right)\mathrm{Cos}[c+d\,x]^2\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\,a^{3/2}\left(-a^2+b^2\right)^{1/4}}\,b\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\right.\right.\right.$$

$$\left.\left.\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$

$$\left(7\,a\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(3\left(7\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{12\,(b+a\,\mathrm{Cos}[c+d\,x])\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\left(8\,a^2\,b+2\,b^3\right)\mathrm{Cos}[c+d\,x]\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)$$

$$\left(\frac{1}{\sqrt{a}\,\left(a^2-b^2\right)^{1/4}}\,(3+3\,i)\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\,\left(7\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)+$$

$$\left((b+a\,\mathrm{Cos}[c+d\,x])\left(-\frac{2\left(-5\,a^2\,b+3\,a^3\,\mathrm{Cos}[c+d\,x]+2\,a\,b^2\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}[c+d\,x]}{5\left(-a^2+b^2\right)^2}-\frac{2\,(b-a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c+d\,x]^3}{5\left(-a^2+b^2\right)}\right)\right.$$

$$\mathrm{Sin}[c+d\,x]^3$$

$$\mathrm{Tan}[$$

$$c+d\,x]\Big)\Big/\Big(d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{7/2}\Big)$$

- **Problem 241: Result unnecessarily involves higher level functions.**

$$\int\frac{(e\,\mathrm{Sin}[c+d\,x])^{9/2}}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 1070 leaves, 35 steps):

$$-\frac{7\,b^3\,(a^2-b^2)^{3/4}\,e^{9/2}\,\mathrm{ArcTan}\Big[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\Big]}{2\,a^{13/2}\,d}+\frac{2\,b\,(a^2-b^2)^{7/4}\,e^{9/2}\,\mathrm{ArcTan}\Big[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\Big]}{a^{13/2}\,d}+\frac{7\,b^3\,(a^2-b^2)^{3/4}\,e^{9/2}\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\Big]}{2\,a^{13/2}\,d}-$$

$$\frac{2\,b\,(a^2-b^2)^{7/4}\,e^{9/2}\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\Big]}{a^{13/2}\,d}+\frac{7\,b^4\,(a^2-b^2)\,e^5\,\mathrm{EllipticPi}\Big[\frac{2\,a}{a-\sqrt{a^2-b^2}},\,\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{\mathrm{Sin}[c+d\,x]}}{2\,a^7\,\Big(a-\sqrt{a^2-b^2}\Big)\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}-$$

$$\frac{2\,b^2\,(a^2-b^2)^2\,e^5\,\mathrm{EllipticPi}\Big[\frac{2\,a}{a-\sqrt{a^2-b^2}},\,\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{\mathrm{Sin}[c+d\,x]}}{a^7\,\Big(a-\sqrt{a^2-b^2}\Big)\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+$$

$$\frac{7\,b^4\,(a^2-b^2)\,e^5\,\mathrm{EllipticPi}\Big[\frac{2\,a}{a+\sqrt{a^2-b^2}},\,\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{\mathrm{Sin}[c+d\,x]}}{2\,a^7\,\Big(a+\sqrt{a^2-b^2}\Big)\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}-$$

$$\frac{2\,b^2\,(a^2-b^2)^2\,e^5\,\mathrm{EllipticPi}\Big[\frac{2\,a}{a+\sqrt{a^2-b^2}},\,\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{\mathrm{Sin}[c+d\,x]}}{a^7\,\Big(a+\sqrt{a^2-b^2}\Big)\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+\frac{14\,e^4\,\mathrm{EllipticE}\Big[\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{15\,a^2\,d\,\sqrt{\mathrm{Sin}[c+d\,x]}}-$$

$$\frac{7\,b^2\,(3\,a^2-5\,b^2)\,e^4\,\mathrm{EllipticE}\Big[\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{5\,a^6\,d\,\sqrt{\mathrm{Sin}[c+d\,x]}}-\frac{4\,b^2\,(8\,a^2-5\,b^2)\,e^4\,\mathrm{EllipticE}\Big[\frac{1}{2}\,(c-\frac{\pi}{2}+d\,x),\,2\Big]\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{5\,a^6\,d\,\sqrt{\mathrm{Sin}[c+d\,x]}}-$$

$$\frac{14\,e^3\,\mathrm{Cos}[c+d\,x]\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}{45\,a^2\,d}-\frac{7\,b^2\,e^3\,(5\,b-3\,a\,\mathrm{Cos}[c+d\,x])\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}{15\,a^5\,d}+$$

$$\frac{4\,b\,e^3\,\Big(5\,(a^2-b^2)+3\,a\,b\,\mathrm{Cos}[c+d\,x]\Big)\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}{15\,a^5\,d}+\frac{4\,b\,e\,(e\,\mathrm{Sin}[c+d\,x])^{7/2}}{7\,a^3\,d}-\frac{2\,e\,\mathrm{Cos}[c+d\,x]\,(e\,\mathrm{Sin}[c+d\,x])^{7/2}}{9\,a^2\,d}+\frac{b^2\,e\,(e\,\mathrm{Sin}[c+d\,x])^{7/2}}{a^3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])}$$

Result (type 6, 1368 leaves):

$$\frac{1}{30\, a^5\, d\, (a+b\,\text{Sec}[c+d\,x])^2\, \text{Sin}[c+d\,x]^{9/2}} (b+a\,\text{Cos}[c+d\,x])^2\, \text{Sec}[c+d\,x]^2\, (e\,\text{Sin}[c+d\,x])^{9/2}$$

$$\left(\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Sin}[c+d\,x]^2\right)}\, 2\left(14\,a^4-159\,a^2\,b^2+165\,b^4\right) \text{Cos}[c+d\,x]^2 \left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\, a^{3/2}\left(-a^2+b^2\right)^{1/4}} b\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$

$$\left.\left.\left.\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]-\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]\right)-$$

$$\left(7\,a\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\text{Sin}[c+d\,x]^{3/2}\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\Big/\left(3\left(7\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{12\,(b+a\,\text{Cos}[c+d\,x])\sqrt{1-\text{Sin}[c+d\,x]^2}}\left(-46\,a^3\,b+66\,a\,b^3\right)\text{Cos}[c+d\,x]\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)$$

$$\left(\frac{1}{\sqrt{a}\left(a^2-b^2\right)^{1/4}}(3+3\,i)\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]+\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\text{Sin}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d\,x]^2}\left(7\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)+$$

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^2}(b+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c+d\,x]^4\,\text{Sec}[c+d\,x]^2\,(e\,\text{Sin}[c+d\,x])^{9/2}$$

$$\left(-\frac{b\left(-37\,a^2+56\,b^2\right)\text{Sin}[c+d\,x]}{21\,a^5}+\right.$$

$$\frac{a^2 b^2 \text{Sin}[c+d x]-b^4 \text{Sin}[c+d x]}{a^5 (b+a \text{Cos}[c+d x])}-$$
$$\frac{\left(19 a^2-54 b^2\right) \text{Sin}[2 (c+d x)]}{90 a^4}-$$
$$\frac{b \text{Sin}[3 (c+d x)]}{7 a^3}+$$
$$\left.\frac{\text{Sin}[4 (c+d x)]}{36 a^2}\right)$$

- **Problem 242: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(e \text{Sin}[c+d x])^{7/2}}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 4, 1101 leaves, 35 steps) :

$$\frac{5 b^3 \left(a^2-b^2\right)^{1/4} e^{7/2} \text{ArcTan}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{2 a^{11/2} d}-\frac{2 b \left(a^2-b^2\right)^{5/4} e^{7/2} \text{ArcTan}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{a^{11/2} d}+$$

$$\frac{5 b^3 \left(a^2-b^2\right)^{1/4} e^{7/2} \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{2 a^{11/2} d}-\frac{2 b \left(a^2-b^2\right)^{5/4} e^{7/2} \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{a^{11/2} d}+$$

$$\frac{10 e^4 \text{EllipticF}\left[\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{21 a^2 d \sqrt{e \text{Sin}[c+d x]}}-\frac{5 b^2 \left(a^2-3 b^2\right) e^4 \text{EllipticF}\left[\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{3 a^6 d \sqrt{e \text{Sin}[c+d x]}}-$$

$$\frac{4 b^2 \left(4 a^2-3 b^2\right) e^4 \text{EllipticF}\left[\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{3 a^6 d \sqrt{e \text{Sin}[c+d x]}}-\frac{5 b^4 \left(a^2-b^2\right) e^4 \text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}},\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{2 a^6 \left(a^2-b^2-a \sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}+$$

$$\frac{2 b^2 \left(a^2-b^2\right)^2 e^4 \text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}},\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{a^6 \left(a^2-b^2-a \sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}-$$

$$\frac{5 b^4 \left(a^2-b^2\right) e^4 \text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}},\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{2 a^6 \left(a^2-b^2+a \sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}+$$

$$\frac{2 b^2 \left(a^2-b^2\right)^2 e^4 \text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}},\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right),2\right] \sqrt{\text{Sin}[c+d x]}}{a^6 \left(a^2-b^2+a \sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}-\frac{10 e^3 \text{Cos}[c+d x] \sqrt{e \text{Sin}[c+d x]}}{21 a^2 d}-$$

$$\frac{5 b^2 e^3 (3 b-a \text{Cos}[c+d x]) \sqrt{e \text{Sin}[c+d x]}}{3 a^5 d}+\frac{4 b e^3 \left(3 \left(a^2-b^2\right)+a b \text{Cos}[c+d x]\right) \sqrt{e \text{Sin}[c+d x]}}{3 a^5 d}+$$

$$\frac{4 b e (e \text{Sin}[c+d x])^{5/2}}{5 a^3 d}-\frac{2 e \text{Cos}[c+d x] (e \text{Sin}[c+d x])^{5/2}}{7 a^2 d}+\frac{b^2 e (e \text{Sin}[c+d x])^{5/2}}{a^3 d (b+a \text{Cos}[c+d x])}$$

Result (type 6, 2295 leaves) :

$$\frac{1}{d (a+b \text{Sec}[c+d x])^2}(b+a \text{Cos}[c+d x])^2 \left(-\frac{\left(23 a^2-84 b^2\right) \text{Cos}[c+d x]}{42 a^4}-\frac{b^2 \left(-a^2+b^2\right)}{a^5 (b+a \text{Cos}[c+d x])}-\frac{2 b \text{Cos}[2 (c+d x)]}{5 a^3}+\frac{\text{Cos}[3 (c+d x)]}{14 a^2}\right)$$

$$\text{Csc}[c+d x]^3 \text{Sec}[c+d x]^2 (e \text{Sin}[c+d x])^{7/2}+\frac{1}{210 a^5 d (a+b \text{Sec}[c+d x])^2 \text{Sin}[c+d x]^{7/2}}(b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2$$

$$(e\,\mathrm{Sin}[c+d\,x])^{7/2}\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\left(1-\mathrm{Sin}[c+d\,x]^2\right)}2\left(50\,a^4-273\,a^2\,b^2+105\,b^4\right)\mathrm{Cos}[c+d\,x]^2\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\sqrt{a}\left(-a^2+b^2\right)^{3/4}}b\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$

$$\left.\left.\sqrt{2}\sqrt{a}\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\sqrt{a}\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$

$$\left(5\,a\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\mathrm{Sin}[c+d\,x]}\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(\left(5\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\mathrm{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}2\left(-139\,a^3\,b+210\,a\,b^3\right)\mathrm{Cos}[c+d\,x]\left(b+a\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)$$

$$\left(-\frac{1}{\left(a^2-b^2\right)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(5\,b\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\mathrm{Sin}[c+d\,x]}\right)\Big/\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\left(5\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\left(1-2\,\mathrm{Sin}[c+d\,x]^2\right)\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\left(231\,a^3\,b-420\,a\,b^3\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Cos}[2\,(c+d\,x)]$$

$$\left(b+a\sqrt{1-\text{Sin}[c+d x]^2}\right)\left(\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\left(a^2-2 b^2\right)\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}-\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\left(a^2-2 b^2\right)\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}+\right.$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)\left(a^2-2 b^2\right)\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\, a\,\text{Sin}[c+d x]\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}-$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)\left(a^2-2 b^2\right)\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Sin}[c+d x]}+i\, a\,\text{Sin}[c+d x]\right]}{a^{3/2}\left(a^2-b^2\right)^{3/4}}+\frac{4\sqrt{\text{Sin}[c+d x]}}{a}+$$

$$\left(10 b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d x]^2}\left(5\left(a^2-b^2\right)\text{AppellF1}\left[\right.\right.\right.$$

$$\left.\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2 a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)+$$

$$\left(36 b\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\text{Sin}[c+d x]^{5/2}\right)\Big/\left(5\sqrt{1-\text{Sin}[c+d x]^2}\left(9\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+2\left(2 a^2\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\right)\right)$$

- **Problem 243: Result unnecessarily involves higher level functions.**

$$\int\frac{(e\,\text{Sin}[c+d x])^{5/2}}{(a+b\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 850 leaves, 32 steps) :

$$-\frac{3 b^3 e^{5/2} \text{ArcTan}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{2 a^{9/2} \left(a^2-b^2\right)^{1/4} d}+\frac{2 b \left(a^2-b^2\right)^{3/4} e^{5/2} \text{ArcTan}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{a^{9/2} d}+\frac{3 b^3 e^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{2 a^{9/2} \left(a^2-b^2\right)^{1/4} d}-\frac{2 b \left(a^2-b^2\right)^{3/4} e^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{e \text{Sin}[c+d x]}}{\left(a^2-b^2\right)^{1/4} \sqrt{e}}\right]}{a^{9/2} d}+\frac{3 b^4 e^3 \text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}}, \frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{2 a^5 \left(a-\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}-\frac{2 b^2 \left(a^2-b^2\right) e^3 \text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}}, \frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{a^5 \left(a-\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}+\frac{3 b^4 e^3 \text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}}, \frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{2 a^5 \left(a+\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}-\frac{2 b^2 \left(a^2-b^2\right) e^3 \text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}}, \frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{a^5 \left(a+\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}}+\frac{6 e^2 \text{EllipticE}\left[\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{e \text{Sin}[c+d x]}}{5 a^2 d \sqrt{\text{Sin}[c+d x]}}-\frac{7 b^2 e^2 \text{EllipticE}\left[\frac{1}{2} \left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{e \text{Sin}[c+d x]}}{a^4 d \sqrt{\text{Sin}[c+d x]}}+\frac{4 b e (e \text{Sin}[c+d x])^{3/2}}{3 a^3 d}-\frac{2 e \text{Cos}[c+d x] (e \text{Sin}[c+d x])^{3/2}}{5 a^2 d}+\frac{b^2 e (e \text{Sin}[c+d x])^{3/2}}{a^3 d (b+a \text{Cos}[c+d x])}$$

Result (type 6, 1280 leaves):

$$-\frac{1}{10 a^3 d (a+b \text{Sec}[c+d x])^2 \text{Sin}[c+d x]^{5/2}} (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2 (e \text{Sin}[c+d x])^{5/2} \left(\frac{1}{(b+a \text{Cos}[c+d x]) \left(1-\text{Sin}[c+d x]^2\right)} 2 \left(-6 a^2+35 b^2\right) \text{Cos}[c+d x]^2 \left(b+a \sqrt{1-\text{Sin}[c+d x]^2}\right) \left(\frac{1}{4 \sqrt{2} a^{3/2} \left(-a^2+b^2\right)^{1/4}} b \left(-2 \text{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{a} \sqrt{\text{Sin}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2 \text{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{a} \sqrt{\text{Sin}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2} \sqrt{a} \left(-a^2+b^2\right)^{1/4} \sqrt{\text{Sin}[c+d x]}+a \text{Sin}[c+d x]\right]-\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2} \sqrt{a} \left(-a^2+b^2\right)^{1/4} \sqrt{\text{Sin}[c+d x]}+a \text{Sin}[c+d x]\right]\right)-\left(7 a \left(a^2-b^2\right) \text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d x]^2,\frac{a^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right] \text{Sin}[c+d x]^{3/2} \sqrt{1-\text{Sin}[c+d x]^2}\right) \Big/ \left(3 \left(7 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\text{Sin}[c+d x]^2,\frac{a^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right]+2 \left(2 a^2 \text{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\text{Sin}[c+d x]^2,\frac{a^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\text{Sin}[c+d x]^2,\frac{a^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right]\right) \text{Sin}[c+d x]^2\right) \left(b^2+a^2 \left(-1+\text{Sin}[c+d x]^2\right)\right)\right)\right)+$$

$$\frac{1}{6\,(b+a\,\mathrm{Cos}[c+d\,x])\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\,7\,a\,b\,\mathrm{Cos}[c+d\,x]\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\left(\frac{1}{\sqrt{a}\,\left(a^2-b^2\right)^{1/4}}\right.$$

$$(3+3\,i)\,\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{a}\right.\right.$$

$$\left.\left.\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\,\left(7\,\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\,\left(b^2+a^2\,\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Csc}[c+d\,x]^2\,\mathrm{Sec}[c+d\,x]^2\,(e\,\mathrm{Sin}[c+d\,x])^{5/2}$$

$$\left(\frac{4\,b\,\mathrm{Sin}[c+d\,x]}{3\,a^3}+\frac{b^2\,\mathrm{Sin}[c+d\,x]}{a^3\,(b+a\,\mathrm{Cos}[c+d\,x])}-\frac{\mathrm{Sin}[2\,(c+d\,x)]}{5\,a^2}\right)$$

- **Problem 244: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\mathrm{Sin}[c+d\,x])^{3/2}}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 882 leaves, 32 steps):

$$\frac{b^3 e^{3/2} \text{ArcTan}\left[\frac{\sqrt{a}\sqrt{e \text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{2 a^{7/2} (a^2-b^2)^{3/4} d} - \frac{2 b (a^2-b^2)^{1/4} e^{3/2} \text{ArcTan}\left[\frac{\sqrt{a}\sqrt{e \text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{a^{7/2} d} + \frac{b^3 e^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{e \text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{2 a^{7/2} (a^2-b^2)^{3/4} d} -$$

$$\frac{2 b (a^2-b^2)^{1/4} e^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{e \text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{a^{7/2} d} + \frac{2 e^2 \text{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{3 a^2 d \sqrt{e \text{Sin}[c+d x]}} -$$

$$\frac{5 b^2 e^2 \text{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{a^4 d \sqrt{e \text{Sin}[c+d x]}} - \frac{b^4 e^2 \text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}}, \frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{2 a^4 \left(a^2-b^2-a\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}} +$$

$$\frac{2 b^2 (a^2-b^2) e^2 \text{EllipticPi}\left[\frac{2 a}{a-\sqrt{a^2-b^2}}, \frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{a^4 \left(a^2-b^2-a\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}} -$$

$$\frac{b^4 e^2 \text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}}, \frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{2 a^4 \left(a^2-b^2+a\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}} + \frac{2 b^2 (a^2-b^2) e^2 \text{EllipticPi}\left[\frac{2 a}{a+\sqrt{a^2-b^2}}, \frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{a^4 \left(a^2-b^2+a\sqrt{a^2-b^2}\right) d \sqrt{e \text{Sin}[c+d x]}} +$$

$$\frac{4 b e \sqrt{e \text{Sin}[c+d x]}}{a^3 d} - \frac{2 e \text{Cos}[c+d x] \sqrt{e \text{Sin}[c+d x]}}{3 a^2 d} + \frac{b^2 e \sqrt{e \text{Sin}[c+d x]}}{a^3 d (b+a \text{Cos}[c+d x])}$$

Result (type 6, 2212 leaves) :

$$\frac{(b+a \text{Cos}[c+d x])^2 \left(-\frac{2 \text{Cos}[c+d x]}{3 a^2}+\frac{b^2}{a^3 (b+a \text{Cos}[c+d x])}\right) \text{Csc}[c+d x] \text{Sec}[c+d x]^2 (e \text{Sin}[c+d x])^{3/2}}{d (a+b \text{Sec}[c+d x])^2} -$$

$$\frac{1}{6 a^3 d (a+b \text{Sec}[c+d x])^2 \text{Sin}[c+d x]^{3/2}} (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2 (e \text{Sin}[c+d x])^{3/2}$$

$$\left(\frac{1}{(b+a \text{Cos}[c+d x]) (1-\text{Sin}[c+d x]^2)} 2 (-2 a^2+3 b^2) \text{Cos}[c+d x]^2 \left(b+a\sqrt{1-\text{Sin}[c+d x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\sqrt{a}(-a^2+b^2)^{3/4}} b \left(-2 \text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{(-a^2+b^2)^{1/4}}\right] + 2 \text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{a}\sqrt{\text{Sin}[c+d x]}}{(-a^2+b^2)^{1/4}}\right] - \text{Log}\left[\sqrt{-a^2+b^2} -\right.\right.\right.$$

$$\left.\left.\sqrt{2}\sqrt{a}(-a^2+b^2)^{1/4}\sqrt{\text{Sin}[c+d x]} + a \text{Sin}[c+d x]\right] + \text{Log}\left[\sqrt{-a^2+b^2} + \sqrt{2}\sqrt{a}(-a^2+b^2)^{1/4}\sqrt{\text{Sin}[c+d x]} + a \text{Sin}[c+d x]\right]\right) -$$

$$\left(5\,a\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\,\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\Big/$$

$$\left(\left(5\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+(-a^2+b^2)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\,(-1+\text{Sin}[c+d\,x]^2)\right)\right)\right)+\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,\sqrt{1-\text{Sin}[c+d\,x]^2}}\,8\,a\,b\,\text{Cos}[c+d\,x]\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)$$

$$\left(-\frac{1}{(a^2-b^2)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]\right)+\right.$$

$$\left(5\,b\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d\,x]^2}\left(5\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+(a^2-b^2)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\,(-1+\text{Sin}[c+d\,x]^2)\right)\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(1-2\,\text{Sin}[c+d\,x]^2)\,\sqrt{1-\text{Sin}[c+d\,x]^2}}\,6\,a\,b\,\text{Cos}[c+d\,x]\,\text{Cos}[2\,(c+d\,x)]\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)$$

$$\left(\frac{\left(\frac{1}{2}-\frac{i}{2}\right)(a^2-2\,b^2)\,\text{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]}{a^{3/2}\,(a^2-b^2)^{3/4}}-\frac{\left(\frac{1}{2}-\frac{i}{2}\right)(a^2-2\,b^2)\,\text{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]}{a^{3/2}\,(a^2-b^2)^{3/4}}+\right.$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)(a^2-2\,b^2)\,\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]}{a^{3/2}\,(a^2-b^2)^{3/4}}-$$

$$\frac{\left(\frac{1}{4}-\frac{i}{4}\right)(a^2-2\,b^2)\,\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]}{a^{3/2}\,(a^2-b^2)^{3/4}}+\frac{4\sqrt{\text{Sin}[c+d\,x]}}{a}+$$

$$\left(10\,b\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d\,x]^2}\left(5\,(a^2-b^2)\,\text{AppellF1}\right[\right.\right.$$

$$\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]+2\Big(2a^2\,\text{AppellF1}\Big[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]+$$

$$(a^2-b^2)\,\text{AppellF1}\Big[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Sin}[c+d x]^2\Big)\,\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\Big)+$$

$$\Big(36\,b\,(-a^2+b^2)\,\text{AppellF1}\Big[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]\,\text{Sin}[c+d x]^{5/2}\Big)\Big/\Big(5\sqrt{1-\text{Sin}[c+d x]^2}\,\Big(9\,(a^2-b^2)$$

$$\text{AppellF1}\Big[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]+2\Big(2a^2\,\text{AppellF1}\Big[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]+$$

$$(a^2-b^2)\,\text{AppellF1}\Big[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},\text{Sin}[c+d x]^2,\frac{a^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Sin}[c+d x]^2\Big)\,\left(b^2+a^2\left(-1+\text{Sin}[c+d x]^2\right)\right)\Big)\Big)$$

- **Problem 245: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{e\,\text{Sin}[c+d x]}}{(a+b\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 809 leaves, 27 steps):

$$\frac{b^3\sqrt{e}\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\Big]}{2a^{5/2}(a^2-b^2)^{5/4}d}+\frac{2b\sqrt{e}\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\Big]}{a^{5/2}(a^2-b^2)^{1/4}d}-\frac{b^3\sqrt{e}\,\text{ArcTanh}\Big[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\Big]}{2a^{5/2}(a^2-b^2)^{5/4}d}-\frac{2b\sqrt{e}\,\text{ArcTanh}\Big[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\Big]}{a^{5/2}(a^2-b^2)^{1/4}d}-$$

$$\frac{2b^2 e\,\text{EllipticPi}\Big[\frac{2a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\Big]\sqrt{\text{Sin}[c+d x]}}{a^3\left(a-\sqrt{a^2-b^2}\right)d\sqrt{e\,\text{Sin}[c+d x]}}-\frac{b^4 e\,\text{EllipticPi}\Big[\frac{2a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\Big]\sqrt{\text{Sin}[c+d x]}}{2a^3(a^2-b^2)\left(a-\sqrt{a^2-b^2}\right)d\sqrt{e\,\text{Sin}[c+d x]}}-$$

$$\frac{2b^2 e\,\text{EllipticPi}\Big[\frac{2a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\Big]\sqrt{\text{Sin}[c+d x]}}{a^3\left(a+\sqrt{a^2-b^2}\right)d\sqrt{e\,\text{Sin}[c+d x]}}-\frac{b^4 e\,\text{EllipticPi}\Big[\frac{2a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\Big]\sqrt{\text{Sin}[c+d x]}}{2a^3(a^2-b^2)\left(a+\sqrt{a^2-b^2}\right)d\sqrt{e\,\text{Sin}[c+d x]}}+$$

$$\frac{2\,\text{EllipticE}\Big[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\Big]\sqrt{e\,\text{Sin}[c+d x]}}{a^2 d\sqrt{\text{Sin}[c+d x]}}-\frac{b^2\,\text{EllipticE}\Big[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right),2\Big]\sqrt{e\,\text{Sin}[c+d x]}}{a^2(a^2-b^2)d\sqrt{\text{Sin}[c+d x]}}+\frac{b^2(e\,\text{Sin}[c+d x])^{3/2}}{a(a^2-b^2)d e\,(b+a\,\text{Cos}[c+d x])}$$

Result (type 6, 1248 leaves):

$$\frac{1}{2\,a\,(-a+b)\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,\sqrt{\mathrm{Sin}[c+d\,x]}}$$

$$(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^2\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}\,\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Sin}[c+d\,x]^2\right)}\,2\,\left(-2\,a^2+3\,b^2\right)\,\mathrm{Cos}[c+d\,x]^2\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\,\sqrt{2}\,a^{3/2}\,\left(-a^2+b^2\right)^{1/4}}\,b\,\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$

$$\left.\left.\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\,\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\,\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$

$$\left(7\,a\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\,\mathrm{Sin}[c+d\,x]^{3/2}\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(3\,\left(7\,\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\mathrm{Sin}[c+d\,x]^2\right)\,\left(b^2+a^2\,\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{6\,(b+a\,\mathrm{Cos}[c+d\,x])\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\,a\,b\,\mathrm{Cos}[c+d\,x]\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\,\left(\frac{1}{\sqrt{a}\,\left(a^2-b^2\right)^{1/4}}\right.$$

$$(3+3\,i)\,\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{a}\right.\right.$$

$$\left.\left.\left(a^2-b^2\right)^{1/4}\,\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\,\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\,\mathrm{Sin}[c+d\,x]^{3/2}\right)\Big/$$

$$\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\,\left(7\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\right.\right.\right.\right.$$

$$\left.\left.\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\mathrm{Sin}[c+d\,x]^2\right)$$

$$\left.\left.\left.\left(b^2+a^2\,\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)+\frac{b^2\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}\,\mathrm{Tan}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}$$

Problem 246: Result unnecessarily involves higher level functions.

$$\int \frac{1}{(a+b\,\mathrm{Sec}[c+d\,x])^2\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}\,dx$$

Optimal (type 4, 838 leaves, 27 steps):

$$-\frac{3\,b^3\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{2\,a^{3/2}\,(a^2-b^2)^{7/4}\,d\,\sqrt{e}}-\frac{2\,b\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{a^{3/2}\,(a^2-b^2)^{3/4}\,d\,\sqrt{e}}-$$
$$\frac{3\,b^3\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{2\,a^{3/2}\,(a^2-b^2)^{7/4}\,d\,\sqrt{e}}-\frac{2\,b\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{a^{3/2}\,(a^2-b^2)^{3/4}\,d\,\sqrt{e}}+\frac{2\,\mathrm{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a^2\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+$$
$$\frac{b^2\,\mathrm{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a^2\,(a^2-b^2)\,d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+\frac{2\,b^2\,\mathrm{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a^2\left(a^2-b^2-a\sqrt{a^2-b^2}\right)d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+$$
$$\frac{3\,b^4\,\mathrm{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{2\,a^2\,(a^2-b^2)\left(a^2-b^2-a\sqrt{a^2-b^2}\right)d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+\frac{2\,b^2\,\mathrm{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{a^2\left(a^2-b^2+a\sqrt{a^2-b^2}\right)d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+$$
$$\frac{3\,b^4\,\mathrm{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\mathrm{Sin}[c+d\,x]}}{2\,a^2\,(a^2-b^2)\left(a^2-b^2+a\sqrt{a^2-b^2}\right)d\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}+\frac{b^2\,\sqrt{e\,\mathrm{Sin}[c+d\,x]}}{a\,(a^2-b^2)\,d\,e\,(b+a\,\mathrm{Cos}[c+d\,x])}$$

Result (type 6, 1246 leaves):

$$\frac{1}{2\,a\,(-a+b)\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}$$

$$(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\,\sqrt{\text{Sin}[c+d\,x]}\,\left(\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Sin}[c+d\,x]^2\right)}\,2\,\left(-2\,a^2+b^2\right)\,\text{Cos}[c+d\,x]^2\,\left(b+a\,\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\,\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{3/4}}b\,\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]-\text{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$

$$\left.\left.\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\,\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]+\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\,\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]\right)-$$

$$\left(5\,a\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\,\sqrt{\text{Sin}[c+d\,x]}\,\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\Big/$$

$$\left(\left(5\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\right.\right.\right.\right.$$

$$\left.\left.\left.\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\text{Sin}[c+d\,x]^2\right)$$

$$\left.\left.\left(b^2+a^2\,\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)+\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,\sqrt{1-\text{Sin}[c+d\,x]^2}}\,4\,a\,b\,\text{Cos}[c+d\,x]\,\left(b+a\,\sqrt{1-\text{Sin}[c+d\,x]^2}\right)$$

$$\left(-\frac{1}{\left(a^2-b^2\right)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\,\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\,\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\,\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]\right)+$$

$$\left(5\,b\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\,\sqrt{\text{Sin}[c+d\,x]}\right)\Big/$$

$$\left(\sqrt{1-\text{Sin}[c+d\,x]^2}\,\left(5\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$2\,\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\right.\right.$$

$$\left.\left.\left.\left.\left.\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\text{Sin}[c+d\,x]^2\right)\,\left(b^2+a^2\,\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)+\frac{b^2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}$$

Problem 247: Result unnecessarily involves higher level functions.

$$\int \frac{1}{(a+b\,\text{Sec}[c+d\,x])^2\,(e\,\text{Sin}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 1054 leaves, 33 steps):

$$\frac{5\,b^3\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{2\,\sqrt{a}\,(a^2-b^2)^{9/4}\,d\,e^{3/2}}+\frac{2\,b\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{\sqrt{a}\,(a^2-b^2)^{5/4}\,d\,e^{3/2}}-\frac{5\,b^3\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{2\,\sqrt{a}\,(a^2-b^2)^{9/4}\,d\,e^{3/2}}-\frac{2\,b\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\,\sqrt{e}}\right]}{\sqrt{a}\,(a^2-b^2)^{5/4}\,d\,e^{3/2}}-$$

$$\frac{2\,\text{Cos}[c+d\,x]}{a^2\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{b^2}{a\,(a^2-b^2)\,d\,e\,(b+a\,\text{Cos}[c+d\,x])\,\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{4\,b\,(a-b\,\text{Cos}[c+d\,x])}{a^2\,(a^2-b^2)\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}+$$

$$\frac{b^2\,\left(5\,a\,b-(3\,a^2+2\,b^2)\,\text{Cos}[c+d\,x]\right)}{a^2\,(a^2-b^2)^2\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{5\,b^4\,\text{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\,\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{\text{Sin}[c+d\,x]}}{2\,a\,(a^2-b^2)^2\,\left(a-\sqrt{a^2-b^2}\right)\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}-$$

$$\frac{2\,b^2\,\text{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\,\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{\text{Sin}[c+d\,x]}}{a\,(a^2-b^2)\,\left(a-\sqrt{a^2-b^2}\right)\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{5\,b^4\,\text{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\,\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{\text{Sin}[c+d\,x]}}{2\,a\,(a^2-b^2)^2\,\left(a+\sqrt{a^2-b^2}\right)\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}-$$

$$\frac{2\,b^2\,\text{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\,\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{\text{Sin}[c+d\,x]}}{a\,(a^2-b^2)\,\left(a+\sqrt{a^2-b^2}\right)\,d\,e\,\sqrt{e\,\text{Sin}[c+d\,x]}}-\frac{2\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{a^2\,d\,e^2\,\sqrt{\text{Sin}[c+d\,x]}}-$$

$$\frac{4\,b^2\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{a^2\,(a^2-b^2)\,d\,e^2\,\sqrt{\text{Sin}[c+d\,x]}}-\frac{b^2\,(3\,a^2+2\,b^2)\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]\sqrt{e\,\text{Sin}[c+d\,x]}}{a^2\,(a^2-b^2)^2\,d\,e^2\,\sqrt{\text{Sin}[c+d\,x]}}$$

Result (type 6, 1316 leaves):

$$-\frac{1}{2\,(a-b)^2\,(a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}$$

$$(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]^{3/2}\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Sin}[c+d\,x]^2\right)}\,2\,\left(2\,a^3+3\,a\,b^2\right)\,\mathrm{Cos}[c+d\,x]^2\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\,\sqrt{2}\,a^{3/2}\,\left(-a^2+b^2\right)^{1/4}}\,b\,\left(-2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\mathrm{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\right.\right.\right.$$

$$\left.\left.\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]-\mathrm{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+a\,\mathrm{Sin}[c+d\,x]\right]\right)-$$

$$\left(7\,a\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)\Big/\left(3\left(7\,\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},-\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},-\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{12\,(b+a\,\mathrm{Cos}[c+d\,x])\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}}\,\left(6\,a^2\,b+4\,b^3\right)\,\mathrm{Cos}[c+d\,x]\,\left(b+a\,\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\right)$$

$$\left(\frac{1}{\sqrt{a}\,\left(a^2-b^2\right)^{1/4}}\,(3+3\,i)\,\left(2\,\mathrm{ArcTan}\left[1-\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\mathrm{ArcTan}\left[1+\frac{(1+i)\,\sqrt{a}\,\sqrt{\mathrm{Sin}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\mathrm{Log}\left[\sqrt{a^2-b^2}-(1+i)\right.\right.\right.$$

$$\left.\left.\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]+\mathrm{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{a}\,\left(a^2-b^2\right)^{1/4}\sqrt{\mathrm{Sin}[c+d\,x]}+i\,a\,\mathrm{Sin}[c+d\,x]\right]\right)+$$

$$\left(56\,b\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sin}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{1-\mathrm{Sin}[c+d\,x]^2}\,\left(7\,\left(a^2-b^2\right)\right.\right.$$

$$\mathrm{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left.\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},\mathrm{Sin}[c+d\,x]^2,\frac{a^2\,\mathrm{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\mathrm{Sin}[c+d\,x]^2\right)\right)\right)\right)\right)+$$

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])^2\left(-\frac{2\left(-2\,a\,b+a^2\,\mathrm{Cos}[c+d\,x]+b^2\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}[c+d\,x]}{\left(-a^2+b^2\right)^2}+\frac{a\,b^2\,\mathrm{Sin}[c+d\,x]}{\left(-a^2+b^2\right)^2\,(b+a\,\mathrm{Cos}[c+d\,x])}\right)\mathrm{Tan}[c+d\,x]^2}{d\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,(e\,\mathrm{Sin}[c+d\,x])^{3/2}}$$

Problem 248: Result unnecessarily involves higher level functions.

$$\int \frac{1}{(a+b\,\text{Sec}[c+d\,x])^2\,(e\,\text{Sin}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 1089 leaves, 33 steps):

$$-\frac{7\sqrt{a}\,b^3\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{2\,(a^2-b^2)^{11/4}\,d\,e^{5/2}}-\frac{2\sqrt{a}\,b\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{(a^2-b^2)^{7/4}\,d\,e^{5/2}}-\frac{7\sqrt{a}\,b^3\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{2\,(a^2-b^2)^{11/4}\,d\,e^{5/2}}-$$

$$\frac{2\sqrt{a}\,b\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{e\,\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}\sqrt{e}}\right]}{(a^2-b^2)^{7/4}\,d\,e^{5/2}}-\frac{2\,\text{Cos}[c+d\,x]}{3\,a^2\,d\,e\,(e\,\text{Sin}[c+d\,x])^{3/2}}+\frac{b^2}{a\,(a^2-b^2)\,d\,e\,(b+a\,\text{Cos}[c+d\,x])\,(e\,\text{Sin}[c+d\,x])^{3/2}}+$$

$$\frac{4\,b\,(a-b\,\text{Cos}[c+d\,x])}{3\,a^2\,(a^2-b^2)\,d\,e\,(e\,\text{Sin}[c+d\,x])^{3/2}}+\frac{b^2\,\left(7\,a\,b-(5\,a^2+2\,b^2)\,\text{Cos}[c+d\,x]\right)}{3\,a^2\,(a^2-b^2)^2\,d\,e\,(e\,\text{Sin}[c+d\,x])^{3/2}}+\frac{2\,\text{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{3\,a^2\,d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}+$$

$$\frac{4\,b^2\,\text{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{3\,a^2\,(a^2-b^2)\,d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{b^2\,(5\,a^2+2\,b^2)\,\text{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{3\,a^2\,(a^2-b^2)^2\,d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}+$$

$$\frac{7\,b^4\,\text{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{2\,(a^2-b^2)^2\left(a^2-b^2-a\sqrt{a^2-b^2}\right)d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{2\,b^2\,\text{EllipticPi}\left[\frac{2\,a}{a-\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)\left(a^2-b^2-a\sqrt{a^2-b^2}\right)d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}+$$

$$\frac{7\,b^4\,\text{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{2\,(a^2-b^2)^2\left(a^2-b^2+a\sqrt{a^2-b^2}\right)d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}+\frac{2\,b^2\,\text{EllipticPi}\left[\frac{2\,a}{a+\sqrt{a^2-b^2}},\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)\left(a^2-b^2+a\sqrt{a^2-b^2}\right)d\,e^2\,\sqrt{e\,\text{Sin}[c+d\,x]}}$$

Result (type 6, 1320 leaves):

$$-\frac{1}{6\,(a-b)^2\,(a+b)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^2\,(e\,\text{Sin}[c+d\,x])^{5/2}}(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2$$

$$\text{Sin}[c+d\,x]^{5/2}\left(\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Sin}[c+d\,x]^2)}2\,(-2\,a^3-5\,a\,b^2)\,\text{Cos}[c+d\,x]^2\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\,\sqrt{a}\,(-a^2+b^2)^{3/4}}b\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(-a^2+b^2)^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(-a^2+b^2)^{1/4}}\right]-\text{Log}\left[\sqrt{-a^2+b^2}-\sqrt{2}\,\sqrt{a}\right.\right.\right.$$

$$\left.\left.(-a^2+b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]+\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{a}\,(-a^2+b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+a\,\text{Sin}[c+d\,x]\right]\right)-$$

$$\left(5\,a\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\,\sqrt{1-\text{Sin}[c+d\,x]^2}\right)\Big/\left(\left(\left(5\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+(-a^2+b^2)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,\sqrt{1-\text{Sin}[c+d\,x]^2}}\,2\,(10\,a^2\,b+4\,b^3)\,\text{Cos}[c+d\,x]\left(b+a\sqrt{1-\text{Sin}[c+d\,x]^2}\right)$$

$$\left(-\frac{1}{(a^2-b^2)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right)\sqrt{a}\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\sqrt{a}\,\sqrt{\text{Sin}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{a}\,(a^2-b^2)^{1/4}\sqrt{\text{Sin}[c+d\,x]}+i\,a\,\text{Sin}[c+d\,x]\right]\right)+$$

$$\left(5\,b\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Sin}[c+d\,x]}\right)\Big/\left(\sqrt{1-\text{Sin}[c+d\,x]^2}\left(5\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,a^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]+(a^2-b^2)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Sin}[c+d\,x]^2,\frac{a^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Sin}[c+d\,x]^2\right)\left(b^2+a^2\left(-1+\text{Sin}[c+d\,x]^2\right)\right)\right)\right)+$$

$$\left((b+a\,\text{Cos}[c+d\,x])^2\left(\frac{a\,b^2}{(-a^2+b^2)^2\,(b+a\,\text{Cos}[c+d\,x])}-\frac{2\,(-2\,a\,b+a^2\,\text{Cos}[c+d\,x]+b^2\,\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]^2}{3\,(-a^2+b^2)^2}\right)\text{Sin}[c+d\,x]\,\text{Tan}[c+d\,x]^2\right)\Big/\left(d\,(a+b\,\text{Sec}[c+d\,x])^2\,(e\,\text{Sin}[c+d\,x])^{5/2}\right)$$

- **Problem 249: Unable to integrate problem.**

$$\int\sqrt{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 125 leaves, 1 step) :

$$-\frac{1}{\sqrt{a+b}\ f}$$

$$2\,\text{Cot}[e+f\,x]\ \text{EllipticPi}\left[\frac{a}{a+b},\ \text{ArcSin}\left[\frac{\sqrt{a+b}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}}\right],\ \frac{a-b}{a+b}\right]\sqrt{-\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b\,\text{Sec}[e+f\,x]}}\ \sqrt{\frac{b\,(1+\text{Sec}[e+f\,x])}{a+b\,\text{Sec}[e+f\,x]}}\ (a+b\,\text{Sec}[e+f\,x])$$

Result (type 8, 16 leaves) :

$$\int\sqrt{a+b\,\text{Sec}[e+f\,x]}\ dx$$

- **Problem 251: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int(a+b\,\text{Sec}[e+f\,x])^{3/2}\,dx$$

Optimal (type 4, 309 leaves, 5 steps) :

$$-\frac{1}{f}2\,(a-b)\,\sqrt{a+b}\ \text{Cot}[e+f\,x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\ \frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}+\frac{1}{f}$$

$$2\,(2\,a-b)\,\sqrt{a+b}\ \text{Cot}[e+f\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\ \frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}-$$

$$\frac{2\,a\,\sqrt{a+b}\ \text{Cot}[e+f\,x]\ \text{EllipticPi}\left[\frac{a+b}{a},\ \text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\ \frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}}{f}$$

Result (type 4, 882 leaves) :

$$\frac{2\,b\,\text{Cos}[e+f\,x]\,(a+b\,\text{Sec}[e+f\,x])^{3/2}\,\text{Sin}[e+f\,x]}{f\,(b+a\,\text{Cos}[e+f\,x])}+$$

$$\Bigg(2\,(a+b\,\text{Sec}[e+f\,x])^{3/2}\Bigg(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]-2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^3+$$

$$a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^5-b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^5+2\,i\,a^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}+$$

$$2\,i\,a^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}-i\,(a-b)\,b\,\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}-$$

$$i\,(a-b)^2\,\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\sqrt{\frac{-a+b}{a+b}}\,f\,(b+a\,\text{Cos}[e+f\,x])^{3/2}\,\text{Sec}[e+f\,x]^{3/2}\,\sqrt{\frac{1}{1-\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}}\,\Big(-1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}}\Bigg)$$

Problem 253: Unable to integrate problem.

$$\int \frac{1}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}\,dx$$

Optimal (type 4, 106 leaves, 1 step):

$$-\frac{2\sqrt{a+b}\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{a\,f}$$

Result (type 8, 16 leaves):

$$\int \frac{1}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}\,dx$$

Problem 255: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+b\,\mathrm{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 4, 347 leaves, 6 steps):

$$\frac{2\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{a\sqrt{a+b}\,f}-$$

$$\frac{2\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{a\sqrt{a+b}\,f}-$$

$$\frac{2\sqrt{a+b}\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{a^2\,f}+\frac{2\,b^2\,\mathrm{Tan}[e+f\,x]}{a\,(a^2-b^2)\,f\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 4, 1249 leaves):

$$\frac{(b+a\,\mathrm{Cos}[e+f\,x])^2\,\mathrm{Sec}[e+f\,x]^2\left(\frac{2\,b\,\mathrm{Sin}[e+f\,x]}{a\,(-a^2+b^2)}+\frac{2\,b^2\,\mathrm{Sin}[e+f\,x]}{a\,(a^2-b^2)\,(b+a\,\mathrm{Cos}[e+f\,x])}\right)}{f\,(a+b\,\mathrm{Sec}[e+f\,x])^{3/2}}+$$

$$\Bigg(2\,(b+a\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Sec}[e+f\,x]^{3/2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}}$$

$$\Bigg(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]-2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^3+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^5-$$

$$b^2\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^5-2\,\mathrm{i}\,a^2\,\mathrm{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,+2\,\mathrm{i}\,b^2\,\mathrm{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,-$$

$$2\,\mathrm{i}\,a^2\,\mathrm{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,+2\,\mathrm{i}\,b^2\,\mathrm{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,-$$

$$\mathrm{i}\,(a-b)\,b\,\mathrm{EllipticE}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\Big(1+\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,+\mathrm{i}\,\big(a^2+a\,b-2\,b^2\big)\,\mathrm{EllipticF}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\Big(1+\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\Bigg(a\,\sqrt{\frac{-a+b}{a+b}}\,\big(a^2-b^2\big)\,f\,(a+b\,\mathrm{Sec}[e+f\,x])^{3/2}\,\Big(-1+\mathrm{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\,\sqrt{\frac{1+\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{1-\mathrm{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}}$$

$$\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Bigg)$$

Problem 256: Unable to integrate problem.

$$\int \frac{\text{Csc}[e+f x]^2}{(a+b\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 4, 318 leaves, 6 steps):

$$\frac{4\,a\,\text{Cot}[e+f x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{(a-b)\,(a+b)^{3/2}\,f}-$$

$$\frac{(3\,a-b)\,\text{Cot}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{(a-b)\,(a+b)^{3/2}\,f}-$$

$$\frac{\text{Cot}[e+f x]}{f\,(a+b\,\text{Sec}[e+f x])^{3/2}}+\frac{b^2\,\text{Tan}[e+f x]}{\left(a^2-b^2\right)\,f\,(a+b\,\text{Sec}[e+f x])^{3/2}}+\frac{4\,a\,b^2\,\text{Tan}[e+f x]}{\left(a^2-b^2\right)^2\,f\,\sqrt{a+b\,\text{Sec}[e+f x]}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Csc}[e+f x]^2}{(a+b\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Problem 260: Result more than twice size of optimal antiderivative.

$$\int \frac{(e\,\text{Sin}[c+d x])^m}{a+b\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 6, 232 leaves, 4 steps):

$$-\frac{1}{a^2\,d\,(1-m)}b\,e\,\text{AppellF1}\left[1-m,\frac{1-m}{2},\frac{1-m}{2},2-m,-\frac{a-b}{b+a\,\text{Cos}[c+d x]},\frac{a+b}{b+a\,\text{Cos}[c+d x]}\right]\left(-\frac{a\,(1-\text{Cos}[c+d x])}{b+a\,\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}}$$

$$\left(\frac{a\,(1+\text{Cos}[c+d x])}{b+a\,\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}}(e\,\text{Sin}[c+d x])^{-1+m}+\frac{\text{Cos}[c+d x]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Sin}[c+d x]^2\right]\,(e\,\text{Sin}[c+d x])^{1+m}}{a\,d\,e\,(1+m)\,\sqrt{\text{Cos}[c+d x]^2}}$$

Result (type 6, 3387 leaves):

$$-\Bigg(\Bigg(2\,\text{Sin}[c+d x]^m\,(e\,\text{Sin}[c+d x])^m\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg(-\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^m-$$

$$\left(b\,(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left((b+a\,\text{Cos}[c+d\,x])\left(-(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((-a+b)\,\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+(a+b)\,m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,\right.\right.$$

$$\left.\left.\left.\left.\left.1,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\right)\Big/\left(a\,d\,(1+m)\,(a+b\,\text{Sec}[c+d\,x])\right.$$

$$\left(-\frac{1}{a\,(1+m)}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]^m\left(-\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^m-\right.\right.$$

$$\left(b\,(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left((b+a\,\text{Cos}[c+d\,x])\left(-(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((-a+b)\,\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+(a+b)\,m\right.$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)-\frac{1}{a\,(1+m)}$$

$$2\,m\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]^{-1+m}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^m-\right.$$

$$\left(b\,(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left((b+a\,\text{Cos}[c+d\,x])\left(-(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((-a+b)\,\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.(a+b)\,m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Bigg)\Bigg)\Bigg)-\frac{1}{a(1+m)}$$

$$2\,\text{Sin}[c+d x]^m\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-m\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^m\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left(b(a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left((b+a\,\text{Cos}[c+d x])\left(-(a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((-a+b)\,\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-$$

$$\left(a\,b(a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sin}[c+d x]\right)\Big/$$

$$\left((b+a\,\text{Cos}[c+d x])^2\left(-(a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((-a+b)\,\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-$$

$$\left(b(a+b)(3+m)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{1}{(a+b)(3+m)}(a-b)(1+m)\,\text{AppellF1}\left[1+\frac{1+m}{2},m,2,1+\frac{3+m}{2},\right.\right.\right.$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\ \text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]-\frac{1}{3+m}m\,(1+m)$$

$$\text{AppellF1}\Big[1+\frac{1+m}{2},\ 1+m,\ 1,\ 1+\frac{3+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\ \text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big/$$

$$\Big((b+a\,\text{Cos}[c+d\,x])\ \Big(-(a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ m,\ 1,\ \frac{3+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\ \Big((-a+b)\ \text{AppellF1}\Big[\frac{3+m}{2},\ m,\ 2,\ \frac{5+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+(a+b)\ m\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1+m,\ 1,$$

$$\frac{5+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\Big)\ \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big)-\frac{1}{2}(1+m)\ \text{Csc}\Big[\frac{1}{2}(c+d\,x)\Big]\ \text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]$$

$$\Big(\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^m\ \Big(-\text{Hypergeometric2F1}\Big[\frac{1+m}{2},\ 1+m,\ \frac{3+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]+\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^{-1-m}\Big)+$$

$$\Big(b\ (a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ m,\ 1,\ \frac{3+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\ \text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^2$$

$$\Big(2\ \Big((-a+b)\ \text{AppellF1}\Big[\frac{3+m}{2},\ m,\ 2,\ \frac{5+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+(a+b)\ m$$

$$\text{AppellF1}\Big[\frac{3+m}{2},\ 1+m,\ 1,\ \frac{5+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\Big)\ \text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]-$$

$$(a+b)\ (3+m)\ \Big(\frac{1}{(a+b)\ (3+m)}(a-b)\ (1+m)\ \text{AppellF1}\Big[1+\frac{1+m}{2},\ m,\ 2,\ 1+\frac{3+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\ \text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]-\frac{1}{3+m}m\,(1+m)\ \text{AppellF1}\Big[1+\frac{1+m}{2},\ 1+m,$$

$$1,\ 1+\frac{3+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\ \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\ \text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\ \text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)+$$

$$2\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\ \Big((-a+b)\ \Big(\frac{1}{(a+b)\ (5+m)}2\ (a-b)\ (3+m)\ \text{AppellF1}\Big[1+\frac{3+m}{2},\ m,\ 3,\ 1+\frac{5+m}{2},\ -\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\Bigg]\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{5+m}m\,(3+m)\,\mathrm{AppellF1}\left[1+\frac{3+m}{2},\,1+m,\right.$$

$$\left.2,\,1+\frac{5+m}{2},\,-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)+$$

$$(a+b)\,m\left(\frac{1}{(a+b)\,(5+m)}(a-b)\,(3+m)\,\mathrm{AppellF1}\left[1+\frac{3+m}{2},\,1+m,\,2,\,1+\frac{5+m}{2},\,-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{5+m}(1+m)\,(3+m)\,\mathrm{AppellF1}\left[1+\frac{3+m}{2},\right.$$

$$\left.\left.2+m,\,1,\,1+\frac{5+m}{2},\,-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg((b+a\,\mathrm{Cos}[c+d\,x])\Bigg(-(a+b)\,(3+m)\,\mathrm{AppellF1}\left[\frac{1+m}{2},\,m,\,1,\,\frac{3+m}{2},\,-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+$$

$$2\left((-a+b)\,\mathrm{AppellF1}\left[\frac{3+m}{2},\,m,\,2,\,\frac{5+m}{2},\,-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)\,m\,\mathrm{AppellF1}\left[\frac{3+m}{2},\,1+m,\,1,\,\frac{5+m}{2},\,-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 261: Result more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\mathrm{Sin}[c+d\,x])^m}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 6, 405 leaves, 6 steps) :

$$-\frac{1}{a^3 d (1-m)} 2 b e \text{AppellF1}\left[1-m, \frac{1-m}{2}, \frac{1-m}{2}, 2-m, -\frac{a-b}{b+a\text{Cos}[c+d x]}, \frac{a+b}{b+a\text{Cos}[c+d x]}\right] \left(-\frac{a (1-\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} \left(\frac{a (1+\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} (e\,\text{Sin}[c+d x])^{-1+m} + \left(b^2 e \text{AppellF1}\left[2-m, \frac{1-m}{2}, \frac{1-m}{2}, 3-m, -\frac{a-b}{b+a\text{Cos}[c+d x]}, \frac{a+b}{b+a\text{Cos}[c+d x]}\right] \left(-\frac{a (1-\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} \left(\frac{a (1+\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} (e\,\text{Sin}[c+d x])^{-1+m}\right) \Big/ \left(a^3 d (2-m) (b+a\text{Cos}[c+d x])\right) + \frac{\text{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Sin}[c+d x]^2\right] (e\,\text{Sin}[c+d x])^{1+m}}{a^2 d e (1+m) \sqrt{\text{Cos}[c+d x]^2}}$$

Result (type 6, 9072 leaves) : Display of huge result suppressed !

- **Problem 262: Result more than twice size of optimal antiderivative.**

$$\int \frac{(e\,\text{Sin}[c+d x])^m}{(a+b\,\text{Sec}[c+d x])^3}\, dx$$

Optimal (type 6, 580 leaves, 7 steps) :

$$-\frac{1}{a^4 d (1-m)} 3 b e \text{AppellF1}\left[1-m, \frac{1-m}{2}, \frac{1-m}{2}, 2-m, -\frac{a-b}{b+a\text{Cos}[c+d x]}, \frac{a+b}{b+a\text{Cos}[c+d x]}\right] \left(-\frac{a (1-\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} \left(\frac{a (1+\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} (e\,\text{Sin}[c+d x])^{-1+m} - \left(b^3 e \text{AppellF1}\left[3-m, \frac{1-m}{2}, \frac{1-m}{2}, 4-m, -\frac{a-b}{b+a\text{Cos}[c+d x]}, \frac{a+b}{b+a\text{Cos}[c+d x]}\right] \left(-\frac{a (1-\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} \left(\frac{a (1+\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} (e\,\text{Sin}[c+d x])^{-1+m}\right) \Big/ \left(a^4 d (3-m) (b+a\text{Cos}[c+d x])^2\right) + \left(3 b^2 e \text{AppellF1}\left[2-m, \frac{1-m}{2}, \frac{1-m}{2}, 3-m, -\frac{a-b}{b+a\text{Cos}[c+d x]}, \frac{a+b}{b+a\text{Cos}[c+d x]}\right] \left(-\frac{a (1-\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} \left(\frac{a (1+\text{Cos}[c+d x])}{b+a\text{Cos}[c+d x]}\right)^{\frac{1-m}{2}} (e\,\text{Sin}[c+d x])^{-1+m}\right) \Big/ \left(a^4 d (2-m) (b+a\text{Cos}[c+d x])\right) + \frac{\text{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Sin}[c+d x]^2\right] (e\,\text{Sin}[c+d x])^{1+m}}{a^3 d e (1+m) \sqrt{\text{Cos}[c+d x]^2}}$$

Result (type 6, 12 336 leaves):

$$\left((e\,\text{Sin}[c+d\,x])^m\left(\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\right)\Big/\right.\right.$$

$$\left((1+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\right.$$

$$\left(-(a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3\,(a-b)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,4,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+(a+b)\,(1+m)\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{3+m}{2},2+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(3\,(a+b)\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\left.\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\right)\Big/\left((3+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\right.$$

$$\left(-(a+b)\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3\,(a-b)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,4,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,(1+m)\,\text{AppellF1}\left[\frac{5+m}{2},2+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)+$$

$$\left(3\,(a+b)\,(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right.$$

$$\left.\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\right)\Big/\left((5+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\right.$$

$$\Big(-(a+b)(7+m)\,\text{AppellF1}\Big[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\Big(-3(a-b)\,\text{AppellF1}\Big[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)(1+m)\,\text{AppellF1}\Big[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big)-$$

$$\Big((a+b)(9+m)\,\text{AppellF1}\Big[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^6$$

$$\Big(\frac{\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]}{1+\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}\Big)^{1+m}\Big)\Big/\Big((7+m)\Big(a+b-a\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2+b\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^3$$

$$\Big(-(a+b)(9+m)\,\text{AppellF1}\Big[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\Big(-3(a-b)\,\text{AppellF1}\Big[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)(1+m)\,\text{AppellF1}\Big[\frac{9+m}{2},2+m,3,\frac{11+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(d\,(a+b\,\text{Sec}[c+d\,x])^3\Big(-\Big(\Big(3(a+b)(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]$$

$$\Big(-a\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+b\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big(\frac{\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]}{1+\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}\Big)^{1+m}\Big)\Big/$$

$$\Big((1+m)\Big(a+b-a\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2+b\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^4\Big(-(a+b)(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+2\Big(-3(a-b)\,\text{AppellF1}\Big[\frac{3+m}{2},1+m,4,\frac{5+m}{2},-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)(1+m)\,\text{AppellF1}\left[\frac{3+m}{2},2+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Bigg)\Bigg)\Bigg)+$$

$$\Bigg((a+b)(3+m)\Bigg(\frac{1}{(a+b)(3+m)}3(a-b)(1+m)\,\text{AppellF1}\left[1+\frac{1+m}{2},1+m,4,1+\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{3+m}(1+m)^2\,\text{AppellF1}\left[1+\frac{1+m}{2},2+m,3,1+\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\Bigg)\Big/$$

$$\Bigg((1+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\Bigg(-(a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+2\Bigg(-3(a-b)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,4,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+$$

$$(a+b)(1+m)\,\text{AppellF1}\left[\frac{3+m}{2},2+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(9(a+b)(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\Bigg)\Big/$$

$$\Bigg((3+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^4\Bigg(-(a+b)(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+2\Bigg(-3(a-b)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,4,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+$$

$$(a+b)(1+m)\,\text{AppellF1}\left[\frac{5+m}{2},2+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Bigg)\Bigg)-$$

$$\left(3\,(a+b)\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\right)\Big/\left((3+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\right.$$

$$\left(-(a+b)\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3\,(a-b)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,4,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,(1+m)\,\text{AppellF1}\left[\frac{5+m}{2},2+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(3\,(a+b)\,(5+m)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\frac{1}{(a+b)\,(5+m)}3\,(a-b)\,(3+m)\,\text{AppellF1}\left[1+\frac{3+m}{2},1+m,4,1+\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{5+m}(1+m)\,(3+m)\,\text{AppellF1}\left[1+\frac{3+m}{2},2+m,3,1+\frac{5+m}{2},\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\right)\Big/$$

$$\left((3+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\left(-(a+b)\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+2\left(-3\,(a-b)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,4,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,(1+m)\,\text{AppellF1}\left[\frac{5+m}{2},2+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(9\,(a+b)\,(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right.$$

$$\left(-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(\frac{\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\Bigg)\Big/$$

$$\Bigg((5+m)\left(a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^4\Bigg(-(a+b)(7+m)\,\mathrm{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+2\Bigg(-3(a-b)\,\mathrm{AppellF1}\left[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+$$

$$(a+b)(1+m)\,\mathrm{AppellF1}\left[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(6(a+b)(7+m)\,\mathrm{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\left(\frac{\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\Bigg)\Big/\Bigg((5+m)\left(a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3$$

$$\Bigg(-(a+b)(7+m)\,\mathrm{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+$$

$$2\Bigg(-3(a-b)\,\mathrm{AppellF1}\left[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+$$

$$(a+b)(1+m)\,\mathrm{AppellF1}\left[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(3(a+b)(7+m)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg(\frac{1}{(a+b)(7+m)}3(a-b)(5+m)\,\mathrm{AppellF1}\left[1+\frac{5+m}{2},1+m,4,1+\frac{7+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{7+m}(1+m)(5+m)$$

$$\mathrm{AppellF1}\left[1+\frac{5+m}{2},2+m,3,1+\frac{7+m}{2},-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)$$

$$\left(\frac{\tan\left[\frac{1}{2}(c+d x)\right]}{1+\tan\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\Bigg/\left((5+m)\left(a+b-a\tan\left[\frac{1}{2}(c+d x)\right]^2+b\tan\left[\frac{1}{2}(c+d x)\right]^2\right)^3\right.$$

$$\left(-(a+b)(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3(a-b)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\tan\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$\left(3(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\tan\left[\frac{1}{2}(c+d x)\right]^6\right.$$

$$\left(-a\sec\left[\frac{1}{2}(c+d x)\right]^2\tan\left[\frac{1}{2}(c+d x)\right]+b\sec\left[\frac{1}{2}(c+d x)\right]^2\tan\left[\frac{1}{2}(c+d x)\right]\right)\left(\frac{\tan\left[\frac{1}{2}(c+d x)\right]}{1+\tan\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\Bigg)\Bigg/$$

$$\left((7+m)\left(a+b-a\tan\left[\frac{1}{2}(c+d x)\right]^2+b\tan\left[\frac{1}{2}(c+d x)\right]^2\right)^4\left(-(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+2\left(-3(a-b)\,\text{AppellF1}\left[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{9+m}{2},2+m,3,\frac{11+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\tan\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-$$

$$\left(3(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\sec\left[\frac{1}{2}(c+d x)\right]^2\right.$$

$$\tan\left[\frac{1}{2}(c+d x)\right]^5\left(\frac{\tan\left[\frac{1}{2}(c+d x)\right]}{1+\tan\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\Bigg)\Bigg/\left((7+m)\left(a+b-a\tan\left[\frac{1}{2}(c+d x)\right]^2+b\tan\left[\frac{1}{2}(c+d x)\right]^2\right)^3\right.$$

$$\left(-(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\tan\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3(a-b)\,\text{AppellF1}\left[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{9+m}{2},2+m,3,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-$$

$$\left((a+b)(9+m)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^6\left(\frac{1}{(a+b)(9+m)}3(a-b)(7+m)\,\text{AppellF1}\left[1+\frac{7+m}{2},1+m,4,1+\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{9+m}(1+m)(7+m)$$

$$\left.\text{AppellF1}\left[1+\frac{7+m}{2},2+m,3,1+\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left.\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\right)\Big/\left((7+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\right.$$

$$\left(-(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3(a-b)\,\text{AppellF1}\left[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{9+m}{2},2+m,3,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$\left((a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^m\right.$$

$$\left.\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}\right)\right)\Big/\left(\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\right.$$

$$\left(-(a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$2\left(-3(a-b)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,4,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{3+m}{2},2+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)-$$

$$\left(3(a+b)(1+m)(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right.$$

$$\left.\left(\frac{\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\right)^m\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)}\right)\right)\Big/$$

$$\left((3+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^3\left(-(a+b)(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]+2\left(-3(a-b)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,4,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{5+m}{2},2+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)+$$

$$\left(3(a+b)(1+m)(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+dx)\right]^4\right.$$

$$\left.\left(\frac{\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\right)^m\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)}\right)\right)\Big/$$

$$\left((5+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^3\left(-(a+b)(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]+2\left(-3(a-b)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)-$$

$$\left((a+b)(1+m)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^6\right.$$

$$\left.\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^m\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}\right)\right)\Bigg/$$

$$\left((7+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\left(-(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+2\left(-3(a-b)\,\text{AppellF1}\left[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{9+m}{2},2+m,3,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-$$

$$\left((a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},1+m,3,\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m}\right.$$

$$\left(2\left(-3(a-b)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,4,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+(a+b)(1+m)\right.\right.$$

$$\left.\text{AppellF1}\left[\frac{3+m}{2},2+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$(a+b)(3+m)\left(\frac{1}{(a+b)(3+m)}3(a-b)(1+m)\,\text{AppellF1}\left[1+\frac{1+m}{2},1+m,4,1+\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{3+m}(1+m)^2\,\text{AppellF1}\left[1+\frac{1+m}{2},2+m,3,1+\frac{3+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-3(a-b)\left(\frac{1}{(a+b)(5+m)}\right.\right.$$

$$4(a-b)(3+m)\,\text{AppellF1}\left[1+\frac{3+m}{2},1+m,5,1+\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{5+m}(1+m)(3+m)\,\text{AppellF1}\left[1+\frac{3+m}{2},2+m,4,1+\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]$$

$$\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)+(a+b)\,(1+m)\,\Bigg(\frac{1}{(a+b)\,(5+m)}3\,(a-b)\,(3+m)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\,2+m,\,4,\,1+\frac{5+m}{2},$$

$$-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\frac{1}{5+m}(2+m)\,(3+m)\,\text{AppellF1}\Big[$$

$$1+\frac{3+m}{2},\,3+m,\,3,\,1+\frac{5+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg((1+m)\,\Big(a+b-a\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2+b\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)^3\,\Bigg(-(a+b)\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\,1+m,\,3,\,\frac{3+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+2\,\Bigg(-3\,(a-b)\,\text{AppellF1}\Big[\frac{3+m}{2},\,1+m,\,4,\,\frac{5+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,(1+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,2+m,\,3,\,\frac{5+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Bigg)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Bigg)^2\Bigg)+$$

$$\Bigg(3\,(a+b)\,(5+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,1+m,\,3,\,\frac{5+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2$$

$$\left(\frac{\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]}{1+\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}\right)^{1+m}\,\Bigg(2\,\Bigg(-3\,(a-b)\,\text{AppellF1}\Big[\frac{5+m}{2},\,1+m,\,4,\,\frac{7+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,(1+m)\,\text{AppellF1}\Big[\frac{5+m}{2},\,2+m,\,3,\,\frac{7+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Bigg)$$

$$\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-(a+b)\,(5+m)\,\Bigg(\frac{1}{(a+b)\,(5+m)}3\,(a-b)\,(3+m)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\,1+m,\,4,\,1+$$

$$\frac{5+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\frac{1}{5+m}(1+m)\,(3+m)$$

$$\text{AppellF1}\Big[1+\frac{3+m}{2},\,2+m,\,3,\,1+\frac{5+m}{2},\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-3\,(a-b)\left(\frac{1}{(a+b)\,(7+m)}4\,(a-b)\,(5+m)\,\text{AppellF1}\left[1+\frac{5+m}{2},1+m,5,1+\frac{7+m}{2},\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{7+m}(1+m)\,(5+m)$$

$$\left.\text{AppellF1}\left[1+\frac{5+m}{2},2+m,4,1+\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$(a+b)\,(1+m)\left(\frac{1}{(a+b)\,(7+m)}3\,(a-b)\,(5+m)\,\text{AppellF1}\left[1+\frac{5+m}{2},2+m,4,1+\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{7+m}(2+m)\,(5+m)\,\text{AppellF1}\left[1+\frac{5+m}{2},\right.$$

$$\left.\left.\left.\left.\left.3+m,3,1+\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left((3+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\left(-(a+b)\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},1+m,3,\frac{5+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+2\left(-3\,(a-b)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,4,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,(1+m)\,\text{AppellF1}\left[\frac{5+m}{2},2+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)-$$

$$\left(3\,(a+b)\,(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right.$$

$$\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+m}\left(2\left(-3\,(a-b)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.\right.$$

$$\left.(a+b)\,(1+m)\,\text{AppellF1}\left[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)$$

$$\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-(a+b)(7+m)\left(\frac{1}{(a+b)(7+m)}3(a-b)(5+m)\operatorname{AppellF1}\left[1+\frac{5+m}{2},1+m,4,1+\right.\right.$$

$$\left.\frac{7+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{7+m}(1+m)(5+m)$$

$$\left.\operatorname{AppellF1}\left[1+\frac{5+m}{2},2+m,3,1+\frac{7+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-3(a-b)\left(\frac{1}{(a+b)(9+m)}4(a-b)(7+m)\operatorname{AppellF1}\left[1+\frac{7+m}{2},1+m,5,1+\frac{9+m}{2},\right.\right.\right.$$

$$\left.-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{9+m}(1+m)(7+m)$$

$$\left.\operatorname{AppellF1}\left[1+\frac{7+m}{2},2+m,4,1+\frac{9+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$(a+b)(1+m)\left(\frac{1}{(a+b)(9+m)}3(a-b)(7+m)\operatorname{AppellF1}\left[1+\frac{7+m}{2},2+m,4,1+\frac{9+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{9+m}(2+m)(7+m)\operatorname{AppellF1}\left[1+\frac{7+m}{2},\right.$$

$$\left.\left.\left.\left.\left.3+m,3,1+\frac{9+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left((5+m)\left(a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\left(-(a+b)(7+m)\operatorname{AppellF1}\left[\frac{5+m}{2},1+m,3,\frac{7+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+2\left(-3(a-b)\operatorname{AppellF1}\left[\frac{7+m}{2},1+m,4,\frac{9+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)(1+m)\operatorname{AppellF1}\left[\frac{7+m}{2},2+m,3,\frac{9+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)+$$

$$\left((a+b)(9+m)\operatorname{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^6\right.$$

$$\left(\frac{\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+m} \left(2\left(-3(a-b)\,\text{AppellF1}\left[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.\right.$$

$$\left.(a+b)(1+m)\,\text{AppellF1}\left[\frac{9+m}{2},2+m,3,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-(a+b)(9+m)\left(\frac{1}{(a+b)(9+m)}3(a-b)(7+m)\,\text{AppellF1}\left[1+\frac{7+m}{2},1+m,4,1+\right.\right.$$

$$\left.\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{9+m}(1+m)(7+m)$$

$$\left.\text{AppellF1}\left[1+\frac{7+m}{2},2+m,3,1+\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-3(a-b)\left(\frac{1}{(a+b)(11+m)}4(a-b)(9+m)\,\text{AppellF1}\left[1+\frac{9+m}{2},1+m,5,1+\frac{11+m}{2},\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{11+m}(1+m)(9+m)$$

$$\left.\text{AppellF1}\left[1+\frac{9+m}{2},2+m,4,1+\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$(a+b)(1+m)\left(\frac{1}{(a+b)(11+m)}3(a-b)(9+m)\,\text{AppellF1}\left[1+\frac{9+m}{2},2+m,4,1+\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{11+m}(2+m)(9+m)\,\text{AppellF1}\left[1+\frac{9+m}{2},\right.$$

$$\left.\left.\left.\left.\left.3+m,3,1+\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)\right) \Big/$$

$$\left((7+m)\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\left(-(a+b)(9+m)\,\text{AppellF1}\left[\frac{7+m}{2},1+m,3,\frac{9+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+2\left(-3(a-b)\,\text{AppellF1}\left[\frac{9+m}{2},1+m,4,\frac{11+m}{2},-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right]+\right.$$

$$(a+b)\ (1+m)\ \text{AppellF1}\left[\frac{9+m}{2},\ 2+m,\ 3,\ \frac{11+m}{2},\ -\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,\ \frac{(a-b)\ \text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{a+b}\right]\ \text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 268: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^n\ \text{Sin}[c+d\,x]^5\,dx$$

Optimal (type 5, 150 leaves, 6 steps):

$$\frac{b\ \text{Hypergeometric2F1}\left[2,\ 1+n,\ 2+n,\ 1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\ (a+b\,\text{Sec}[c+d\,x])^{1+n}}{a^2\ d\ (1+n)}-\frac{2\ b^3\ \text{Hypergeometric2F1}\left[4,\ 1+n,\ 2+n,\ 1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\ (a+b\,\text{Sec}[c+d\,x])^{1+n}}{a^4\ d\ (1+n)}+\frac{b^5\ \text{Hypergeometric2F1}\left[6,\ 1+n,\ 2+n,\ 1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\ (a+b\,\text{Sec}[c+d\,x])^{1+n}}{a^6\ d\ (1+n)}$$

Result (type 6, 8397 leaves): Display of huge result suppressed!

- **Problem 269: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^n\ \text{Sin}[c+d\,x]^3\,dx$$

Optimal (type 5, 121 leaves, 3 steps):

$$\frac{b\ \left(6\,a^2-b^2\ \left(2-3\,n+n^2\right)\right)\ \text{Hypergeometric2F1}\left[2,\ 1+n,\ 2+n,\ 1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\ (a+b\,\text{Sec}[c+d\,x])^{1+n}}{6\,a^4\ d\ (1+n)}+\frac{\text{Cos}[c+d\,x]^3\ (a+b\,\text{Sec}[c+d\,x])^{1+n}\ (2\,a-b\ (2-n)\ \text{Sec}[c+d\,x])}{6\,a^2\,d}$$

Result (type 6, 4523 leaves):

$$\Bigg(4\ (a-b)\ (b+a\,\text{Cos}[c+d\,x])^n\ \left(\text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)^{-2+n}$$

$$\Bigg(-\left(9\ \text{AppellF1}\left[2,\ n,\ -n,\ 3,\ 2\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2,\ \frac{2\,a\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{a-b}\right]\ \text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)\Bigg/\Bigg(-2\,a\,n\ \text{AppellF1}\Bigg[3,\ n,\ 1-n,\ 4,$$

$$2\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2,\ \frac{2\,a\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{a-b}\Bigg]+(a-b)\ \Bigg(2\,n\ \text{AppellF1}\left[3,\ 1+n,\ -n,\ 4,\ 2\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2,\ \frac{2\,a\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{a-b}\right]+$$

$$3\,\text{AppellF1}\left[2,n,-n,3,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\sec\left[\frac{1}{2}(c+dx)\right]^2\Bigg)\Bigg)+$$

$$\left(4\,\text{AppellF1}\left[3,n,-n,4,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\right)\Big/\left(-a\,n\,\text{AppellF1}\left[4,n,1-n,5,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.$$

$$\left.\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]+(a-b)\left(n\,\text{AppellF1}\left[4,1+n,-n,5,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]+\right.$$

$$\left.\left.\left.2\,\text{AppellF1}\left[3,n,-n,4,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\sec\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\right)$$

$$\left(\left(\cos\left[\frac{1}{2}(c+dx)\right]^2\sec[c+dx]\right)^n(a+b\sec[c+dx])^n\sin[c+dx]^3\right)\Big/\Bigg(3$$

$$d$$

$$\left(-\frac{4}{3}a(a-b)n(b+a\cos[c+dx])^{-1+n}\left(\sec\left[\frac{1}{2}(c+dx)\right]^2\right)^{-2+n}\right.$$

$$\left(-\left(9\,\text{AppellF1}\left[2,n,-n,3,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\sec\left[\frac{1}{2}(c+dx)\right]^2\right)\Big/\right.$$

$$\left(-2a\,n\,\text{AppellF1}\left[3,n,1-n,4,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]+\right.$$

$$(a-b)\left(2n\,\text{AppellF1}\left[3,1+n,-n,4,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]+3\,\text{AppellF1}\left[2,n,-n,3,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.$$

$$\left.\left.\left.\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\sec\left[\frac{1}{2}(c+dx)\right]^2\right)\right)+\left(4\,\text{AppellF1}\left[3,n,-n,4,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\right)\Big/$$

$$\left(-a\,n\,\text{AppellF1}\left[4,n,1-n,5,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]+(a-b)\left(n\,\text{AppellF1}\left[4,1+n,-n,5,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]+2\,\text{AppellF1}\left[3,n,-n,4,2\cos\left[\frac{1}{2}(c+dx)\right]^2,\frac{2a\cos\left[\frac{1}{2}(c+dx)\right]^2}{a-b}\right]\sec\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\right)\right)$$

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^n \text{Sin}[c+d x]+\frac{4}{3}(a-b)(-2+n)(b+a\,\text{Cos}[c+d x])^n\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-2+n}$$

$$\left(-\left(9\,\text{AppellF1}\left[2,n,-n,3,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\right.$$

$$\left(-2\,a\,n\,\text{AppellF1}\left[3,n,1-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]+\right.$$

$$(a-b)\left(2\,n\,\text{AppellF1}\left[3,1+n,-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]+3\,\text{AppellF1}\left[2,n,-n,3,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+\left(4\,\text{AppellF1}\left[3,n,-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\right)\Big/$$

$$\left(-a\,n\,\text{AppellF1}\left[4,n,1-n,5,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]+(a-b)\left(n\,\text{AppellF1}\left[4,1+n,-n,5,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]+2\,\text{AppellF1}\left[3,n,-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^n \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{4}{3}(a-b)(b+a\,\text{Cos}[c+d x])^n\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-2+n}$$

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^n$$

$$\left(-\left(9\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(1/(3(a-b))4\,a\,n\,\text{AppellF1}\left[3,n,1-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\right.\right.\right.\right.$$

$$\left.\left.\frac{1}{2}(c+d x)\right]-\frac{4}{3}n\,\text{AppellF1}\left[3,1+n,-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(-2\,a\,n\,\text{AppellF1}\left[3,n,1-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]+(a-b)\right.$$

$$\left(2\,n\,\text{AppellF1}\left[3,1+n,-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]+3\right.$$

$$\text{AppellF1}\left[2, n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg) +$$

$$\Bigg(4\,\Bigg(1/(2\,(a-b))\,3\,a\,n\,\text{AppellF1}\left[4, n, 1-n, 5, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right] -$$

$$\frac{3}{2}\,n\,\text{AppellF1}\left[4, 1+n, -n, 5, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg) \Big/$$

$$\Bigg(-a\,n\,\text{AppellF1}\left[4, n, 1-n, 5, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right] + (a-b)\,\Bigg(n\,\text{AppellF1}\left[4, 1+n, -n, 5, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right] + 2\,\text{AppellF1}\left[3, n, -n, 4, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg) -$$

$$\Bigg(9\,\text{AppellF1}\left[2, n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg) \Big/$$

$$\Bigg(-2\,a\,n\,\text{AppellF1}\left[3, n, 1-n, 4, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right] +$$

$$(a-b)\,\Bigg(2\,n\,\text{AppellF1}\left[3, 1+n, -n, 4, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right] +$$

$$3\,\text{AppellF1}\left[2, n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg) +$$

$$\Bigg(9\,\text{AppellF1}\left[2, n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\Bigg(-2\,a\,n\,\Bigg(-\frac{1}{2\,(a-b)}3\,a\,(1-n)$$

$$\text{AppellF1}\left[4, n, 2-n, 5, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right] - \frac{3}{2}\,n\,\text{AppellF1}\left[4,\right.$$

$$\left.1+n, 1-n, 5, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\Bigg) + (a-b)\,\Bigg(3\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left(\frac{1}{3\,(a-b)}4\,a\,n\,\text{AppellF1}\left[3,\,n,\,1-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$\left.\frac{4}{3}\,n\,\text{AppellF1}\left[3,\,1+n,\,-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$

$$2\,n\left(\frac{1}{2\,(a-b)}3\,a\,n\,\text{AppellF1}\left[4,\,1+n,\,1-n,\,5,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$\left.\frac{3}{2}\,(1+n)\,\text{AppellF1}\left[4,\,2+n,\,-n,\,5,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$

$$\left.\left.\left.3\,\text{AppellF1}\left[2,\,n,\,-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)\Big/$$

$$\left(-2\,a\,n\,\text{AppellF1}\left[3,\,n,\,1-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+(a-b)\right.$$

$$\left(2\,n\,\text{AppellF1}\left[3,\,1+n,\,-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+\right.$$

$$\left.\left.3\,\text{AppellF1}\left[2,\,n,\,-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)^2-$$

$$\left(4\,\text{AppellF1}\left[3,\,n,\,-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\left(-a\,n\left(-\frac{1}{5\,(a-b)}8\,a\,(1-n)\,\text{AppellF1}\left[5,\,n,\,2-n,\right.\right.\right.\right.$$

$$6,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\Big]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{8}{5}\,n\,\text{AppellF1}\Big[5,\,1+n,\,1-n,\,6,$$

$$\left.2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\Big]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+(a-b)\left(2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.$$

$$\left(\frac{1}{2\,(a-b)}3\,a\,n\,\text{AppellF1}\left[4,\,n,\,1-n,\,5,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$\frac{3}{2} n \,\text{AppellF1}\left[4, 1+n, -n, 5, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] \cos\left[\frac{1}{2}(c+d x)\right] \sin\left[\frac{1}{2}(c+d x)\right]\Bigg) +$$

$$n \left(\frac{1}{5 (a-b)} 8 a n \,\text{AppellF1}\left[5, 1+n, 1-n, 6, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] \cos\left[\frac{1}{2}(c+d x)\right] \sin\left[\frac{1}{2}(c+d x)\right] -\right.$$

$$\left.\frac{8}{5} (1+n) \,\text{AppellF1}\left[5, 2+n, -n, 6, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] \cos\left[\frac{1}{2}(c+d x)\right] \sin\left[\frac{1}{2}(c+d x)\right]\right) +$$

$$2 \,\text{AppellF1}\left[3, n, -n, 4, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] \sec\left[\frac{1}{2}(c+d x)\right]^2 \tan\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(-a n \,\text{AppellF1}\left[4, n, 1-n, 5, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] + (a-b) \left(n \,\text{AppellF1}\left[4, 1+n, -n, 5, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] + 2 \,\text{AppellF1}\left[3, n, -n, 4, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] \sec\left[\frac{1}{2}(c+d x)\right]^2\right)\right)^2\right) +$$

$$\frac{4}{3} (a-b) n (b + a \cos[c+d x])^n \left(\sec\left[\frac{1}{2}(c+d x)\right]^2\right)^{-2+n} \left(-\left(9 \,\text{AppellF1}\left[2, n, -n, 3, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\right.\right.$$

$$\left.\sec\left[\frac{1}{2}(c+d x)\right]^2\right) \Bigg/ \left(-2 a n \,\text{AppellF1}\left[3, n, 1-n, 4, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] +\right.$$

$$(a-b) \left(2 n \,\text{AppellF1}\left[3, 1+n, -n, 4, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] + 3\right.$$

$$\left.\left.\text{AppellF1}\left[2, n, -n, 3, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] \sec\left[\frac{1}{2}(c+d x)\right]^2\right)\right) +$$

$$\left(4 \,\text{AppellF1}\left[3, n, -n, 4, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right]\right) \Bigg/ \left(-a n \,\text{AppellF1}\left[4, n, 1-n, 5, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] + (a-b) \left(n \,\text{AppellF1}\left[4, 1+n, -n, 5, 2 \cos\left[\frac{1}{2}(c+d x)\right]^2, \frac{2 a \cos\left[\frac{1}{2}(c+d x)\right]^2}{a-b}\right] +\right.$$

$$2\,\text{AppellF1}\left[3, n, -n, 4, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)\Bigg)$$

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{-1+n}\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Bigg)\Bigg)$$

- **Problem 270: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\,dx$$

Optimal (type 5, 48 leaves, 2 steps):

$$\frac{b\,\text{Hypergeometric2F1}\left[2, 1+n, 2+n, 1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{a^2\,d\,(1+n)}$$

Result (type 6, 1849 leaves):

$$-\Bigg(\Bigg(2\,(a-b)\,\text{AppellF1}\left[1, n, -n, 2, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]$$

$$(b+a\,\text{Cos}[c+d\,x])^n\,\text{Sec}[c+d\,x]^n\,(a+b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\Bigg)\Big/$$

$$\Bigg(d\,\Bigg(-a\,n\,\text{AppellF1}\left[2, n, 1-n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]+(a-b)\,\Bigg(n\,\text{AppellF1}\left[2, 1+n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]+\text{AppellF1}\left[1, n, -n, 2, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)\Bigg(-\Bigg(2\,(a-b)$$

$$(b+a\,\text{Cos}[c+d\,x])^n\,\text{Sec}[c+d\,x]^n\,\Bigg(1/(a-b)\,a\,n\,\text{AppellF1}\left[2, n, 1-n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-n\,\text{AppellF1}\left[2, 1+n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg)\Big/$$

$$\Bigg(-a\,n\,\text{AppellF1}\left[2, n, 1-n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2, \frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]+(a-b)\,\Bigg(n\,\text{AppellF1}\left[2, 1+n, -n, 3, 2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+\text{AppellF1}\left[1,\,n,\,-n,\,2,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)+$$

$$\left(2\,a\,(a-b)\,n\,\text{AppellF1}\left[1,\,n,\,-n,\,2,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,(b+a\,\text{Cos}[c+d\,x])^{-1+n}\,\text{Sec}[c+d\,x]^n\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(-a\,n\,\text{AppellF1}\left[2,\,n,\,1-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+(a-b)\,\left(n\,\text{AppellF1}\left[2,\,1+n,\,-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+\text{AppellF1}\left[1,\,n,\,-n,\,2,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)-$$

$$\left(2\,(a-b)\,n\,\text{AppellF1}\left[1,\,n,\,-n,\,2,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,(b+a\,\text{Cos}[c+d\,x])^n\,\text{Sec}[c+d\,x]^{1+n}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(-a\,n\,\text{AppellF1}\left[2,\,n,\,1-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+(a-b)\,\left(n\,\text{AppellF1}\left[2,\,1+n,\,-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]+\text{AppellF1}\left[1,\,n,\,-n,\,2,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)+$$

$$\left(2\,(a-b)\,\text{AppellF1}\left[1,\,n,\,-n,\,2,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,(b+a\,\text{Cos}[c+d\,x])^n\,\text{Sec}[c+d\,x]^n\right.$$

$$\left(-a\,n\,\left(-\frac{1}{3\,(a-b)}4\,a\,(1-n)\,\text{AppellF1}\left[3,\,n,\,2-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{4}{3}\right.\right.$$

$$\left.n\,\text{AppellF1}\left[3,\,1+n,\,1-n,\,4,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$

$$(a-b)\,\left(\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(\frac{1}{a-b}a\,n\,\text{AppellF1}\left[2,\,n,\,1-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\right.\right.\right.$$

$$\left.\left.\frac{1}{2}\,(c+d\,x)\right]-n\,\text{AppellF1}\left[2,\,1+n,\,-n,\,3,\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a-b}\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$

$$n\left(\frac{1}{3(a-b)}4\,a\,n\,\text{AppellF1}\left[3,1+n,1-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\left.\frac{4}{3}(1+n)\,\text{AppellF1}\left[3,2+n,-n,4,2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$\left.\left.\left.\text{AppellF1}\left[1,n,-n,2,2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\Big/$$

$$\left(-a\,n\,\text{AppellF1}\left[2,n,1-n,3,2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]+(a-b)\left(n\,\text{AppellF1}\left[2,1+n,-n,3,2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]+\text{AppellF1}\left[1,n,-n,2,2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{2\,a\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)^2\right)\right)\right)$$

- **Problem 271: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

Optimal (type 5, 115 leaves, 4 steps):

$$\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a-b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{2(a-b)\,d\,(1+n)}-\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{2(a+b)\,d\,(1+n)}$$

Result (type 6, 3438 leaves):

$$\left(b\,(-2+n)\,\text{AppellF1}\left[1-n,-n,1,2-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.$$

$$\left.(b+a\,\text{Cos}[c+d\,x])^n\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]^{-1+n}\,(a+b\,\text{Sec}[c+d\,x])^n\right)\Big/$$

$$\left(d\,(-1+n)\left(2\,b\,(-2+n)\,\text{AppellF1}\left[1-n,-n,1,2-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2+\right.\right.$$

$$\left(-(a-b)\,n\,\text{AppellF1}\left[2-n,1-n,1,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.$$

$$2\,b\,\text{AppellF1}\left[2-n,\,-n,\,2,\,3-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Cos}[c+d\,x]\Bigg)$$

$$\Bigg(-\Bigg(\Bigg(b\,(-2+n)\,\text{AppellF1}\left[1-n,\,-n,\,1,\,2-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]$$

$$(b+a\,\text{Cos}[c+d\,x])^n\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^{-1+n}\Bigg)\Big/\Bigg((-1+n)$$

$$\Bigg(2\,b\,(-2+n)\,\text{AppellF1}\left[1-n,\,-n,\,1,\,2-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2+$$

$$\Bigg(-(a-b)\,n\,\text{AppellF1}\left[2-n,\,1-n,\,1,\,3-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-2\,b$$

$$\text{AppellF1}\left[2-n,\,-n,\,2,\,3-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Cos}[c+d\,x]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(a\,b\,(-2+n)\,n\,\text{AppellF1}\left[1-n,\,-n,\,1,\,2-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]$$

$$(b+a\,\text{Cos}[c+d\,x])^{-1+n}\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^{-1+n}\,\text{Sin}[c+d\,x]\Bigg)\Big/\Bigg((-1+n)$$

$$\Bigg(2\,b\,(-2+n)\,\text{AppellF1}\left[1-n,\,-n,\,1,\,2-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2+$$

$$\Bigg(-(a-b)\,n\,\text{AppellF1}\left[2-n,\,1-n,\,1,\,3-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-$$

$$2\,b\,\text{AppellF1}\left[2-n,\,-n,\,2,\,3-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Cos}[c+d\,x]\Bigg)\Bigg)+$$

$$\Bigg(b\,(-2+n)\,\text{AppellF1}\left[1-n,\,-n,\,1,\,2-n,\,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]$$

$$(b + a \operatorname{Cos}[c + d x])^n \operatorname{Cot}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sec}[c + d x]^n \operatorname{Sin}[c + d x]\Bigg) \Bigg/$$

$$\Bigg(2 b (-2 + n) \operatorname{AppellF1}\left[1 - n, -n, 1, 2 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^2 +$$

$$\Bigg(-(a - b) n \operatorname{AppellF1}\left[2 - n, 1 - n, 1, 3 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right] -$$

$$2 b \operatorname{AppellF1}\left[2 - n, -n, 2, 3 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right]\Bigg) \operatorname{Cos}[c + d x]\Bigg) + \Bigg(b (-2 + n)$$

$$(b + a \operatorname{Cos}[c + d x])^n \operatorname{Cot}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sec}[c + d x]^{-1+n} \Bigg(\frac{1}{2 - n} (1 - n) \operatorname{AppellF1}\left[2 - n, -n, 2, 3 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b},\right.$$

$$\left.\operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right] \left(-\operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sin}[c + d x] + \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]\right) -$$

$$\frac{1}{2 - n} (1 - n) n \operatorname{AppellF1}\left[2 - n, 1 - n, 1, 3 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right]$$

$$\left(-\frac{(-a + b) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sin}[c + d x]}{2 b} + \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]}{2 b}\right)\Bigg)\Bigg) \Bigg/ \Bigg((-1 + n)$$

$$\Bigg(2 b (-2 + n) \operatorname{AppellF1}\left[1 - n, -n, 1, 2 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^2 +$$

$$\Bigg(-(a - b) n \operatorname{AppellF1}\left[2 - n, 1 - n, 1, 3 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right] -$$

$$2 b \operatorname{AppellF1}\left[2 - n, -n, 2, 3 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right]\Bigg) \operatorname{Cos}[c + d x]\Bigg)\Bigg) -$$

$$\Bigg(b (-2 + n) \operatorname{AppellF1}\left[1 - n, -n, 1, 2 - n, \frac{(-a + b) \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2}{2 b}, \operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2\right]$$

$$(b + a \operatorname{Cos}[c + d x])^n \operatorname{Cot}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sec}[c + d x]^{-1+n}$$

$$\left(-2\,b\,(-2+n)\,\text{AppellF1}\left[1-n,-n,1,2-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\left(-(a-b)\,n\,\text{AppellF1}\left[2-n,1-n,1,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-2\,b\,\text{AppellF1}\left[2-n,-n,2,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\text{Sin}[c+d\,x]+\right.$$

$$2\,b\,(-2+n)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(\frac{1}{2-n}(1-n)\,\text{AppellF1}\left[2-n,-n,2,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(-\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-\frac{1}{2-n}\right.$$

$$(1-n)\,n\,\text{AppellF1}\left[2-n,1-n,1,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left.\left(-\frac{(-a+b)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sin}[c+d\,x]}{2\,b}+\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{2\,b}\right)\right)+$$

$$\text{Cos}[c+d\,x]\left(-2\,b\left(\frac{1}{3-n}2\,(2-n)\,\text{AppellF1}\left[3-n,-n,3,4-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(-\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-\frac{1}{3-n}\right.\right.$$

$$(2-n)\,n\,\text{AppellF1}\left[3-n,1-n,2,4-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left.\left(-\frac{(-a+b)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sin}[c+d\,x]}{2\,b}+\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{2\,b}\right)\right)-$$

$$(a-b)\,n\left(\frac{1}{3-n}(2-n)\,\text{AppellF1}\left[3-n,1-n,2,4-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\left(-\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+\frac{1}{3-n}\right.$$

$$(1-n)\,(2-n)\,\text{AppellF1}\left[3-n,2-n,1,4-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]$$

$$\left(-\frac{(-a+b)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sin}[c+d\,x]}{2\,b}+\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{2\,b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\Bigg((-1+n)$$

$$\Bigg(2\,b\,(-2+n)\,\text{AppellF1}\left[1-n,-n,1,2-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2+$$

$$\Bigg(-(a-b)\,n\,\text{AppellF1}\left[2-n,1-n,1,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\,b$$

$$\text{AppellF1}\left[2-n,-n,2,3-n,\frac{(-a+b)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\,b},\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\,\text{Cos}[c+d\,x]\Bigg)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 272: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

Optimal (type 5, 231 leaves, 9 steps):

$$\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a-b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{4\,(a-b)\,d\,(1+n)}-\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{4\,(a+b)\,d\,(1+n)}+$$
$$\frac{b\,\text{Hypergeometric2F1}\left[2,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a-b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{4\,(a-b)^2\,d\,(1+n)}+$$
$$\frac{b\,\text{Hypergeometric2F1}\left[2,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{4\,(a+b)^2\,d\,(1+n)}$$

Result (type 6, 7420 leaves): Display of huge result suppressed!

- **Problem 275: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

Optimal (type 6, 136 leaves, 4 steps):

$$-\frac{\text{Cot}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^n}{d}+$$
$$\left(\sqrt{2}\,b\,n\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},1-n,\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^n\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{-n}\text{Tan}[c+d\,x]\right)\Big/$$
$$\left((a+b)\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\right)$$

Result (type 6, 4339 leaves):

$$\Big((a+b)\ (b+a\,\mathrm{Cos}[c+d\,x])^n\,\mathrm{Csc}[c+d\,x]^2\,\mathrm{Sec}[c+d\,x]^n\,(a+b\,\mathrm{Sec}[c+d\,x])^n$$

$$\Big(\Big(3\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\Big/$$

$$\Big(3\,(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\,n\,\Big((-a+b)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,n,\,1-n,\,\frac{5}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,1+n,\,-n,\,\frac{5}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)-$$

$$\mathrm{AppellF1}\Big[-\frac{1}{2},\,n,\,-n,\,\frac{1}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big/\Big((a+b)\,\mathrm{AppellF1}\Big[-\frac{1}{2},\,n,\,-n,\,\frac{1}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+2\,n\,\Big((-a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,1+n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3\Big)\Big)\Big)\Big/$$

$$\Big(2\,d\,\Big(-\frac{1}{2}\,a\,(a+b)\,n\,(b+a\,\mathrm{Cos}[c+d\,x])^{-1+n}\,\mathrm{Sec}[c+d\,x]^n\,\mathrm{Sin}[c+d\,x]\,\Big(\Big(3\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]$$

$$\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\Big/\Big(3\,(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\,n\,\Big((-a+b)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,n,\,1-n,\,\frac{5}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+(a+b)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,1+n,\,-n,\,\frac{5}{2},$$

$$\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)-\mathrm{AppellF1}\Big[-\frac{1}{2},\,n,\,-n,\,\frac{1}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big/\Big((a+b)\,\mathrm{AppellF1}\Big[-\frac{1}{2},\,n,\,-n,\,\frac{1}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$2\,n\,\Big((-a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,1+n,$$

$$-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3\Big)\Big)+\frac{1}{2}\,(a+b)\,n\,(b+a\,\mathrm{Cos}[c+d\,x])^n$$

$$\mathrm{Sec}[c+d\,x]^{1+n}\,\mathrm{Sin}[c+d\,x]\,\Big(\Big(3\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\Big/$$

$$\Big(3\,(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\,n\,\Big((-a+b)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,n,\,1-n,\,\frac{5}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+(a+b)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,1+n,\,-n,\,\frac{5}{2},$$

$$\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)-\mathrm{AppellF1}\Big[-\frac{1}{2},\,n,\,-n,\,\frac{1}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big/\Big((a+b)\,\mathrm{AppellF1}\Big[-\frac{1}{2},\,n,\,-n,\,\frac{1}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$2\,n\,\Big((-a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,1+n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\Big)\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3\Big)\Big)+$$

$$\frac{1}{2}\,(a+b)\,(b+a\,\mathrm{Cos}[c+d\,x])^n\,\mathrm{Sec}[c+d\,x]^n\,\Big(\Big(3\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]\,\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)\Big/$$

$$\Big(2\,\Big(3\,(a+b)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,n,\,-n,\,\frac{3}{2},\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,\frac{(a-b)\,\mathrm{Tan}\big[\tfrac{1}{2}\,(c+d\,x)\big]^2}{a+b}\Big]+$$

$$2\,n\left((-a+b)\,\text{AppellF1}\left[\frac{3}{2},n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},1+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Bigg)+\Bigg(3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\Bigg(-1/(3\,(a+b))\,(a-b)\,n\,\text{AppellF1}\left[\frac{3}{2},n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{1}{3}\,n\,\text{AppellF1}\left[\frac{3}{2},1+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+$$

$$2\,n\Bigg((-a+b)\,\text{AppellF1}\left[\frac{3}{2},n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},1+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)-$$

$$\Bigg(1/(a+b)\,(a-b)\,n\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$n\,\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Big/$$

$$\Bigg((a+b)\,\text{AppellF1}\left[-\frac{1}{2},n,-n,\frac{1}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$2\,n\Bigg((-a+b)\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\Bigg)+\Bigg(\text{AppellF1}\left[-\frac{1}{2},n,-n,\frac{1}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\Bigg]\left(\frac{1}{2}(a+b)\,\text{AppellF1}\left[-\frac{1}{2},n,-n,\frac{1}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2+\right.$$

$$3\,n\left((-a+b)\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+n,-n,\right.\right.$$

$$\left.\left.\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+(a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\frac{1}{a+b}(a-b)\,n\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\left.n\,\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,n\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\left((-a+b)\left(\frac{1}{3(a+b)}(a-b)(1-n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+(a+b)\left(-\frac{1}{3(a+b)}(a-b)\,n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\Bigg]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}(1+n)$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{3}{2},2+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\Bigg/$$

$$\left((a+b)\,\text{AppellF1}\left[-\frac{1}{2},n,-n,\frac{1}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$2\,n\left((-a+b)\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[\frac{1}{2},1+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\right)^2-$$

$$\Bigg(3\,\text{AppellF1}\Big[\frac{1}{2}, n, -n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]$$

$$\Bigg(2\,n\,\Bigg((-a+b)\,\text{AppellF1}\Big[\frac{3}{2}, n, 1-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, -n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\Bigg)\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+3\,(a+b)$$

$$\Bigg(-\frac{1}{3\,(a+b)}(a-b)\,n\,\text{AppellF1}\Big[\frac{3}{2}, n, 1-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, -n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Bigg)+$$

$$2\,n\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\,\Bigg((-a+b)\,\Bigg(\frac{1}{5\,(a+b)}3\,(a-b)\,(1-n)\,\text{AppellF1}\Big[\frac{5}{2}, n, 2-n, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+\frac{3}{5}\,n\,\text{AppellF1}\Big[\frac{5}{2}, 1+n, 1-n, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Bigg)+(a+b)\,\Bigg(-\frac{1}{5\,(a+b)}3\,(a-b)\,n\,\text{AppellF1}\Big[\frac{5}{2}, 1+n, 1-n, \frac{7}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+\frac{3}{5}(1+n)$$

$$\text{AppellF1}\Big[\frac{5}{2}, 2+n, -n, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2}, n, -n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]+2\,n\,\Bigg((-a+b)\,\text{AppellF1}\Big[\frac{3}{2},$$

$$n, 1-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]+$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, -n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}\Big]\Bigg)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

Problem 276: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[c+d x]^4 (a+b \text{Sec}[c+d x])^n \, dx$$

Optimal (type 6, 424 leaves, ? steps):

$$-\frac{1}{2\sqrt{2}\, d} 3\,\text{AppellF1}\left[-\frac{1}{2}, \frac{5}{2}, -n, \frac{1}{2}, \frac{1}{2}(1-\text{Sec}[c+d x]), \frac{b (1-\text{Sec}[c+d x])}{a+b}\right] \text{Cot}[c+d x] \sqrt{1+\text{Sec}[c+d x]} (a+b \text{Sec}[c+d x])^n \left(\frac{a+b \text{Sec}[c+d x]}{a+b}\right)^{-n} - \frac{1}{6\sqrt{2}\, d} \text{AppellF1}\left[-\frac{3}{2}, \frac{5}{2}, -n, -\frac{1}{2}, \frac{1}{2}(1-\text{Sec}[c+d x]), \frac{b (1-\text{Sec}[c+d x])}{a+b}\right] \text{Cot}[c+d x]^3 (1+\text{Sec}[c+d x])^{3/2} (a+b \text{Sec}[c+d x])^n \left(\frac{a+b \text{Sec}[c+d x]}{a+b}\right)^{-n} + \frac{1}{\sqrt{2}\, d \sqrt{1+\text{Sec}[c+d x]}} \text{AppellF1}\left[\frac{1}{2}, \frac{3}{2}, -n, \frac{3}{2}, \frac{1}{2}(1-\text{Sec}[c+d x]), \frac{b (1-\text{Sec}[c+d x])}{a+b}\right] (a+b \text{Sec}[c+d x])^n \left(\frac{a+b \text{Sec}[c+d x]}{a+b}\right)^{-n} \text{Tan}[c+d x] + \frac{1}{2\sqrt{2}\, d \sqrt{1+\text{Sec}[c+d x]}} \text{AppellF1}\left[\frac{1}{2}, \frac{5}{2}, -n, \frac{3}{2}, \frac{1}{2}(1-\text{Sec}[c+d x]), \frac{b (1-\text{Sec}[c+d x])}{a+b}\right] (a+b \text{Sec}[c+d x])^n \left(\frac{a+b \text{Sec}[c+d x]}{a+b}\right)^{-n} \text{Tan}[c+d x]$$

Result (type 6, 8963 leaves) : Display of huge result suppressed!

- **Problem 294: Result unnecessarily involves higher level functions.**

$$\int \frac{(e \,\text{Csc}[c+d x])^{3/2}}{a+a \,\text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 145 leaves, 8 steps) :

$$-\frac{4 e \,\text{Cos}[c+d x] \sqrt{e \,\text{Csc}[c+d x]}}{5 a d} + \frac{2 e \,\text{Cot}[c+d x] \,\text{Csc}[c+d x] \sqrt{e \,\text{Csc}[c+d x]}}{5 a d} - \frac{2 e \,\text{Csc}[c+d x]^2 \sqrt{e \,\text{Csc}[c+d x]}}{5 a d} - \frac{4 e \sqrt{e \,\text{Csc}[c+d x]} \,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d x\right), 2\right] \sqrt{\text{Sin}[c+d x]}}{5 a d}$$

Result (type 5, 219 leaves) :

$$\frac{1}{5\, a\, (1+\text{Sec}[c+d\, x])}\text{Cos}\left[\frac{1}{2}\,(c+d\, x)\right]^2\,(e\,\text{Csc}[c+d\, x])^{3/2}$$
$$\left(\left(8\sqrt{2}\, e^{-i\,(c+d\,x)}\sqrt{\frac{i\, e^{i\,(c+d\,x)}}{-1+e^{2\,i\,(c+d\,x)}}}\left(-1+e^{2\,i\,(c+d\,x)}+\left(1+e^{2\,i\,c}\right)\sqrt{1-e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\right.$$
$$\left.\left(d\left(1+e^{2\,i\,c}\right)\text{Csc}[c+d\,x]^{3/2}\right)-\frac{2\left(4\,\text{Cos}[d\,x]\,\text{Sec}[c]+\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\text{Tan}[c+d\,x]}{d}\right)$$

Problem 296: Result unnecessarily involves higher level functions.

$$\int\frac{1}{\sqrt{e\,\text{Csc}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 99 leaves, 7 steps):

$$\frac{2\,\text{Cot}[c+d\,x]}{a\,d\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{2\,\text{Csc}[c+d\,x]}{a\,d\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{4\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]}{a\,d\sqrt{e\,\text{Csc}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]}}$$

Result (type 5, 82 leaves):

$$-\frac{2\left(2\,i-\text{Cot}[c+d\,x]+\text{Csc}[c+d\,x]-\frac{4\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1-e^{2\,i\,(c+d\,x)}}}\right)}{a\,d\sqrt{e\,\text{Csc}[c+d\,x]}}$$

Problem 298: Result unnecessarily involves higher level functions.

$$\int\frac{1}{(e\,\text{Csc}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 120 leaves, 7 steps):

$$-\frac{4\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]}{5\,a\,d\,e^2\sqrt{e\,\text{Csc}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]}}+\frac{2\,\text{Sin}[c+d\,x]}{3\,a\,d\,e^2\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{2\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{5\,a\,d\,e^2\sqrt{e\,\text{Csc}[c+d\,x]}}$$

Result (type 5, 91 leaves):

$$\frac{24\,i-\frac{48\,i\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1-e^{2\,i\,(c+d\,x)}}}+20\,\text{Sin}[c+d\,x]-6\,\text{Sin}[2\,(c+d\,x)]}{30\,a\,d\,e^2\sqrt{e\,\text{Csc}[c+d\,x]}}$$

Problem 301: Result unnecessarily involves higher level functions.

$$\int\frac{(e\,\text{Csc}[c+d\,x])^{3/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 250 leaves, 16 steps):

$$-\frac{4\,e\,\text{Cos}[c+d\,x]\,\sqrt{e\,\text{Csc}[c+d\,x]}}{15\,a^2\,d}+\frac{16\,e\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]\,\sqrt{e\,\text{Csc}[c+d\,x]}}{45\,a^2\,d}-\frac{2\,e\,\text{Cot}[c+d\,x]^3\,\text{Csc}[c+d\,x]\,\sqrt{e\,\text{Csc}[c+d\,x]}}{9\,a^2\,d}-\frac{4\,e\,\text{Csc}[c+d\,x]^2\,\sqrt{e\,\text{Csc}[c+d\,x]}}{5\,a^2\,d}-\frac{2\,e\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]^3\,\sqrt{e\,\text{Csc}[c+d\,x]}}{9\,a^2\,d}+\frac{4\,e\,\text{Csc}[c+d\,x]^4\,\sqrt{e\,\text{Csc}[c+d\,x]}}{9\,a^2\,d}-\frac{4\,e\,\sqrt{e\,\text{Csc}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]\sqrt{\text{Sin}[c+d\,x]}}{15\,a^2\,d}$$

Result (type 5, 238 leaves):

$$\frac{1}{15\,a^2\,(1+\text{Sec}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^4(e\,\text{Csc}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]\left(\left(16\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{i\,e^{i\,(c+d\,x)}}{-1+e^{2\,i\,(c+d\,x)}}}\left(-1+e^{2\,i\,(c+d\,x)}+\left(1+e^{2\,i\,c}\right)\sqrt{1-e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]\right)\Big/\left(d\left(1+e^{2\,i\,c}\right)\text{Csc}[c+d\,x]^{3/2}\right)-\frac{2\left(24\,\text{Cos}[d\,x]\,\text{Sec}[c]+(8+13\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\text{Tan}[c+d\,x]}{3\,d}\right)$$

Problem 303: Result unnecessarily involves higher level functions.

$$\int\frac{1}{\sqrt{e\,\text{Csc}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 199 leaves, 14 steps):

$$\frac{16\,\text{Cot}[c+d\,x]}{5\,a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{2\,\text{Cot}[c+d\,x]^3}{5\,a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{4\,\text{Csc}[c+d\,x]}{a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{2\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]^2}{5\,a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{4\,\text{Csc}[c+d\,x]^3}{5\,a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{28\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]}{5\,a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]}}$$

Result (type 5, 241 leaves):

$$\left(4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\sqrt{\text{Csc}[c+d\,x]}\,\text{Sec}[c+d\,x]^2\left(-1\Big/\left(1+e^{2\,i\,c}\right)28\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{i\,e^{i\,(c+d\,x)}}{-1+e^{2\,i\,(c+d\,x)}}}\left(-1+e^{2\,i\,(c+d\,x)}+\left(1+e^{2\,i\,c}\right)\sqrt{1-e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]\right)+\sqrt{\text{Csc}[c+d\,x]}\left(-(-23+5\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Sec}[c]+2\left(-10+\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+5\,\text{Sin}[c]\,\text{Sin}[d\,x]\right)\right)\right)\right)\Big/\left(5\,a^2\,d\,\sqrt{e\,\text{Csc}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^2\right)$$

- **Problem 305: Result unnecessarily involves higher level functions.**

$$\int\frac{1}{(e\,\text{Csc}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 215 leaves, 13 steps):

$$-\frac{2\,\text{Cot}[c+d\,x]}{a^2\,d\,e^2\,\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{2\,\text{Cos}[c+d\,x]^2\,\text{Cot}[c+d\,x]}{a^2\,d\,e^2\,\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{4\,\text{Csc}[c+d\,x]}{a^2\,d\,e^2\,\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{44\,\text{EllipticE}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),2\right]}{5\,a^2\,d\,e^2\,\sqrt{e\,\text{Csc}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]}}+\frac{4\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,e^2\,\sqrt{e\,\text{Csc}[c+d\,x]}}-\frac{12\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{5\,a^2\,d\,e^2\,\sqrt{e\,\text{Csc}[c+d\,x]}}$$

Result (type 5, 351 leaves):

$$\left(176\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{i\,e^{i\,(c+d\,x)}}{-1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}[c+d\,x]^{5/2}\left(-1+e^{2\,i\,(c+d\,x)}+\left(1+e^{2\,i\,c}\right)\sqrt{1-e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}[c+d\,x]^2\right)\Big/\left(5\,d\left(1+e^{2\,i\,c}\right)(e\,\text{Csc}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}[c+d\,x]^3\,\text{Sec}[c+d\,x]^2\left(\frac{56}{3\,d}-\frac{8\,\text{Cos}[2\,c]\,\text{Cos}[2\,d\,x]}{3\,d}+\frac{2\,\text{Cos}[3\,c]\,\text{Cos}[3\,d\,x]}{5\,d}+\frac{(-129+47\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Sec}[c]}{5\,d}-\frac{94\,\text{Sin}[c]\,\text{Sin}[d\,x]}{5\,d}+\frac{8\,\text{Sin}[2\,c]\,\text{Sin}[2\,d\,x]}{3\,d}-\frac{2\,\text{Sin}[3\,c]\,\text{Sin}[3\,d\,x]}{5\,d}\right)\right)\Big/\left((e\,\text{Csc}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 306: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(e\,\text{Csc}[c+d\,x])^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 172 leaves, 13 steps):

$$-\frac{4}{a^2\,d\,e^3\,\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{26\,\text{Cos}[c+d\,x]}{21\,a^2\,d\,e^3\,\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{2\,\text{Cos}[c+d\,x]^3}{7\,a^2\,d\,e^3\,\sqrt{e\,\text{Csc}[c+d\,x]}}+\frac{52\,\text{EllipticF}\left[\frac{1}{2}\left(c-\frac{\pi}{2}+d\,x\right),\,2\right]}{21\,a^2\,d\,e^3\,\sqrt{e\,\text{Csc}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]}}+\frac{4\,\text{Sin}[c+d\,x]^2}{5\,a^2\,d\,e^3\,\sqrt{e\,\text{Csc}[c+d\,x]}}$$

Result (type 4, 365 leaves):

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}[c+d\,x]^4\,\text{Sec}[c+d\,x]^2\left(\frac{58\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{21\,d}-\frac{2\,\text{Cos}[d\,x]\,\text{Sec}[c]\,(-520\,\text{Sin}[c]+357\,\text{Sin}[2\,c])}{105\,d}-\frac{4\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{5\,d}+\frac{\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{7\,d}-\frac{4\,(-260+357\,\text{Cos}[c])\,\text{Sin}[d\,x]}{105\,d}+\frac{58\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{21\,d}-\frac{4\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{5\,d}+\frac{\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{7\,d}\right)\right)\Big/\left((e\,\text{Csc}[c+d\,x])^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)-\left(104\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}[c+d\,x]^{7/2}\,\text{Sec}[c+d\,x]^2\left(\frac{2\,\sqrt{\text{Csc}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\left(-c+\frac{\pi}{2}-d\,x\right),\,2\right]\sqrt{\text{Sin}[c+d\,x]}}{d}+\frac{2\,\text{Cos}[c+d\,x]^2\,\text{Sec}[c]}{d\,\sqrt{\text{Csc}[c+d\,x]}\,\sqrt{\left(-1+\text{Csc}[c+d\,x]^2\right)\text{Sin}[c+d\,x]^2}\,\sqrt{1-\text{Sin}[c+d\,x]^2}}\right)\right)\Big/\left(21\,(e\,\text{Csc}[c+d\,x])^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

Test results for the 365 problems in "4.5.1.4 (d tan)^n (a+b sec)^m.m"

- **Problem 12: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^4\,dx$$

Optimal (type 3, 73 leaves, 4 steps):

$$a\,x+\frac{3\,a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}-\frac{(8\,a+3\,a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{8\,d}+\frac{(4\,a+3\,a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^3}{12\,d}$$

Result (type 3, 230 leaves):

$$a\,x-\frac{3\,a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{3\,a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{a}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{5\,a}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{5\,a}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{4\,a\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

- **Problem 13: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^2\,dx$$

Optimal (type 3, 45 leaves, 3 steps):

$$-a\,x-\frac{a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{(2\,a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 142 leaves):

$$-a\,x+\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}-\frac{a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{a}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{a\,\text{Tan}[c+d\,x]}{d}$$

- **Problem 15: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 55 leaves, 3 steps):

$$a\,x-\frac{\text{Cot}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])}{3\,d}+\frac{\text{Cot}[c+d\,x]\,(3\,a+2\,a\,\text{Sec}[c+d\,x])}{3\,d}$$

Result (type 3, 136 leaves):

$$a\,x+\frac{5\,a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]}{12\,d}+\frac{4\,a\,\text{Cot}[c+d\,x]}{3\,d}-\frac{a\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{24\,d}-\frac{a\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]^2}{3\,d}+\frac{5\,a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{12\,d}-\frac{a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{24\,d}$$

- **Problem 16: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d\,x]^6\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 84 leaves, 4 steps):

$$-a x-\frac{\text{Cot}[c+d x]^5 (a+a \text{Sec}[c+d x])}{5 d}+\frac{\text{Cot}[c+d x]^3 (5 a+4 a \text{Sec}[c+d x])}{15 d}-\frac{\text{Cot}[c+d x] (15 a+8 a \text{Sec}[c+d x])}{15 d}$$

Result (type 3, 219 leaves) :

$$-a x-\frac{89 a \text{Cot}\left[\frac{1}{2} (c+d x)\right]}{240 d}-\frac{23 a \text{Cot}[c+d x]}{15 d}+\frac{31 a \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{480 d}-\frac{a \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^4}{160 d}+\frac{11 a \text{Cot}[c+d x] \text{Csc}[c+d x]^2}{15 d}-\frac{a \text{Cot}[c+d x] \text{Csc}[c+d x]^4}{5 d}-\frac{89 a \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{240 d}+\frac{31 a \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{480 d}-\frac{a \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{160 d}$$

Problem 17: Result more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d x]^8 (a+a \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 111 leaves, 5 steps) :

$$a x-\frac{\text{Cot}[c+d x]^7 (a+a \text{Sec}[c+d x])}{7 d}+\frac{\text{Cot}[c+d x]^5 (7 a+6 a \text{Sec}[c+d x])}{35 d}+\frac{\text{Cot}[c+d x] (35 a+16 a \text{Sec}[c+d x])}{35 d}-\frac{\text{Cot}[c+d x]^3 (35 a+24 a \text{Sec}[c+d x])}{105 d}$$

Result (type 3, 300 leaves) :

$$a x+\frac{381 a \text{Cot}\left[\frac{1}{2} (c+d x)\right]}{1120 d}+\frac{176 a \text{Cot}[c+d x]}{105 d}-\frac{179 a \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{2240 d}+\frac{a \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^4}{70 d}-\frac{a \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^6}{896 d}-\frac{122 a \text{Cot}[c+d x] \text{Csc}[c+d x]^2}{105 d}+\frac{22 a \text{Cot}[c+d x] \text{Csc}[c+d x]^4}{35 d}-\frac{a \text{Cot}[c+d x] \text{Csc}[c+d x]^6}{7 d}+\frac{381 a \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{1120 d}-\frac{179 a \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{2240 d}+\frac{a \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{70 d}-\frac{a \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{896 d}$$

Problem 18: Result more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d x]^{10} (a+a \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 140 leaves, 6 steps) :

$$-a x-\frac{\text{Cot}[c+d x]^9 (a+a \text{Sec}[c+d x])}{9 d}+\frac{\text{Cot}[c+d x]^7 (9 a+8 a \text{Sec}[c+d x])}{63 d}-\frac{\text{Cot}[c+d x]^5 (21 a+16 a \text{Sec}[c+d x])}{105 d}+\frac{\text{Cot}[c+d x]^3 (105 a+64 a \text{Sec}[c+d x])}{315 d}-\frac{\text{Cot}[c+d x] (315 a+128 a \text{Sec}[c+d x])}{315 d}$$

Result (type 3, 383 leaves):

$$-a x-\frac{25609 a \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]}{80640 d}-\frac{563 a \operatorname{Cot}[c+d x]}{315 d}+\frac{14711 a \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{161280 d}-\frac{1231 a \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^4}{53760 d}+\frac{109 a \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^6}{32256 d}-\frac{a \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^8}{4608 d}+\frac{506 a \operatorname{Cot}[c+d x] \operatorname{Csc}[c+d x]^2}{315 d}-\frac{136 a \operatorname{Cot}[c+d x] \operatorname{Csc}[c+d x]^4}{105 d}+\frac{37 a \operatorname{Cot}[c+d x] \operatorname{Csc}[c+d x]^6}{63 d}-\frac{a \operatorname{Cot}[c+d x] \operatorname{Csc}[c+d x]^8}{9 d}-\frac{25609 a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{80640 d}+\frac{14711 a \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{161280 d}-\frac{1231 a \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{53760 d}+\frac{109 a \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^6 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{32256 d}-\frac{a \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^8 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{4608 d}$$

Problem 29: Result more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]^6 \, dx$$

Optimal (type 3, 161 leaves, 12 steps):

$$-a^2 x-\frac{5 a^2 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{8 d}+\frac{a^2 \operatorname{Tan}[c+d x]}{d}+\frac{5 a^2 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{8 d}-\frac{a^2 \operatorname{Tan}[c+d x]^3}{3 d}-\frac{5 a^2 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]^3}{12 d}+\frac{a^2 \operatorname{Tan}[c+d x]^5}{5 d}+\frac{a^2 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]^5}{3 d}+\frac{a^2 \operatorname{Tan}[c+d x]^7}{7 d}$$

Result (type 3, 337 leaves):

$$\frac{1}{215040 d} a^2 (1+\operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \operatorname{Sec}[c+d x]^7 \left(33600 \operatorname{Cos}[c+d x]^7 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\right.$$
$$\operatorname{Sec}[c] (-14700 d x \operatorname{Cos}[d x]-14700 d x \operatorname{Cos}[2 c+d x]-8820 d x \operatorname{Cos}[2 c+3 d x]-8820 d x \operatorname{Cos}[4 c+3 d x]-2940 d x \operatorname{Cos}[4 c+5 d x]-$$
$$2940 d x \operatorname{Cos}[6 c+5 d x]-420 d x \operatorname{Cos}[6 c+7 d x]-420 d x \operatorname{Cos}[8 c+7 d x]+24640 \operatorname{Sin}[d x]-16240 \operatorname{Sin}[2 c+d x]+$$
$$2975 \operatorname{Sin}[c+2 d x]+2975 \operatorname{Sin}[3 c+2 d x]+14448 \operatorname{Sin}[2 c+3 d x]-10080 \operatorname{Sin}[4 c+3 d x]+980 \operatorname{Sin}[3 c+4 d x]+980 \operatorname{Sin}[5 c+4 d x]+$$
$$\left.6496 \operatorname{Sin}[4 c+5 d x]-1680 \operatorname{Sin}[6 c+5 d x]+1155 \operatorname{Sin}[5 c+6 d x]+1155 \operatorname{Sin}[7 c+6 d x]+1168 \operatorname{Sin}[6 c+7 d x])\right)$$

Problem 30: Result more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]^4 \, dx$$

Optimal (type 3, 119 leaves, 10 steps):

$$a^2 x+\frac{3 a^2 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{4 d}-\frac{a^2 \operatorname{Tan}[c+d x]}{d}-\frac{3 a^2 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{4 d}+\frac{a^2 \operatorname{Tan}[c+d x]^3}{3 d}+\frac{a^2 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]^3}{2 d}+\frac{a^2 \operatorname{Tan}[c+d x]^5}{5 d}$$

Result (type 3, 1173 leaves):

$$\frac{1}{4} x \text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2-\frac{3 \text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{16 d}+$$

$$\frac{3 \text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2}{16 d}+$$

$$\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{80 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^5}+\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(3 \text{Cos}\left[\frac{c}{2}\right]-2 \text{Sin}\left[\frac{c}{2}\right]\right)}{80 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}-$$

$$\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{480 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(-151 \text{Cos}\left[\frac{c}{2}\right]+149 \text{Sin}\left[\frac{c}{2}\right]\right)}{960 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}-$$

$$\frac{17 \text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{60 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{80 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^5}+$$

$$\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(-3 \text{Cos}\left[\frac{c}{2}\right]-2 \text{Sin}\left[\frac{c}{2}\right]\right)}{80 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}-\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{480 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(151 \text{Cos}\left[\frac{c}{2}\right]+149 \text{Sin}\left[\frac{c}{2}\right]\right)}{960 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}-\frac{17 \text{Cos}[c+d x]^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \text{Sin}\left[\frac{d x}{2}\right]}{60 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

Problem 31: Result more than twice size of optimal antiderivative.

$$\int (a+a \text{Sec}[c+d x])^2 \text{Tan}[c+d x]^2 \, dx$$

Optimal (type 3, 72 leaves, 8 steps):

$$-a^2 x-\frac{a^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{a^2 \text{Tan}[c+d x]}{d}+\frac{a^2 \text{Sec}[c+d x] \text{Tan}[c+d x]}{d}+\frac{a^2 \text{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 773 leaves):

$$-\frac{1}{4}x\,\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2+\frac{\text{Cos}[c+d x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2}{4 d}-$$

$$\frac{\text{Cos}[c+d x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2}{4 d}+$$

$$\frac{\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\,\text{Sin}\left[\frac{d x}{2}\right]}{24 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+\frac{\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(7\,\text{Cos}\left[\frac{c}{2}\right]-5\,\text{Sin}\left[\frac{c}{2}\right]\right)}{48 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\,\text{Sin}\left[\frac{d x}{2}\right]}{6 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+\frac{\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\,\text{Sin}\left[\frac{d x}{2}\right]}{24 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(-7\,\text{Cos}\left[\frac{c}{2}\right]-5\,\text{Sin}\left[\frac{c}{2}\right]\right)}{48 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\frac{\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\,\text{Sin}\left[\frac{d x}{2}\right]}{6 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

Problem 35: Result more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d x]^8\,(a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 139 leaves, 12 steps):

$$a^2 x+\frac{a^2\,\text{Cot}[c+d x]}{d}-\frac{a^2\,\text{Cot}[c+d x]^3}{3 d}+\frac{a^2\,\text{Cot}[c+d x]^5}{5 d}-\frac{2 a^2\,\text{Cot}[c+d x]^7}{7 d}+\frac{2 a^2\,\text{Csc}[c+d x]}{d}-\frac{2 a^2\,\text{Csc}[c+d x]^3}{d}+\frac{6 a^2\,\text{Csc}[c+d x]^5}{5 d}-\frac{2 a^2\,\text{Csc}[c+d x]^7}{7 d}$$

Result (type 3, 312 leaves):

$$\frac{1}{860160 d}a^2\,\text{Csc}\left[\frac{c}{2}\right]\text{Csc}\left[\frac{1}{2}(c+d x)\right]^7\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3$$
$$(5880 d x\,\text{Cos}[d x]-5880 d x\,\text{Cos}[2 c+d x]-3360 d x\,\text{Cos}[c+2 d x]+3360 d x\,\text{Cos}[3 c+2 d x]-1260 d x\,\text{Cos}[2 c+3 d x]+$$
$$1260 d x\,\text{Cos}[4 c+3 d x]+1680 d x\,\text{Cos}[3 c+4 d x]-1680 d x\,\text{Cos}[5 c+4 d x]-420 d x\,\text{Cos}[4 c+5 d x]+$$
$$420 d x\,\text{Cos}[6 c+5 d x]+4032\,\text{Sin}[c]-9632\,\text{Sin}[d x]-16002\,\text{Sin}[c+d x]+9144\,\text{Sin}[2(c+d x)]+3429\,\text{Sin}[3(c+d x)]-$$
$$4572\,\text{Sin}[4(c+d x)]+1143\,\text{Sin}[5(c+d x)]-11760\,\text{Sin}[2 c+d x]+8864\,\text{Sin}[c+2 d x]+3360\,\text{Sin}[3 c+2 d x]+$$
$$2064\,\text{Sin}[2 c+3 d x]+2520\,\text{Sin}[4 c+3 d x]-4432\,\text{Sin}[3 c+4 d x]-1680\,\text{Sin}[5 c+4 d x]+1528\,\text{Sin}[4 c+5 d x])$$

Problem 36: Result more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d x]^{10}\,(a+a\,\text{Sec}[c+d x])^2\,dx$$

Optimal (type 3, 179 leaves, 13 steps):

$$-a^2 x-\frac{a^2 \operatorname{Cot}[c+d x]}{d}+\frac{a^2 \operatorname{Cot}[c+d x]^3}{3 d}-\frac{a^2 \operatorname{Cot}[c+d x]^5}{5 d}+\frac{a^2 \operatorname{Cot}[c+d x]^7}{7 d}-\frac{2 a^2 \operatorname{Cot}[c+d x]^9}{9 d}-\frac{2 a^2 \operatorname{Csc}[c+d x]}{d}+\frac{8 a^2 \operatorname{Csc}[c+d x]^3}{3 d}-\frac{12 a^2 \operatorname{Csc}[c+d x]^5}{5 d}+\frac{8 a^2 \operatorname{Csc}[c+d x]^7}{7 d}-\frac{2 a^2 \operatorname{Csc}[c+d x]^9}{9 d}$$

Result (type 3, 428 leaves):

$$-\frac{1}{330301440 d} a^2 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^9 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (453600 d x \operatorname{Cos}[d x]-453600 d x \operatorname{Cos}[2 c+d x]-201600 d x \operatorname{Cos}[c+2 d x]+201600 d x \operatorname{Cos}[3 c+2 d x]-191520 d x \operatorname{Cos}[2 c+3 d x]+191520 d x \operatorname{Cos}[4 c+3 d x]+161280 d x \operatorname{Cos}[3 c+4 d x]-161280 d x \operatorname{Cos}[5 c+4 d x]+10080 d x \operatorname{Cos}[4 c+5 d x]-10080 d x \operatorname{Cos}[6 c+5 d x]-40320 d x \operatorname{Cos}[5 c+6 d x]+40320 d x \operatorname{Cos}[7 c+6 d x]+10080 d x \operatorname{Cos}[6 c+7 d x]-10080 d x \operatorname{Cos}[8 c+7 d x]+259584 \operatorname{Sin}[c]-897024 \operatorname{Sin}[d x]-1152405 \operatorname{Sin}[c+d x]+512180 \operatorname{Sin}[2(c+d x)]+486571 \operatorname{Sin}[3(c+d x)]-409744 \operatorname{Sin}[4(c+d x)]-25609 \operatorname{Sin}[5(c+d x)]+102436 \operatorname{Sin}[6(c+d x)]-25609 \operatorname{Sin}[7(c+d x)]-825216 \operatorname{Sin}[2 c+d x]+622976 \operatorname{Sin}[c+2 d x]+142464 \operatorname{Sin}[3 c+2 d x]+297088 \operatorname{Sin}[2 c+3 d x]+430080 \operatorname{Sin}[4 c+3 d x]-424192 \operatorname{Sin}[3 c+4 d x]-188160 \operatorname{Sin}[5 c+4 d x]+2048 \operatorname{Sin}[4 c+5 d x]-40320 \operatorname{Sin}[6 c+5 d x]+112768 \operatorname{Sin}[5 c+6 d x]+40320 \operatorname{Sin}[7 c+6 d x]-38272 \operatorname{Sin}[6 c+7 d x])$$

- **Problem 49: Result more than twice size of optimal antiderivative.**

$$\int (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Tan}[c+d x]^2 \, dx$$

Optimal (type 3, 98 leaves, 11 steps):

$$-a^3 x-\frac{13 a^3 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{8 d}+\frac{a^3 \operatorname{Tan}[c+d x]}{d}+\frac{11 a^3 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{8 d}+\frac{a^3 \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{4 d}+\frac{a^3 \operatorname{Tan}[c+d x]^3}{d}$$

Result (type 3, 230 leaves):

$$-\frac{1}{64 d} a^3 \operatorname{Sec}[c+d x]^4 \left(24 d x-39 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+39 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+4 \operatorname{Cos}[2(c+d x)]\left(8 d x-13 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+13 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\operatorname{Cos}[4(c+d x)]\left(8 d x-13 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+13 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)-38 \operatorname{Sin}[c+d x]-32 \operatorname{Sin}[2(c+d x)]-22 \operatorname{Sin}[3(c+d x)]\right)$$

- **Problem 50: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cot}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^3 \, dx$$

Optimal (type 3, 49 leaves, 11 steps):

$$-a^3 x+\frac{a^3 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}-\frac{4 a^3 \operatorname{Cot}[c+d x]}{d}-\frac{4 a^3 \operatorname{Csc}[c+d x]}{d}$$

Result (type 3, 109 leaves):

$$-\frac{1}{8\,d}a^3\,(1+\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^6$$
$$\left(d\,x+\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)$$

- **Problem 54: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d\,x]^{10}\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 179 leaves, 16 steps):

$$-a^3\,x-\frac{a^3\,\text{Cot}[c+d\,x]}{d}+\frac{a^3\,\text{Cot}[c+d\,x]^3}{3\,d}-\frac{a^3\,\text{Cot}[c+d\,x]^5}{5\,d}+\frac{a^3\,\text{Cot}[c+d\,x]^7}{7\,d}-\frac{4\,a^3\,\text{Cot}[c+d\,x]^9}{9\,d}-$$
$$\frac{3\,a^3\,\text{Csc}[c+d\,x]}{d}+\frac{13\,a^3\,\text{Csc}[c+d\,x]^3}{3\,d}-\frac{21\,a^3\,\text{Csc}[c+d\,x]^5}{5\,d}+\frac{15\,a^3\,\text{Csc}[c+d\,x]^7}{7\,d}-\frac{4\,a^3\,\text{Csc}[c+d\,x]^9}{9\,d}$$

Result (type 3, 370 leaves):

$$\frac{1}{41\,287\,680\,d}\,a^3\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^9\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3$$
$$(-181\,440\,d\,x\,\text{Cos}[d\,x]+181\,440\,d\,x\,\text{Cos}[2\,c+d\,x]+136\,080\,d\,x\,\text{Cos}[c+2\,d\,x]-136\,080\,d\,x\,\text{Cos}[3\,c+2\,d\,x]+10\,080\,d\,x\,\text{Cos}[2\,c+3\,d\,x]-$$
$$10\,080\,d\,x\,\text{Cos}[4\,c+3\,d\,x]-60\,480\,d\,x\,\text{Cos}[3\,c+4\,d\,x]+60\,480\,d\,x\,\text{Cos}[5\,c+4\,d\,x]+30\,240\,d\,x\,\text{Cos}[4\,c+5\,d\,x]-$$
$$30\,240\,d\,x\,\text{Cos}[6\,c+5\,d\,x]-5040\,d\,x\,\text{Cos}[5\,c+6\,d\,x]+5040\,d\,x\,\text{Cos}[7\,c+6\,d\,x]-169\,344\,\text{Sin}[c]+338\,112\,\text{Sin}[d\,x]+675\,036\,\text{Sin}[c+d\,x]-$$
$$506\,277\,\text{Sin}[2\,(c+d\,x)]-37\,502\,\text{Sin}[3\,(c+d\,x)]+225\,012\,\text{Sin}[4\,(c+d\,x)]-112\,506\,\text{Sin}[5\,(c+d\,x)]+18\,751\,\text{Sin}[6\,(c+d\,x)]+$$
$$431\,424\,\text{Sin}[2\,c+d\,x]-375\,552\,\text{Sin}[c+2\,d\,x]-201\,600\,\text{Sin}[3\,c+2\,d\,x]+41\,248\,\text{Sin}[2\,c+3\,d\,x]-84\,000\,\text{Sin}[4\,c+3\,d\,x]+$$
$$155\,712\,\text{Sin}[3\,c+4\,d\,x]+100\,800\,\text{Sin}[5\,c+4\,d\,x]-98\,016\,\text{Sin}[4\,c+5\,d\,x]-30\,240\,\text{Sin}[6\,c+5\,d\,x]+21\,376\,\text{Sin}[5\,c+6\,d\,x])$$

- **Problem 55: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d\,x]^{12}\,(a+a\,\text{Sec}[c+d\,x])^3\,dx$$

Optimal (type 3, 213 leaves, 17 steps):

$$a^3\,x+\frac{a^3\,\text{Cot}[c+d\,x]}{d}-\frac{a^3\,\text{Cot}[c+d\,x]^3}{3\,d}+\frac{a^3\,\text{Cot}[c+d\,x]^5}{5\,d}-\frac{a^3\,\text{Cot}[c+d\,x]^7}{7\,d}+\frac{a^3\,\text{Cot}[c+d\,x]^9}{9\,d}-\frac{4\,a^3\,\text{Cot}[c+d\,x]^{11}}{11\,d}+$$
$$\frac{3\,a^3\,\text{Csc}[c+d\,x]}{d}-\frac{16\,a^3\,\text{Csc}[c+d\,x]^3}{3\,d}+\frac{34\,a^3\,\text{Csc}[c+d\,x]^5}{5\,d}-\frac{36\,a^3\,\text{Csc}[c+d\,x]^7}{7\,d}+\frac{19\,a^3\,\text{Csc}[c+d\,x]^9}{9\,d}-\frac{4\,a^3\,\text{Csc}[c+d\,x]^{11}}{11\,d}$$

Result (type 3, 1035 leaves):

$$\frac{1}{8} x \operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3-\frac{112229 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{1419264 d}+$$
$$\frac{6155 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{236544 d}-$$
$$\frac{1033 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{177408 d}+$$
$$\frac{155 \operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{202752 d}-\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Cot}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^{10} \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3}{22528 d}-$$
$$\frac{347267 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{1419264 d}+$$
$$\frac{112229 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{1419264 d}-$$
$$\frac{6155 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{236544 d}+$$
$$\frac{1033 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{177408 d}-$$
$$\frac{155 \operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^9 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{202752 d}+$$
$$\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Csc}\left[\frac{c}{2}+\frac{d x}{2}\right]^{11} \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{22528 d}-$$
$$\frac{743 \operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{30720 d}+$$
$$\frac{7 \operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^9 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{3840 d}-\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^{11} (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{10240 d}+$$
$$\frac{7 \operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Tan}\left[\frac{c}{2}\right]}{3840 d}-\frac{\operatorname{Cos}[c+d x]^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^{10} (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Tan}\left[\frac{c}{2}\right]}{10240 d}$$

- **Problem 64: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Tan}[c+d x]^8}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 3, 105 leaves, 6 steps) :

$$\frac{x}{a}-\frac{5\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{16\,a\,d}-\frac{(16-5\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{16\,a\,d}+\frac{(8-5\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^3}{24\,a\,d}-\frac{(6-5\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^5}{30\,a\,d}$$

Result (type 3, 301 leaves) :

$$\frac{1}{3840\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\left(2400\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+\text{Sec}[c]\,\text{Sec}[c+d\,x]^6\right.$$
$$(2400\,d\,x\,\text{Cos}[c]+1800\,d\,x\,\text{Cos}[c+2\,d\,x]+1800\,d\,x\,\text{Cos}[3\,c+2\,d\,x]+720\,d\,x\,\text{Cos}[3\,c+4\,d\,x]+720\,d\,x\,\text{Cos}[5\,c+4\,d\,x]+120\,d\,x\,\text{Cos}[5\,c+6\,d\,x]+$$
$$120\,d\,x\,\text{Cos}[7\,c+6\,d\,x]+3680\,\text{Sin}[c]+450\,\text{Sin}[d\,x]+450\,\text{Sin}[2\,c+d\,x]-3360\,\text{Sin}[c+2\,d\,x]+2160\,\text{Sin}[3\,c+2\,d\,x]-25\,\text{Sin}[2\,c+3\,d\,x]-$$
$$\left.25\,\text{Sin}[4\,c+3\,d\,x]-1488\,\text{Sin}[3\,c+4\,d\,x]+720\,\text{Sin}[5\,c+4\,d\,x]+165\,\text{Sin}[4\,c+5\,d\,x]+165\,\text{Sin}[6\,c+5\,d\,x]-368\,\text{Sin}[5\,c+6\,d\,x])\right)$$

Problem 65: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tan}[c+d\,x]^6}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 78 leaves, 5 steps) :

$$-\frac{x}{a}+\frac{3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,a\,d}+\frac{(8-3\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{8\,a\,d}-\frac{(4-3\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^3}{12\,a\,d}$$

Result (type 3, 893 leaves) :

$$-\frac{2 x \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]}{a+a \,\text{Sec}[c+d x]}-\frac{3 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]}{4 d\, (a+a \,\text{Sec}[c+d x])}+$$

$$\frac{3 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]}{4 d\, (a+a \,\text{Sec}[c+d x])}+\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]}{8 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}-$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]\, \text{Sin}\left[\frac{d x}{2}\right]}{3 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x] \left(-19 \,\text{Cos}\left[\frac{c}{2}\right]+11 \,\text{Sin}\left[\frac{c}{2}\right]\right)}{24 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{8 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]\, \text{Sin}\left[\frac{d x}{2}\right]}{3 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]}{8 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}-$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]\, \text{Sin}\left[\frac{d x}{2}\right]}{3 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x] \left(19 \,\text{Cos}\left[\frac{c}{2}\right]+11 \,\text{Sin}\left[\frac{c}{2}\right]\right)}{24 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{8 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[c+d x]\, \text{Sin}\left[\frac{d x}{2}\right]}{3 d\, (a+a \,\text{Sec}[c+d x]) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

- **Problem 66: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[c+d x]^4}{a+a \,\text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 49 leaves, 4 steps):

$$\frac{x}{a}-\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{2 a d}-\frac{(2-\text{Sec}[c+d x])\, \text{Tan}[c+d x]}{2 a d}$$

Result (type 3, 241 leaves):

$$\frac{1}{2\,a\,(1+\text{Sec}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\left(4\,x+\frac{2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}-\frac{2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}+\frac{1}{d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{1}{d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-(4\,\text{Sin}[d\,x])\Big/\left(d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)$$

- **Problem 67: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]^2}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 21 leaves, 3 steps):

$$-\frac{x}{a}+\frac{\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}$$

Result (type 3, 60 leaves):

$$-\frac{d\,x+\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{a\,d}$$

- **Problem 69: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cot}[c+d\,x]^4}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 88 leaves, 5 steps):

$$\frac{x}{a}+\frac{\text{Cot}[c+d\,x]\,(15-8\,\text{Sec}[c+d\,x])}{15\,a\,d}-\frac{\text{Cot}[c+d\,x]^3\,(5-4\,\text{Sec}[c+d\,x])}{15\,a\,d}+\frac{\text{Cot}[c+d\,x]^5\,(1-\text{Sec}[c+d\,x])}{5\,a\,d}$$

Result (type 3, 254 leaves):

$$\frac{1}{1920\,a\,d\,(1+\text{Sec}[c+d\,x])}\text{Csc}\left[\frac{c}{2}\right]\text{Csc}[c+d\,x]^3\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\,(360\,d\,x\,\text{Cos}[d\,x]-360\,d\,x\,\text{Cos}[2\,c+d\,x]+120\,d\,x\,\text{Cos}[c+2\,d\,x]-120\,d\,x\,\text{Cos}[3\,c+2\,d\,x]-120\,d\,x\,\text{Cos}[2\,c+3\,d\,x]+120\,d\,x\,\text{Cos}[4\,c+3\,d\,x]-60\,d\,x\,\text{Cos}[3\,c+4\,d\,x]+60\,d\,x\,\text{Cos}[5\,c+4\,d\,x]-200\,\text{Sin}[c]-584\,\text{Sin}[d\,x]+534\,\text{Sin}[c+d\,x]+178\,\text{Sin}[2\,(c+d\,x)]-178\,\text{Sin}[3\,(c+d\,x)]-89\,\text{Sin}[4\,(c+d\,x)]-520\,\text{Sin}[2\,c+d\,x]-248\,\text{Sin}[c+2\,d\,x]-120\,\text{Sin}[3\,c+2\,d\,x]+248\,\text{Sin}[2\,c+3\,d\,x]+120\,\text{Sin}[4\,c+3\,d\,x]+184\,\text{Sin}[3\,c+4\,d\,x])$$

- **Problem 70: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cot}[c+d\,x]^6}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 117 leaves, 6 steps):

$$-\frac{x}{a}+\frac{\text{Cot}[c+d x]^3\,(35-24\,\text{Sec}[c+d x])}{105\,a\,d}-\frac{\text{Cot}[c+d x]\,(35-16\,\text{Sec}[c+d x])}{35\,a\,d}-\frac{\text{Cot}[c+d x]^5\,(7-6\,\text{Sec}[c+d x])}{35\,a\,d}+\frac{\text{Cot}[c+d x]^7\,(1-\text{Sec}[c+d x])}{7\,a\,d}$$

Result (type 3, 359 leaves):

$$\frac{1}{107520\,a\,d\,(1+\text{Sec}[c+d x])}\text{Csc}\left[\frac{c}{2}\right]\text{Csc}[c+d x]^5\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]\,(-16800\,d\,x\,\text{Cos}[d x]+16800\,d\,x\,\text{Cos}[2 c+d x]-4200\,d\,x\,\text{Cos}[c+2 d x]+4200\,d\,x\,\text{Cos}[3 c+2 d x]+8400\,d\,x\,\text{Cos}[2 c+3 d x]-8400\,d\,x\,\text{Cos}[4 c+3 d x]+3360\,d\,x\,\text{Cos}[3 c+4 d x]-3360\,d\,x\,\text{Cos}[5 c+4 d x]-1680\,d\,x\,\text{Cos}[4 c+5 d x]+1680\,d\,x\,\text{Cos}[6 c+5 d x]-840\,d\,x\,\text{Cos}[5 c+6 d x]+840\,d\,x\,\text{Cos}[7 c+6 d x]+3136\,\text{Sin}[c]+30112\,\text{Sin}[d x]-22860\,\text{Sin}[c+d x]-5715\,\text{Sin}[2\,(c+d x)]+11430\,\text{Sin}[3\,(c+d x)]+4572\,\text{Sin}[4\,(c+d x)]-2286\,\text{Sin}[5\,(c+d x)]-1143\,\text{Sin}[6\,(c+d x)]+26208\,\text{Sin}[2 c+d x]+14080\,\text{Sin}[c+2 d x]-16400\,\text{Sin}[2 c+3 d x]-11760\,\text{Sin}[4 c+3 d x]-7904\,\text{Sin}[3 c+4 d x]-3360\,\text{Sin}[5 c+4 d x]+3952\,\text{Sin}[4 c+5 d x]+1680\,\text{Sin}[6 c+5 d x]+2816\,\text{Sin}[5 c+6 d x])$$

- **Problem 79: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d x]^8}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 119 leaves, 11 steps):

$$\frac{x}{a^2}-\frac{3\,\text{ArcTanh}[\text{Sin}[c+d x]]}{4\,a^2\,d}-\frac{\text{Tan}[c+d x]}{a^2\,d}+\frac{3\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{4\,a^2\,d}+\frac{\text{Tan}[c+d x]^3}{3\,a^2\,d}-\frac{\text{Sec}[c+d x]\,\text{Tan}[c+d x]^3}{2\,a^2\,d}+\frac{\text{Tan}[c+d x]^5}{5\,a^2\,d}$$

Result (type 3, 1167 leaves):

$$\frac{4\,x\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{3\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}[c+d\,x]^2}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-$$

$$\frac{3\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}[c+d\,x]^2}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^5}+$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\left(-2\,\mathrm{Cos}\left[\frac{c}{2}\right]+3\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}-$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{30\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\left(149\,\mathrm{Cos}\left[\frac{c}{2}\right]-151\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{60\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}-$$

$$\frac{68\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{15\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^5}+$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\left(2\,\mathrm{Cos}\left[\frac{c}{2}\right]+3\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}-$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{30\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\left(-149\,\mathrm{Cos}\left[\frac{c}{2}\right]-151\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{60\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}-$$

$$\frac{68\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{15\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 80: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Tan}[c+d\,x]^6}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 72 leaves, 9 steps) :

$$-\frac{x}{a^2}+\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{\text{Tan}[c+d x]}{a^2 d}-\frac{\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{a^2 d}+\frac{\text{Tan}[c+d x]^3}{3 a^2 d}$$

Result (type 3, 767 leaves) :

$$-\frac{4 x \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2}{(a+a\,\text{Sec}[c+d x])^2}-\frac{4 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]^2}{d\,(a+a\,\text{Sec}[c+d x])^2}+$$

$$\frac{4 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]^2}{d\,(a+a\,\text{Sec}[c+d x])^2}+\frac{2 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 \,\text{Sin}\left[\frac{d x}{2}\right]}{3 d\,(a+a\,\text{Sec}[c+d x])^2 \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 \left(-5 \,\text{Cos}\left[\frac{c}{2}\right]+7 \,\text{Sin}\left[\frac{c}{2}\right]\right)}{3 d\,(a+a\,\text{Sec}[c+d x])^2 \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{8 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 \,\text{Sin}\left[\frac{d x}{2}\right]}{3 d\,(a+a\,\text{Sec}[c+d x])^2 \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+$$

$$\frac{2 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 \,\text{Sin}\left[\frac{d x}{2}\right]}{3 d\,(a+a\,\text{Sec}[c+d x])^2 \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 \left(5 \,\text{Cos}\left[\frac{c}{2}\right]+7 \,\text{Sin}\left[\frac{c}{2}\right]\right)}{3 d\,(a+a\,\text{Sec}[c+d x])^2 \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{8 \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 \,\text{Sin}\left[\frac{d x}{2}\right]}{3 d\,(a+a\,\text{Sec}[c+d x])^2 \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

- **Problem 81: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[c+d x]^4}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 34 leaves, 5 steps) :

$$\frac{x}{a^2}-\frac{2 \,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{\text{Tan}[c+d x]}{a^2 d}$$

Result (type 3, 177 leaves) :

$$\frac{1}{a^2 d (1+\text{Sec}[c+d x])^2} 4 \text{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \text{Sec}[c+d x]^2 \left(d x+2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\text{Sin}[d x] \Big/ \left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)$$

Problem 84: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d x]^4}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 139 leaves, 13 steps):

$$\frac{x}{a^2}+\frac{\text{Cot}[c+d x]}{a^2 d}-\frac{\text{Cot}[c+d x]^3}{3 a^2 d}+\frac{\text{Cot}[c+d x]^5}{5 a^2 d}-\frac{2 \text{Cot}[c+d x]^7}{7 a^2 d}-\frac{2 \text{Csc}[c+d x]}{a^2 d}+\frac{2 \text{Csc}[c+d x]^3}{a^2 d}-\frac{6 \text{Csc}[c+d x]^5}{5 a^2 d}+\frac{2 \text{Csc}[c+d x]^7}{7 a^2 d}$$

Result (type 3, 314 leaves):

$$\frac{1}{26880 a^2 d (1+\text{Sec}[c+d x])^2} \text{Csc}\left[\frac{c}{2}\right] \text{Csc}[c+d x]^3 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (5880 d x \text{Cos}[d x]-5880 d x \text{Cos}[2 c+d x]+3360 d x \text{Cos}[c+2 d x]-3360 d x \text{Cos}[3 c+2 d x]-1260 d x \text{Cos}[2 c+3 d x]+1260 d x \text{Cos}[4 c+3 d x]-1680 d x \text{Cos}[3 c+4 d x]+1680 d x \text{Cos}[5 c+4 d x]-420 d x \text{Cos}[4 c+5 d x]+420 d x \text{Cos}[6 c+5 d x]-4032 \text{Sin}[c]-9632 \text{Sin}[d x]+16002 \text{Sin}[c+d x]+9144 \text{Sin}[2 (c+d x)]-3429 \text{Sin}[3 (c+d x)]-4572 \text{Sin}[4 (c+d x)]-1143 \text{Sin}[5 (c+d x)]-11760 \text{Sin}[2 c+d x]-8864 \text{Sin}[c+2 d x]-3360 \text{Sin}[3 c+2 d x]+2064 \text{Sin}[2 c+3 d x]+2520 \text{Sin}[4 c+3 d x]+4432 \text{Sin}[3 c+4 d x]+1680 \text{Sin}[5 c+4 d x]+1528 \text{Sin}[4 c+5 d x])$$

Problem 85: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d x]^6}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 179 leaves, 14 steps):

$$-\frac{x}{a^2}-\frac{\text{Cot}[c+d x]}{a^2 d}+\frac{\text{Cot}[c+d x]^3}{3 a^2 d}-\frac{\text{Cot}[c+d x]^5}{5 a^2 d}+\frac{\text{Cot}[c+d x]^7}{7 a^2 d}-\frac{2 \text{Cot}[c+d x]^9}{9 a^2 d}+\frac{2 \text{Csc}[c+d x]}{a^2 d}-\frac{8 \text{Csc}[c+d x]^3}{3 a^2 d}+\frac{12 \text{Csc}[c+d x]^5}{5 a^2 d}-\frac{8 \text{Csc}[c+d x]^7}{7 a^2 d}+\frac{2 \text{Csc}[c+d x]^9}{9 a^2 d}$$

Result (type 3, 802 leaves):

$$-\frac{4\,x\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{17\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Cot}\left[\frac{c}{2}\right]\mathrm{Cot}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Sec}[c+d\,x]^2}{160\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{\mathrm{Cot}\left[\frac{c}{2}\right]\mathrm{Cot}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Sec}[c+d\,x]^2}{160\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+$$

$$\frac{201\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Cot}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{160\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{17\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Cot}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{160\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+$$

$$\frac{\mathrm{Cot}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Csc}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{160\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{7891\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{5040\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+$$

$$\frac{63\,881\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{10\,080\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{313\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{840\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-$$

$$\frac{109\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{2016\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{288\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{313\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{840\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-$$

$$\frac{7891\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{5040\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{109\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{2016\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{288\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}$$

Problem 97: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Tan}[c+d\,x]^8}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 99 leaves, 12 steps):

$$\frac{x}{a^3}-\frac{13\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,a^3\,d}-\frac{\mathrm{Tan}[c+d\,x]}{a^3\,d}+\frac{11\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{8\,a^3\,d}+\frac{\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{4\,a^3\,d}-\frac{\mathrm{Tan}[c+d\,x]^3}{a^3\,d}$$

Result (type 3, 230 leaves):

$$\frac{1}{64\,a^3\,d}\mathrm{Sec}[c+d\,x]^4\left(24\,d\,x+39\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$

$$4\,\mathrm{Cos}[2\,(c+d\,x)]\left(8\,d\,x+13\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-13\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$

$$\mathrm{Cos}[4\,(c+d\,x)]\left(8\,d\,x+13\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-13\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$

$$\left.39\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+38\,\mathrm{Sin}[c+d\,x]-32\,\mathrm{Sin}[2\,(c+d\,x)]+22\,\mathrm{Sin}[3\,(c+d\,x)]\right)$$

Problem 98: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Tan}[c+d\,x]^6}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 66 leaves, 6 steps):

$$-\frac{x}{a^3}+\frac{7\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}-\frac{5\,\text{Tan}[c+d\,x]}{2\,a^3\,d}-\frac{(1-\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{2\,a^3\,d}$$

Result (type 3, 241 leaves):

$$\frac{1}{a^3\,(1+\text{Sec}[c+d\,x])^3}2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^6\,\text{Sec}[c+d\,x]^3\left(-4\,x-\frac{14\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{14\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{1}{d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{1}{d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-(12\,\text{Sin}[d\,x])\Big/\left(d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)$$

Problem 99: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tan}[c+d\,x]^4}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 46 leaves, 12 steps):

$$\frac{x}{a^3}+\frac{\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^3\,d}-\frac{4\,\text{Tan}[c+d\,x]}{a^2\,d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 117 leaves):

$$\frac{1}{a^3\,d\,(1+\text{Sec}[c+d\,x])^3}8\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^3\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(d\,x-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)$$

Problem 100: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tan}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 60 leaves, 12 steps):

$$-\frac{x}{a^3}+\frac{2\,\text{Tan}[c+d\,x]}{a^2\,d\,(a+a\,\text{Sec}[c+d\,x])}-\frac{\text{Tan}[c+d\,x]^3}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 125 leaves):

$$-\frac{1}{480\,a^3\,d}\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(180\,d\,x\operatorname{Cos}\left[\frac{d\,x}{2}\right]+180\,d\,x\operatorname{Cos}\left[c+\frac{d\,x}{2}\right]+60\,d\,x\operatorname{Cos}\left[c+\frac{3\,d\,x}{2}\right]+60\,d\,x\operatorname{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-471\operatorname{Sin}\left[\frac{d\,x}{2}\right]+351\operatorname{Sin}\left[c+\frac{d\,x}{2}\right]-277\operatorname{Sin}\left[c+\frac{3\,d\,x}{2}\right]-3\operatorname{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]\right)$$

Problem 102: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Cot}[c+d\,x]^4}{(a+a\operatorname{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 177 leaves, 17 steps):

$$\frac{x}{a^3}+\frac{\operatorname{Cot}[c+d\,x]}{a^3\,d}-\frac{\operatorname{Cot}[c+d\,x]^3}{3\,a^3\,d}+\frac{\operatorname{Cot}[c+d\,x]^5}{5\,a^3\,d}-\frac{\operatorname{Cot}[c+d\,x]^7}{7\,a^3\,d}+\frac{4\operatorname{Cot}[c+d\,x]^9}{9\,a^3\,d}-\frac{3\operatorname{Csc}[c+d\,x]}{a^3\,d}+\frac{13\operatorname{Csc}[c+d\,x]^3}{3\,a^3\,d}-\frac{21\operatorname{Csc}[c+d\,x]^5}{5\,a^3\,d}+\frac{15\operatorname{Csc}[c+d\,x]^7}{7\,a^3\,d}-\frac{4\operatorname{Csc}[c+d\,x]^9}{9\,a^3\,d}$$

Result (type 3, 366 leaves):

$$\frac{1}{80640\,a^3\,d\,(1+\operatorname{Sec}[c+d\,x])^3}\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Csc}[2\,(c+d\,x)]^3\operatorname{Sec}\left[\frac{c}{2}\right](181440\,d\,x\operatorname{Cos}[d\,x]-181440\,d\,x\operatorname{Cos}[2\,c+d\,x]+136080\,d\,x\operatorname{Cos}[c+2\,d\,x]-136080\,d\,x\operatorname{Cos}[3\,c+2\,d\,x]-10080\,d\,x\operatorname{Cos}[2\,c+3\,d\,x]+10080\,d\,x\operatorname{Cos}[4\,c+3\,d\,x]-60480\,d\,x\operatorname{Cos}[3\,c+4\,d\,x]+60480\,d\,x\operatorname{Cos}[5\,c+4\,d\,x]-30240\,d\,x\operatorname{Cos}[4\,c+5\,d\,x]+30240\,d\,x\operatorname{Cos}[6\,c+5\,d\,x]-5040\,d\,x\operatorname{Cos}[5\,c+6\,d\,x]+5040\,d\,x\operatorname{Cos}[7\,c+6\,d\,x]-169344\operatorname{Sin}[c]-338112\operatorname{Sin}[d\,x]+675036\operatorname{Sin}[c+d\,x]+506277\operatorname{Sin}[2\,(c+d\,x)]-37502\operatorname{Sin}[3\,(c+d\,x)]-225012\operatorname{Sin}[4\,(c+d\,x)]-112506\operatorname{Sin}[5\,(c+d\,x)]-18751\operatorname{Sin}[6\,(c+d\,x)]-431424\operatorname{Sin}[2\,c+d\,x]-375552\operatorname{Sin}[c+2\,d\,x]-201600\operatorname{Sin}[3\,c+2\,d\,x]-41248\operatorname{Sin}[2\,c+3\,d\,x]+84000\operatorname{Sin}[4\,c+3\,d\,x]+155712\operatorname{Sin}[3\,c+4\,d\,x]+100800\operatorname{Sin}[5\,c+4\,d\,x]+98016\operatorname{Sin}[4\,c+5\,d\,x]+30240\operatorname{Sin}[6\,c+5\,d\,x]+21376\operatorname{Sin}[5\,c+6\,d\,x])$$

Problem 104: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+a\operatorname{Sec}[c+d\,x])\,(e\operatorname{Tan}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 310 leaves, 17 steps):

$$\frac{a\,e^{5/2}\operatorname{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\operatorname{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}-\frac{a\,e^{5/2}\operatorname{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\operatorname{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}-\frac{a\,e^{5/2}\operatorname{Log}\left[\sqrt{e}+\sqrt{e}\operatorname{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\operatorname{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d}+\frac{a\,e^{5/2}\operatorname{Log}\left[\sqrt{e}+\sqrt{e}\operatorname{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\operatorname{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d}+\frac{6\,a\,e^2\operatorname{Cos}[c+d\,x]\operatorname{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{e\operatorname{Tan}[c+d\,x]}}{5\,d\,\sqrt{\operatorname{Sin}[2\,c+2\,d\,x]}}-\frac{6\,a\,e\operatorname{Cos}[c+d\,x]\,(e\operatorname{Tan}[c+d\,x])^{3/2}}{5\,d}+\frac{2\,e\,(5\,a+3\,a\operatorname{Sec}[c+d\,x])\,(e\operatorname{Tan}[c+d\,x])^{3/2}}{15\,d}$$

Result (type 4, 332 leaves):

$$a\left(\frac{1}{d}\right.$$

$$\text{Cos}[c+d x]\,\text{Cot}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2(1+\text{Sec}[c+d x])\,(e\,\text{Tan}[c+d x])^{5/2}\left(-\frac{3}{5}\text{Sin}[c+d x]+\frac{1}{3}\text{Tan}[c+d x]+\frac{1}{5}\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)+$$

$$\frac{1}{10\,d\,\text{Tan}[c+d x]^{5/2}}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2(1+\text{Sec}[c+d x])\,(e\,\text{Tan}[c+d x])^{5/2}$$

$$\left(-\frac{5}{2}\text{Csc}[c+d x]\left(-\text{ArcSin}[\text{Cos}[c+d x]-\text{Sin}[c+d x]]-\text{Log}\left[\text{Cos}[c+d x]+\text{Sin}[c+d x]+\sqrt{\text{Sin}[2(c+d x)]}\right]\right)\sqrt{\text{Sin}[2(c+d x)]}\right.$$

$$\sqrt{\text{Tan}[c+d x]}+\frac{1}{\sqrt{1+\text{Tan}[c+d x]^2}}6\,\text{Sec}[c+d x]\left((-1)^{3/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d x]}\right],-1\right]-\right.$$

$$\left.\left.\left.(-1)^{3/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d x]}\right],-1\right]+\frac{\text{Tan}[c+d x]^{3/2}}{\sqrt{1+\text{Tan}[c+d x]^2}}\right)\right)\right)$$

- **Problem 105: Result unnecessarily involves imaginary or complex numbers.**

$$\int(a+a\,\text{Sec}[c+d x])\,(e\,\text{Tan}[c+d x])^{3/2}\,dx$$

Optimal (type 4, 282 leaves, 16 steps):

$$\frac{a\,e^{3/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}-\frac{a\,e^{3/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}+$$

$$\frac{a\,e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d x]-\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}\right]}{2\sqrt{2}\,d}-\frac{a\,e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d x]+\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}\right]}{2\sqrt{2}\,d}-$$

$$\frac{a\,e^2\,\text{EllipticF}\left[c-\frac{\pi}{4}+d x,2\right]\text{Sec}[c+d x]\sqrt{\text{Sin}[2c+2d x]}}{3\,d\sqrt{e\,\text{Tan}[c+d x]}}+\frac{2\,e\,(3a+a\,\text{Sec}[c+d x])\sqrt{e\,\text{Tan}[c+d x]}}{3\,d}$$

Result (type 4, 214 leaves):

$$-\frac{1}{12\,d\,\left(-1+\text{Tan}[c+d\,x]^2\right)}\,a\,e\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$
$$\sqrt{\text{Sec}[c+d\,x]^2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\,\left(4\,(-1)^{1/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Tan}[c+d\,x]}\,+\right.$$
$$\sqrt{\text{Sec}[c+d\,x]^2}\,\left(12\,\text{Sin}[c+d\,x]+3\,\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\,-\right.$$
$$\left.\left.3\,\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\,+4\,\text{Tan}[c+d\,x]\right)\right)$$

- **Problem 106: Result unnecessarily involves imaginary or complex numbers.**

$$\int (a+a\,\text{Sec}[c+d\,x])\,\sqrt{e\,\text{Tan}[c+d\,x]}\,dx$$

Optimal (type 4, 272 leaves, 16 steps):

$$-\frac{a\,\sqrt{e}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}+\frac{a\,\sqrt{e}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}+$$
$$\frac{a\,\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d}-\frac{a\,\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d}-$$
$$\frac{2\,a\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{2\,a\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{d\,e}$$

Result (type 4, 207 leaves):

$$-\frac{1}{4\,d\,\sqrt{\text{Sec}[c+d\,x]^2}}\,a\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\left(\left(\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]+\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]\right)\,\sqrt{\text{Sec}[c+d\,x]^2}\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\,+\right.$$
$$4\,(-1)^{3/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Tan}[c+d\,x]}\,-$$
$$\left.4\,(-1)^{3/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Tan}[c+d\,x]}\right)\,\sqrt{e\,\text{Tan}[c+d\,x]}$$

- **Problem 107: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{a+a\,\text{Sec}[c+d\,x]}{\sqrt{e\,\text{Tan}[c+d\,x]}}\,dx$$

Optimal (type 4, 244 leaves, 15 steps):

$$-\frac{a\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,\sqrt{e}}+\frac{a\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,\sqrt{e}}-\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,\sqrt{e}}+$$
$$\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,\sqrt{e}}+\frac{a\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{d\,\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 6, 1511 leaves) :

$$\left(45\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(c+d\,x)\right](1+\text{Sec}[c+d\,x])\,\text{Sin}[c+d\,x]\right.$$
$$\left(5\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-4\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.$$
$$\left.\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+2\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\Big/$$
$$\left(d\left(5\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(-2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.\right.$$
$$\left.\left.\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$
$$\left(225\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]^2\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]-\right.$$
$$450\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]^2\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-$$
$$180\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$
$$\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2+90\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$
$$\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2+$$
$$360\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$
$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-180\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$
$$\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$360\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$
$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-180\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$
$$72\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$
$$72\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$
$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+18\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$
$$400\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},3,\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$
$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+200\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},2,\frac{13}{4},\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-150\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$
$$\left.\left.\text{AppellF1}\left[\frac{9}{4},\frac{5}{2},1,\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3\right)\sqrt{e\,\text{Tan}[c+d x]}\right)$$

- **Problem 108: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{a+a\,\text{Sec}[c+d x]}{(e\,\text{Tan}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 305 leaves, 17 steps):

$$\frac{a\,\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{3/2}}-\frac{a\,\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{3/2}}-$$
$$\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d x]-\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}\right]}{2\sqrt{2}\,d\,e^{3/2}}+\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d x]+\sqrt{2}\sqrt{e\,\text{Tan}[c+d x]}\right]}{2\sqrt{2}\,d\,e^{3/2}}-$$
$$\frac{2\,(a+a\,\text{Sec}[c+d x])}{d\,e\sqrt{e\,\text{Tan}[c+d x]}}-\frac{2\,a\,\text{Cos}[c+d x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d x,2\right]\sqrt{e\,\text{Tan}[c+d x]}}{d\,e^2\sqrt{\text{Sin}[2c+2d x]}}+\frac{2\,a\,\text{Cos}[c+d x]\,(e\,\text{Tan}[c+d x])^{3/2}}{d\,e^3}$$

Result (type 4, 312 leaves):

$$a\left(\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2(1+\text{Sec}[c+dx])\,\text{Sin}[c+dx]\left(-\text{Cot}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}[c+dx]\right)\text{Tan}[c+dx]}{d\,(e\,\text{Tan}[c+dx])^{3/2}}+\right.$$

$$\frac{1}{2\,d\,(e\,\text{Tan}[c+dx])^{3/2}}\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2(1+\text{Sec}[c+dx])\,\text{Tan}[c+dx]^{3/2}$$

$$\left(-\frac{1}{2}\text{Csc}[c+dx]\left(-\text{ArcSin}[\text{Cos}[c+dx]-\text{Sin}[c+dx]]-\text{Log}\left[\text{Cos}[c+dx]+\text{Sin}[c+dx]+\sqrt{\text{Sin}[2(c+dx)]}\right]\right)\sqrt{\text{Sin}[2(c+dx)]}\right.$$

$$\sqrt{\text{Tan}[c+dx]}-\frac{1}{\sqrt{1+\text{Tan}[c+dx]^2}}2\,\text{Sec}[c+dx]\left((-1)^{3/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+dx]}\right],-1\right]-\right.$$

$$\left.\left.\left.(-1)^{3/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+dx]}\right],-1\right]+\frac{\text{Tan}[c+dx]^{3/2}}{\sqrt{1+\text{Tan}[c+dx]^2}}\right)\right)\right)$$

- **Problem 109: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{a+a\,\text{Sec}[c+dx]}{(e\,\text{Tan}[c+dx])^{5/2}}\,dx$$

Optimal (type 4, 282 leaves, 16 steps):

$$\frac{a\,\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+dx]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{5/2}}-\frac{a\,\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+dx]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{5/2}}+\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+dx]-\sqrt{2}\sqrt{e\,\text{Tan}[c+dx]}\right]}{2\sqrt{2}\,d\,e^{5/2}}-$$

$$\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+dx]+\sqrt{2}\sqrt{e\,\text{Tan}[c+dx]}\right]}{2\sqrt{2}\,d\,e^{5/2}}-\frac{2\,(a+a\,\text{Sec}[c+dx])}{3\,d\,e\,(e\,\text{Tan}[c+dx])^{3/2}}-\frac{a\,\text{EllipticF}\left[c-\frac{\pi}{4}+dx,2\right]\text{Sec}[c+dx]\sqrt{\text{Sin}[2c+2dx]}}{3\,d\,e^2\sqrt{e\,\text{Tan}[c+dx]}}$$

Result (type 4, 200 leaves):

$$-\frac{1}{6\,d\,e^3\sqrt{\text{Sec}[c+dx]^2}}a\,\text{Csc}[c+dx]$$

$$\left(\sqrt{\text{Sec}[c+dx]^2}\left(2\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]+2\,\text{Cos}\left[\frac{3}{2}(c+dx)\right]\text{Csc}\left[\frac{1}{2}(c+dx)\right]-3\,\text{ArcSin}[\text{Cos}[c+dx]-\text{Sin}[c+dx]]\sqrt{\text{Sin}[2(c+dx)]}+\right.\right.$$

$$\left.3\,\text{Log}\left[\text{Cos}[c+dx]+\text{Sin}[c+dx]+\sqrt{\text{Sin}[2(c+dx)]}\right]\sqrt{\text{Sin}[2(c+dx)]}\right)-$$

$$\left.4\,(-1)^{1/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+dx]}\right],-1\right]\sqrt{\text{Tan}[c+dx]}\right)\sqrt{e\,\text{Tan}[c+dx]}$$

Problem 110: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a+a\,\text{Sec}[c+d\,x]}{(e\,\text{Tan}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 346 leaves, 18 steps):

$$-\frac{a\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{7/2}}+\frac{a\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{7/2}}+\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,d\,e^{7/2}}-\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,d\,e^{7/2}}-\frac{2\,(a+a\,\text{Sec}[c+d\,x])}{5\,d\,e\,(e\,\text{Tan}[c+d\,x])^{5/2}}+\frac{2\,(5\,a+3\,a\,\text{Sec}[c+d\,x])}{5\,d\,e^3\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{6\,a\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{5\,d\,e^4\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{6\,a\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{5\,d\,e^5}$$

Result (type 4, 360 leaves):

$$a\left(\frac{1}{d\,(e\,\text{Tan}[c+d\,x])^{7/2}}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2(1+\text{Sec}[c+d\,x])\,\text{Sin}[c+d\,x]\left(\frac{19}{20}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{20}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2-\frac{3}{5}\text{Sin}[c+d\,x]-\frac{1}{4}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Tan}[c+d\,x]^3+\frac{1}{10\,d\,(e\,\text{Tan}[c+d\,x])^{7/2}}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2(1+\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^{7/2}\left(\frac{5}{2}\text{Csc}[c+d\,x]\left(-\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]-\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]\right)\sqrt{\text{Sin}[2\,(c+d\,x)]}\,\sqrt{\text{Tan}[c+d\,x]}+\frac{1}{\sqrt{1+\text{Tan}[c+d\,x]^2}}6\,\text{Sec}[c+d\,x]\left((-1)^{3/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]-(-1)^{3/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+\frac{\text{Tan}[c+d\,x]^{3/2}}{\sqrt{1+\text{Tan}[c+d\,x]^2}}\right)\right)\right)$$

Problem 111: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+a\,\text{Sec}[c+d\,x])^2\,(e\,\text{Tan}[c+d\,x])^{5/2}\,dx$$

Optimal (type 4, 366 leaves, 21 steps):

$$\frac{a^2 e^{5/2} \text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2} d}-\frac{a^2 e^{5/2} \text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2} d}-\frac{a^2 e^{5/2} \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]-\sqrt{2}\sqrt{e \text{Tan}[c+d x]}\right]}{2\sqrt{2} d}+$$
$$\frac{a^2 e^{5/2} \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]+\sqrt{2}\sqrt{e \text{Tan}[c+d x]}\right]}{2\sqrt{2} d}+\frac{12 a^2 e^2 \text{Cos}[c+d x] \text{EllipticE}\left[c-\frac{\pi}{4}+d x, 2\right]\sqrt{e \text{Tan}[c+d x]}}{5 d \sqrt{\text{Sin}[2 c+2 d x]}}+$$
$$\frac{2 a^2 e (e \text{Tan}[c+d x])^{3/2}}{3 d}-\frac{12 a^2 e \text{Cos}[c+d x] (e \text{Tan}[c+d x])^{3/2}}{5 d}+\frac{4 a^2 e \text{Sec}[c+d x] (e \text{Tan}[c+d x])^{3/2}}{5 d}+\frac{2 a^2 (e \text{Tan}[c+d x])^{7/2}}{7 d e}$$

Result (type 4, 338 leaves):

$$\left(\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{d x}{2}\right)\right]\right)^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[c+d x]^2 (a+a \text{Sec}[c+d x])^2 (e \text{Tan}[c+d x])^{5/2}\right.$$
$$\left(\frac{1}{20 d}\left(48 (-1)^{3/4} \text{EllipticE}\left[i \text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d x]}\right], -1\right]-48 (-1)^{3/4} \text{EllipticF}\left[i \text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d x]}\right], -1\right]+\right.\right.$$
$$5\sqrt{2}\left(2 \text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d x]}\right]-2 \text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d x]}\right]-\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d x]}+\text{Tan}[c+d x]\right]+\right.$$
$$\left.\left.\left.\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d x]}+\text{Tan}[c+d x]\right]\right)\right)+\frac{2 \text{Tan}[c+d x]^{3/2}\left(35+15 \text{Tan}[c+d x]^2+42\sqrt{1+\text{Tan}[c+d x]^2}\right)}{105 d}\right)\right)\Bigg/$$
$$\left(4\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{1}{2}(-c+\text{ArcTan}[\text{Tan}[c+d x]])\right)\right]\right)^2 \text{Tan}[c+d x]^{5/2}\left(1+\text{Tan}[c+d x]^2\right)^2\right)$$

Problem 112: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+a \text{Sec}[c+d x])^2 (e \text{Tan}[c+d x])^{3/2} \, dx$$

Optimal (type 4, 335 leaves, 20 steps):

$$\frac{a^2 e^{3/2} \text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2} d}-\frac{a^2 e^{3/2} \text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2} d}+\frac{a^2 e^{3/2} \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]-\sqrt{2}\sqrt{e \text{Tan}[c+d x]}\right]}{2\sqrt{2} d}-$$
$$\frac{a^2 e^{3/2} \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]+\sqrt{2}\sqrt{e \text{Tan}[c+d x]}\right]}{2\sqrt{2} d}-\frac{2 a^2 e^2 \text{EllipticF}\left[c-\frac{\pi}{4}+d x, 2\right] \text{Sec}[c+d x]\sqrt{\text{Sin}[2 c+2 d x]}}{3 d \sqrt{e \text{Tan}[c+d x]}}+$$
$$\frac{2 a^2 e \sqrt{e \text{Tan}[c+d x]}}{d}+\frac{4 a^2 e \text{Sec}[c+d x]\sqrt{e \text{Tan}[c+d x]}}{3 d}+\frac{2 a^2 (e \text{Tan}[c+d x])^{5/2}}{5 d e}$$

Result (type 4, 323 leaves) :

$$\left(\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{d\,x}{2}\right)\right]\right)^2\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^2\,(e\,\text{Tan}[c+d\,x])^{3/2}\left(\frac{1}{d}2\left(\frac{2}{3}(-1)^{1/4}\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+1\Big/\left(4\sqrt{2}\right)\left(2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]-2\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)\right)+\frac{2\left(\sqrt{\text{Tan}[c+d\,x]}+\frac{1}{5}\text{Tan}[c+d\,x]^{5/2}+\frac{2}{3}\sqrt{\text{Tan}[c+d\,x]}\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{d}\right)\right)\Big/\left(4\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{1}{2}(-c+\text{ArcTan}[\text{Tan}[c+d\,x]])\right)\right]\right)^2\text{Tan}[c+d\,x]^{3/2}\left(1+\text{Tan}[c+d\,x]^2\right)^2\right)$$

- **Problem 113: Result unnecessarily involves imaginary or complex numbers.**

$$\int (a+a\,\text{Sec}[c+d\,x])^2\sqrt{e\,\text{Tan}[c+d\,x]}\,dx$$

Optimal (type 4, 309 leaves, 19 steps) :

$$-\frac{a^2\sqrt{e}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}+\frac{a^2\sqrt{e}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d}+\frac{a^2\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,d}-\frac{a^2\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,d}-\frac{4\,a^2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{d\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{2\,a^2\,(e\,\text{Tan}[c+d\,x])^{3/2}}{3\,d\,e}+\frac{4\,a^2\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{d\,e}$$

Result (type 4, 249 leaves) :

$$\frac{1}{12\,d\,\sqrt{\text{Tan}[c+d\,x]}}\,a^2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}\left[\frac{1}{2}\,\text{ArcTan}[\text{Tan}[c+d\,x]]\right]^4\,\sqrt{e\,\text{Tan}[c+d\,x]}\,\left(-6\,\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+6\,\sqrt{2}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]-48\,(-1)^{3/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+48\,(-1)^{3/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+3\,\sqrt{2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-3\,\sqrt{2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]+8\,\text{Tan}[c+d\,x]^{3/2}\right)$$

Problem 114: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2}{\sqrt{e\,\text{Tan}[c+d\,x]}}\,dx$$

Optimal (type 4, 278 leaves, 18 steps):

$$-\frac{a^2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,\sqrt{e}}+\frac{a^2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,\sqrt{e}}-\frac{a^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,\sqrt{e}}+\frac{a^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,\sqrt{e}}+\frac{2\,a^2\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{d\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{2\,a^2\,\sqrt{e\,\text{Tan}[c+d\,x]}}{d\,e}$$

Result (type 4, 218 leaves):

$$\frac{1}{4\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}\,a^2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}\left[\frac{1}{2}\,\text{ArcTan}[\text{Tan}[c+d\,x]]\right]^4\,\left(-2\,\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+2\,\sqrt{2}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]-16\,(-1)^{1/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]-\sqrt{2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]+\sqrt{2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]+8\,\sqrt{\text{Tan}[c+d\,x]}\right)\,\sqrt{\text{Tan}[c+d\,x]}$$

Problem 115: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2}{(e\,\text{Tan}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 310 leaves, 20 steps):

$$\frac{a^2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{3/2}}-\frac{a^2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{3/2}}-\frac{a^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,e^{3/2}}+\frac{a^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,e^{3/2}}-\frac{4\,a^2}{d\,e\,\sqrt{e\,\text{Tan}[c+d\,x]}}-\frac{4\,a^2\,\text{Cos}[c+d\,x]}{d\,e\,\sqrt{e\,\text{Tan}[c+d\,x]}}-\frac{4\,a^2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{d\,e^2\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}$$

Result (type 4, 304 leaves):

$$-\frac{1}{4\,d\,e\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}\,a^2\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}\left[\frac{1}{2}\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\right]^4\,\Big(16+16\,\sqrt{\mathrm{Sec}[c+d\,x]^2}-2\,\sqrt{2}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right]\,\sqrt{\mathrm{Tan}[c+d\,x]}+2\,\sqrt{2}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right]\,\sqrt{\mathrm{Tan}[c+d\,x]}+16\,(-1)^{3/4}\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right],-1\right]\,\sqrt{\mathrm{Tan}[c+d\,x]}-16\,(-1)^{3/4}\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right],-1\right]\,\sqrt{\mathrm{Tan}[c+d\,x]}+\sqrt{2}\,\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]\,\sqrt{\mathrm{Tan}[c+d\,x]}-\sqrt{2}\,\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]\,\sqrt{\mathrm{Tan}[c+d\,x]}\Big)$$

Problem 116: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^2}{(e\,\mathrm{Tan}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 316 leaves, 20 steps):

$$\frac{a^2\,\mathrm{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{5/2}}-\frac{a^2\,\mathrm{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{5/2}}+\frac{a^2\,\mathrm{Log}\left[\sqrt{e}+\sqrt{e}\,\mathrm{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,e^{5/2}}-\frac{a^2\,\mathrm{Log}\left[\sqrt{e}+\sqrt{e}\,\mathrm{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,e^{5/2}}-\frac{4\,a^2}{3\,d\,e\,(e\,\mathrm{Tan}[c+d\,x])^{3/2}}-\frac{4\,a^2\,\mathrm{Sec}[c+d\,x]}{3\,d\,e\,(e\,\mathrm{Tan}[c+d\,x])^{3/2}}-\frac{2\,a^2\,\mathrm{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\,\mathrm{Sec}[c+d\,x]\,\sqrt{\mathrm{Sin}[2\,c+2\,d\,x]}}{3\,d\,e^2\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}$$

Result (type 4, 281 leaves):

$$\frac{1}{24\,d\,e^2\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}\,a^2\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Cos}[c+d\,x]\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Sec}\left[\frac{1}{2}\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\right]^4\,\Big(-16-16\,\sqrt{\mathrm{Sec}[c+d\,x]^2}+6\,\sqrt{2}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right]\,\mathrm{Tan}[c+d\,x]^{3/2}-6\,\sqrt{2}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right]\,\mathrm{Tan}[c+d\,x]^{3/2}+16\,(-1)^{1/4}\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right],-1\right]\,\mathrm{Tan}[c+d\,x]^{3/2}+3\,\sqrt{2}\,\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]\,\mathrm{Tan}[c+d\,x]^{3/2}-3\,\sqrt{2}\,\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]\,\mathrm{Tan}[c+d\,x]^{3/2}\Big)$$

Problem 117: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^2}{(e\,\mathrm{Tan}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 370 leaves, 22 steps):

$$-\frac{a^2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{7/2}}+\frac{a^2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,d\,e^{7/2}}+\frac{a^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,e^{7/2}}-$$

$$\frac{a^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,d\,e^{7/2}}-\frac{4\,a^2}{5\,d\,e\,(e\,\text{Tan}[c+d\,x])^{5/2}}-\frac{4\,a^2\,\text{Sec}[c+d\,x]}{5\,d\,e\,(e\,\text{Tan}[c+d\,x])^{5/2}}+$$

$$\frac{2\,a^2}{d\,e^3\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{12\,a^2\,\text{Cos}[c+d\,x]}{5\,d\,e^3\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{12\,a^2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{5\,d\,e^4\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}$$

Result (type 4, 367 leaves) :

$$\left(\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{d\,x}{2}\right)\right]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]^{7/2}\right.$$

$$\left(\frac{1}{20\,d}\left(48\,(-1)^{3/4}\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]-48\,(-1)^{3/4}\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+\right.\right.$$

$$5\,\sqrt{2}\,\left(-2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\right.$$

$$\left.\left.\left.\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)\right)+\frac{2\left(-\frac{2}{5\,\text{Tan}[c+d\,x]^{5/2}}+\frac{1}{\sqrt{\text{Tan}[c+d\,x]}}+\left(-\frac{2}{5\,\text{Tan}[c+d\,x]^{5/2}}+\frac{6}{5\,\sqrt{\text{Tan}[c+d\,x]}}\right)\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{d}\right)\right)\Big/$$

$$\left(4\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{1}{2}\,(-c+\text{ArcTan}[\text{Tan}[c+d\,x]])\right)\right]\right)^2\,(e\,\text{Tan}[c+d\,x])^{7/2}\,\left(1+\text{Tan}[c+d\,x]^2\right)^2\right)$$

Problem 118: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{11/2}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 330 leaves, 18 steps) :

$$\frac{e^{11/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}-\frac{e^{11/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{e^{11/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}-\frac{e^{11/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}+\frac{5\,e^6\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{21\,a\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{2\,e^5\,(21-5\,\text{Sec}[c+d\,x])\,\sqrt{e\,\text{Tan}[c+d\,x]}}{21\,a\,d}-\frac{2\,e^3\,(7-5\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{5/2}}{35\,a\,d}$$

Result (type 4, 316 leaves) :

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]^2\,(e\,\text{Tan}[c+d\,x])^{11/2}\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\left(\frac{1}{d}2\left(-\frac{5}{21}\,(-1)^{1/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],\,-1\right]+1\Big/\left(4\sqrt{2}\right)\left(2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]-2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)\right)+\frac{2\left(\sqrt{\text{Tan}[c+d\,x]}-\frac{1}{5}\,\text{Tan}[c+d\,x]^{5/2}+\sqrt{1+\text{Tan}[c+d\,x]^2}\left(-\frac{5}{21}\sqrt{\text{Tan}[c+d\,x]}+\frac{1}{7}\,\text{Tan}[c+d\,x]^{5/2}\right)\right)}{d}\right)\right)\Big/\left((1+\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^{11/2}\left(1+\text{Tan}[c+d\,x]^2\right)\right)$$

Problem 119: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{9/2}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 326 leaves, 18 steps) :

$$-\frac{e^{9/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{e^{9/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{e^{9/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}-\frac{e^{9/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}+\frac{6\,e^4\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{5\,a\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{6\,e^3\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{5\,a\,d}-\frac{2\,e^3\,(5-3\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{3/2}}{15\,a\,d}$$

Result (type 4, 305 leaves) :

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[c+d\,x]^2\,(e\,\text{Tan}[c+d\,x])^{9/2}\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\left(\frac{1}{20\,d}\left(24\,(-1)^{3/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]-24\,(-1)^{3/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+5\sqrt{2}\left(-2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]+2\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)\right)+\frac{2\,\text{Tan}[c+d\,x]^{3/2}\left(-5+3\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{15\,d}\right)\right)\Big/\left((1+\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^{9/2}\left(1+\text{Tan}[c+d\,x]^2\right)\right)$$

Problem 120: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{7/2}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 295 leaves, 17 steps) :

$$-\frac{e^{7/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{e^{7/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}-\frac{e^{7/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}+\frac{e^{7/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}-\frac{e^4\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\,\text{Sec}[c+d\,x]\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a\,d\sqrt{e\,\text{Tan}[c+d\,x]}}-\frac{2\,e^3\,(3-\text{Sec}[c+d\,x])\sqrt{e\,\text{Tan}[c+d\,x]}}{3\,a\,d}$$

Result (type 4, 262 leaves) :

$$\frac{1}{6\,a\,d\,(1+\text{Sec}[c+d\,x])^2\sqrt{\text{Tan}[c+d\,x]}}e^3\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\left(1+\sqrt{\text{Sec}[c+d\,x]^2}\right)\left(-6\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]+6\sqrt{2}\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]+8\,(-1)^{1/4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]-3\sqrt{2}\,\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]+3\sqrt{2}\,\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-24\sqrt{\text{Tan}[c+d\,x]}+8\sqrt{\text{Sec}[c+d\,x]^2}\sqrt{\text{Tan}[c+d\,x]}\right)\sqrt{e\,\text{Tan}[c+d\,x]}$$

Problem 121: Unable to integrate problem.

$$\int \frac{(e \operatorname{Tan}[c+d x])^{5/2}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 285 leaves, 17 steps):

$$\frac{e^{5/2} \operatorname{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a d}-\frac{e^{5/2} \operatorname{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a d}-\frac{e^{5/2} \operatorname{Log}\left[\sqrt{e}+\sqrt{e} \operatorname{Tan}[c+d x]-\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}\right]}{2 \sqrt{2}\, a d}+\frac{e^{5/2} \operatorname{Log}\left[\sqrt{e}+\sqrt{e} \operatorname{Tan}[c+d x]+\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}\right]}{2 \sqrt{2}\, a d}-\frac{2 e^2 \operatorname{Cos}[c+d x] \operatorname{EllipticE}\left[c-\frac{\pi}{4}+d x, 2\right] \sqrt{e \operatorname{Tan}[c+d x]}}{a d \sqrt{\operatorname{Sin}[2 c+2 d x]}}+\frac{2 e \operatorname{Cos}[c+d x]\,(e \operatorname{Tan}[c+d x])^{3/2}}{a d}$$

Result (type 8, 27 leaves):

$$\int \frac{(e \operatorname{Tan}[c+d x])^{5/2}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Problem 122: Unable to integrate problem.

$$\int \frac{(e \operatorname{Tan}[c+d x])^{3/2}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 257 leaves, 16 steps):

$$\frac{e^{3/2} \operatorname{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a d}-\frac{e^{3/2} \operatorname{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a d}+\frac{e^{3/2} \operatorname{Log}\left[\sqrt{e}+\sqrt{e} \operatorname{Tan}[c+d x]-\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}\right]}{2 \sqrt{2}\, a d}-\frac{e^{3/2} \operatorname{Log}\left[\sqrt{e}+\sqrt{e} \operatorname{Tan}[c+d x]+\sqrt{2} \sqrt{e \operatorname{Tan}[c+d x]}\right]}{2 \sqrt{2}\, a d}+\frac{e^2 \operatorname{EllipticF}\left[c-\frac{\pi}{4}+d x, 2\right] \operatorname{Sec}[c+d x] \sqrt{\operatorname{Sin}[2 c+2 d x]}}{a d \sqrt{e \operatorname{Tan}[c+d x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{(e \operatorname{Tan}[c+d x])^{3/2}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Problem 123: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{e \operatorname{Tan}[c+d x]}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 315 leaves, 18 steps):

$$-\frac{\sqrt{e}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{\sqrt{e}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+$$

$$\frac{\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,d}-\frac{\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,d}+$$

$$\frac{2\,e\,(1-\text{Sec}[c+d\,x])}{a\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}-\frac{2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{a\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{2\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{a\,d\,e}$$

Result (type 4, 261 leaves) :

$$\frac{1}{a\,d\,\sqrt{\text{Tan}[c+d\,x]}}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(1+\sqrt{\text{Sec}[c+d\,x]^2}\right)$$

$$\left(-(-1)^{3/4}\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],\,-1\right]+(-1)^{3/4}\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],\,-1\right]+\right.$$

$$\frac{1}{4\,\sqrt{2}}\left(-2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\right.$$

$$\left.\left.\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)+\frac{1}{\sqrt{\text{Tan}[c+d\,x]}}-\frac{\sqrt{\text{Sec}[c+d\,x]^2}}{\sqrt{\text{Tan}[c+d\,x]}}\right)\sqrt{e\,\text{Tan}[c+d\,x]}$$

- **Problem 124: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])\,\sqrt{e\,\text{Tan}[c+d\,x]}}\,dx$$

Optimal (type 4, 290 leaves, 17 steps) :

$$-\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d\,\sqrt{e}}+\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d\,\sqrt{e}}-\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,d\,\sqrt{e}}+$$

$$\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,d\,\sqrt{e}}+\frac{2\,e\,(1-\text{Sec}[c+d\,x])}{3\,a\,d\,(e\,\text{Tan}[c+d\,x])^{3/2}}-\frac{\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 4, 225 leaves) :

$$\frac{1}{24\,a\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(1+\sqrt{\text{Sec}[c+d\,x]^2}\right)$$
$$\left(8\,(-1)^{1/4}\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+3\,\sqrt{2}\,\left(-2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]-\right.\right.$$
$$\left.\left.\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]+\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)-\frac{8\left(-1+\sqrt{\text{Sec}[c+d\,x]^2}\right)}{\text{Tan}[c+d\,x]^{3/2}}\right)\sqrt{\text{Tan}[c+d\,x]}$$

- **Problem 125: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 359 leaves, 19 steps):

$$\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d\,e^{3/2}}-\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d\,e^{3/2}}-\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,d\,e^{3/2}}+$$
$$\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,d\,e^{3/2}}+\frac{2\,e\,(1-\text{Sec}[c+d\,x])}{5\,a\,d\,(e\,\text{Tan}[c+d\,x])^{5/2}}-\frac{2\,(5-3\,\text{Sec}[c+d\,x])}{5\,a\,d\,e\,\sqrt{e\,\text{Tan}[c+d\,x]}}+$$
$$\frac{6\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{5\,a\,d\,e^2\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{6\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{5\,a\,d\,e^3}$$

Result (type 4, 346 leaves):

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^{3/2}\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{20\,d}\left(24\,(-1)^{3/4}\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]-24\,(-1)^{3/4}\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+\right.\right.$$

$$5\sqrt{2}\left(2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]-2\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]-\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]+\right.$$

$$\left.\left.\left.\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)\right)+\frac{2\left(\frac{1}{5\,\text{Tan}[c+d\,x]^{5/2}}-\frac{1}{\sqrt{\text{Tan}[c+d\,x]}}+\left(-\frac{1}{5\,\text{Tan}[c+d\,x]^{5/2}}+\frac{3}{5\sqrt{\text{Tan}[c+d\,x]}}\right)\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{d}\right)\right)\Big/$$

$$\left((1+\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{3/2}\left(1+\text{Tan}[c+d\,x]^2\right)\right)$$

- **Problem 126: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 328 leaves, 18 steps):

$$\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d\,e^{5/2}}-\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d\,e^{5/2}}+$$

$$\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d\,e^{5/2}}-\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d\,e^{5/2}}+$$

$$\frac{2\,e\,(1-\text{Sec}[c+d\,x])}{7\,a\,d\,(e\,\text{Tan}[c+d\,x])^{7/2}}-\frac{2\,(7-5\,\text{Sec}[c+d\,x])}{21\,a\,d\,e\,(e\,\text{Tan}[c+d\,x])^{3/2}}+\frac{5\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\text{Sec}[c+d\,x]\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{21\,a\,d\,e^2\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 4, 304 leaves):

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^{5/2}\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\right.$$

$$\left(1/d2\left(-\frac{5}{21}(-1)^{1/4}\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Tan}[c+d\,x]}\right],-1\right]+1\Big/\left(4\sqrt{2}\right)\left(2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]-\right.\right.\right.$$

$$\left.\left.2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\right)\right)+$$

$$\left.\left.\frac{2\left(3-3\sqrt{1+\text{Tan}[c+d\,x]^2}+\text{Tan}[c+d\,x]^2\left(-7+5\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\right)}{21\,d\,\text{Tan}[c+d\,x]^{7/2}}\right)\right)\Big/$$

$$\left((1+\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{5/2}\left(1+\text{Tan}[c+d\,x]^2\right)\right)$$

Problem 127: Unable to integrate problem.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{13/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 372 leaves, 22 steps):

$$\frac{e^{13/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{13/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{13/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a^2\,d}+$$

$$\frac{e^{13/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a^2\,d}-\frac{12\,e^6\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{5\,a^2\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+$$

$$\frac{2\,e^5\,(e\,\text{Tan}[c+d\,x])^{3/2}}{3\,a^2\,d}+\frac{12\,e^5\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{5\,a^2\,d}-\frac{4\,e^5\,\text{Sec}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{5\,a^2\,d}+\frac{2\,e^3\,(e\,\text{Tan}[c+d\,x])^{7/2}}{7\,a^2\,d}$$

Result (type 8, 27 leaves):

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{13/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 128: Unable to integrate problem.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{11/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 339 leaves, 21 steps):

$$\frac{e^{11/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{11/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+\frac{e^{11/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-$$

$$\frac{e^{11/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}+\frac{2\,e^6\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}+$$

$$\frac{2\,e^5\,\sqrt{e\,\text{Tan}[c+d\,x]}}{a^2\,d}-\frac{4\,e^5\,\text{Sec}[c+d\,x]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{3\,a^2\,d}+\frac{2\,e^3\,(e\,\text{Tan}[c+d\,x])^{5/2}}{5\,a^2\,d}$$

Result (type 8, 27 leaves) :

$$\int \frac{(e\,\text{Tan}[c+d\,x])^{11/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 129: Unable to integrate problem.

$$\int \frac{(e\,\text{Tan}[c+d\,x])^{9/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 312 leaves, 20 steps) :

$$-\frac{e^{9/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+\frac{e^{9/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+$$

$$\frac{e^{9/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-\frac{e^{9/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}+$$

$$\frac{4\,e^4\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{a^2\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{2\,e^3\,(e\,\text{Tan}[c+d\,x])^{3/2}}{3\,a^2\,d}-\frac{4\,e^3\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{a^2\,d}$$

Result (type 8, 27 leaves) :

$$\int \frac{(e\,\text{Tan}[c+d\,x])^{9/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 130: Unable to integrate problem.

$$\int \frac{(e\,\text{Tan}[c+d\,x])^{7/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 281 leaves, 19 steps) :

$$-\frac{e^{7/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+\frac{e^{7/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{7/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}+\frac{e^{7/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-\frac{2\,e^4\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{2\,e^3\,\sqrt{e\,\text{Tan}[c+d\,x]}}{a^2\,d}$$

Result (type 8, 27 leaves):

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{7/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 131: Unable to integrate problem.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{5/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 310 leaves, 21 steps):

$$\frac{e^{5/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{5/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{5/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}+\frac{e^{5/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-\frac{4\,e^3}{a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{4\,e^3\,\text{Cos}[c+d\,x]}{a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{4\,e^2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{a^2\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{5/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 132: Unable to integrate problem.

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{3/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 316 leaves, 21 steps):

$$\frac{e^{3/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}-\frac{e^{3/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+$$
$$\frac{e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-\frac{e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-$$
$$\frac{4\,e^3}{3\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{3/2}}+\frac{4\,e^3\,\text{Sec}[c+d\,x]}{3\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{3/2}}+\frac{2\,e^2\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{3/2}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

- **Problem 133: Unable to integrate problem.**

$$\int\frac{\sqrt{e\,\text{Tan}[c+d\,x]}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 363 leaves, 23 steps):

$$-\frac{\sqrt{e}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+\frac{\sqrt{e}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d}+\frac{\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-$$
$$\frac{\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a^2\,d}-\frac{4\,e^3}{5\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{5/2}}+\frac{4\,e^3\,\text{Sec}[c+d\,x]}{5\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{5/2}}+$$
$$\frac{2\,e}{a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}-\frac{12\,e\,\text{Cos}[c+d\,x]}{5\,a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}-\frac{12\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{e\,\text{Tan}[c+d\,x]}}{5\,a^2\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{\sqrt{e\,\text{Tan}[c+d\,x]}}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

- **Problem 134: Mathematica result simpler than optimal antiderivative, IF it can be verified!**

$$\int\frac{1}{(a+a\,\text{Sec}[c+d\,x])^2\,\sqrt{e\,\text{Tan}[c+d\,x]}}\,dx$$

Optimal (type 4, 365 leaves, 23 steps):

$$-\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d\,\sqrt{e}}+\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a^2\,d\,\sqrt{e}}-\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a^2\,d\,\sqrt{e}}+$$

$$\frac{\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a^2\,d\,\sqrt{e}}-\frac{4\,e^3}{7\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{7/2}}+\frac{4\,e^3\,\text{Sec}[c+d\,x]}{7\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{7/2}}+$$

$$\frac{2\,e}{3\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{3/2}}-\frac{20\,e\,\text{Sec}[c+d\,x]}{21\,a^2\,d\,(e\,\text{Tan}[c+d\,x])^{3/2}}-\frac{10\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{21\,a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 3, 247 leaves):

$$-\left((60-126\,\text{Cos}[c]+40\,\text{Cos}[2\,c]-84\,\text{Cos}[d\,x]+26\,\text{Cos}[c-d\,x]+80\,\text{Cos}[c+d\,x]+20\,\text{Cos}[2\,(c+d\,x)]-84\,\text{Cos}[2\,c+d\,x]+26\,\text{Cos}[3\,c+d\,x]-21\,\text{Cos}[c+2\,d\,x]-21\,\text{Cos}[3\,c+2\,d\,x])\,\text{Sec}[2\,c]\,\text{Sin}[c+d\,x]\right)\Big/\left(42\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2\,\sqrt{e\,\text{Tan}[c+d\,x]}\right)-$$

$$\frac{1}{42\,a^2\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}\text{Sec}[2\,c]\,\text{Sec}[c+d\,x]\,\Big(21\,\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]\,\text{Cos}[2\,c]-21\,\text{Cos}[2\,c]\,\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]+2\,(-10+21\,\text{Cos}[c])\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\Big)\,\sqrt{\text{Sin}[2\,(c+d\,x)]}$$

Problem 135: Result more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]^5\,dx$$

Optimal (type 3, 147 leaves, 8 steps):

$$-\frac{2\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}+\frac{2\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}+$$

$$\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}{3\,a\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}{5\,a^2\,d}-\frac{6\,(a+a\,\text{Sec}[c+d\,x])^{7/2}}{7\,a^3\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{9/2}}{9\,a^4\,d}$$

Result (type 3, 533 leaves):

$$\frac{1}{144\,d}5\,(1-2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)]-2\,\text{Cos}[3\,(c+d\,x)]+2\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}[c+d\,x]^4\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}-\frac{1}{504\,d}$$
$$5\,(11-22\,\text{Cos}[c+d\,x]+22\,\text{Cos}[2\,(c+d\,x)]-4\,\text{Cos}[3\,(c+d\,x)]+4\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}[c+d\,x]^4\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}+\frac{1}{504\,d}$$
$$(107-88\,\text{Cos}[c+d\,x]+88\,\text{Cos}[2\,(c+d\,x)]-16\,\text{Cos}[3\,(c+d\,x)]+16\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}[c+d\,x]^4\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}-\frac{1}{1008\,d}$$
$$(109+34\,\text{Cos}[c+d\,x]+176\,\text{Cos}[2\,(c+d\,x)]-32\,\text{Cos}[3\,(c+d\,x)]+32\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}[c+d\,x]^4\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}+\frac{1}{5040\,d}$$
$$(557+902\,\text{Cos}[c+d\,x]+778\,\text{Cos}[2\,(c+d\,x)]+374\,\text{Cos}[3\,(c+d\,x)]+256\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}[c+d\,x]^4\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}+$$
$$\frac{1}{5040\,d}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(5040\,\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\right.$$
$$\left.\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(9008-1984\,\text{Sec}[c+d\,x]-1032\,\text{Sec}[c+d\,x]^2+230\,\text{Sec}[c+d\,x]^3+35\,\text{Sec}[c+d\,x]^4\right)\right)$$

- **Problem 136: Result more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]^3\,dx$$

Optimal (type 3, 99 leaves, 6 steps) :

$$\frac{2\,\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}-\frac{2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}-\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}{3\,a\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}{5\,a^2\,d}$$

Result (type 3, 315 leaves) :

$$-\frac{3\,(1-2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^2\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}}{20\,d}+\frac{(7-4\,\text{Cos}[c+d\,x]+4\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^2\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}}{20\,d}-\frac{(13+14\,\text{Cos}[c+d\,x]+16\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^2\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}}{60\,d}+\frac{1}{60\,d}\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(60\,\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(-\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]+\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-92+16\,\text{Sec}[c+d\,x]+3\,\text{Sec}[c+d\,x]^2\right)\right)$$

■ Problem 137: Result more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\,\text{Tan}[c+d\,x]\,dx$$

Optimal (type 3, 51 leaves, 4 steps):

$$-\frac{2\,\sqrt{a}\,\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}+\frac{2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}$$

Result (type 3, 144 leaves):

$$\frac{1}{d}\left(2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\sqrt{2}\,\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

■ Problem 138: Result more than twice size of optimal antiderivative.

$$\int\text{Cot}[c+d\,x]\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\,dx$$

Optimal (type 3, 73 leaves, 6 steps):

$$\frac{2\,\sqrt{a}\,\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}-\frac{\sqrt{2}\,\,\sqrt{a}\,\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{2}\,\sqrt{a}}\right]}{d}$$

Result (type 3, 237 leaves):

$$\frac{1}{2d}\text{Cos}\left[\frac{1}{4}(c+dx)\right]^2\left(-2\sqrt{2}\,\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2\right]+\text{Log}\left[\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]-\text{Log}\left[1+\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-3\,\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]+2\sqrt{2}\,\text{Log}\left[2+\sqrt{2}\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]+\text{Log}\left[3-\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]\right)\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a\,(1+\text{Sec}[c+dx])}$$

- **Problem 139: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+dx]^3\sqrt{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 131 leaves, 8 steps) :

$$-\frac{2\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+dx]}}{\sqrt{a}}\right]}{d}+\frac{7\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+dx]}}{\sqrt{2}\sqrt{a}}\right]}{4\sqrt{2}\,d}+\frac{a}{4d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a}{2d\,(1-\text{Sec}[c+dx])\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 3, 273 leaves) :

$$\frac{1}{16d}\left(-2\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2+\text{Cos}\left[\frac{1}{4}(c+dx)\right]^2\left(16\sqrt{2}\,\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2\right]-7\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]+7\,\text{Log}\left[1+\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-3\,\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]-16\sqrt{2}\,\text{Log}\left[2+\sqrt{2}\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]-7\,\text{Log}\left[3-\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]\right)\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]-4\left(-3+\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\sqrt{a\,(1+\text{Sec}[c+dx])}$$

- **Problem 141: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Tan}[c+dx]^6\,dx$$

Optimal (type 3, 222 leaves, 4 steps) :

$$-\frac{2\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2\,a\,\text{Tan}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}-\frac{2\,a^2\,\text{Tan}[c+d x]^3}{3\,d\,(a+a\,\text{Sec}[c+d x])^{3/2}}+$$
$$\frac{2\,a^3\,\text{Tan}[c+d x]^5}{5\,d\,(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{2\,a^4\,\text{Tan}[c+d x]^7}{d\,(a+a\,\text{Sec}[c+d x])^{7/2}}+\frac{10\,a^5\,\text{Tan}[c+d x]^9}{9\,d\,(a+a\,\text{Sec}[c+d x])^{9/2}}+\frac{2\,a^6\,\text{Tan}[c+d x]^{11}}{11\,d\,(a+a\,\text{Sec}[c+d x])^{11/2}}$$

Result (type 4, 959 leaves):

$$\frac{1}{64\,d\sqrt{\text{Sec}[c+d x]}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}$$
$$\left(\frac{1}{3465}2\,(14153+108232\,\text{Cos}[c+d x]+19924\,\text{Cos}[2\,(c+d x)]+56884\,\text{Cos}[3\,(c+d x)]+6086\,\text{Cos}[4\,(c+d x)]+13016\,\text{Cos}[5\,(c+d x)])\right.$$
$$\text{Sec}[c+d x]^{11/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+512\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\,\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)+$$
$$\frac{1}{176\,d}3\,(1+2\,\text{Cos}[c+d x]+2\,\text{Cos}[2\,(c+d x)]+2\,\text{Cos}[3\,(c+d x)]+2\,\text{Cos}[4\,(c+d x)]+2\,\text{Cos}[5\,(c+d x)])$$
$$\text{Sec}[c+d x]^5\sqrt{a\,(1+\text{Sec}[c+d x])}$$
$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{1056\,d}$$
$$5\,(13+26\,\text{Cos}[c+d x]+26\,\text{Cos}[2\,(c+d x)]+26\,\text{Cos}[3\,(c+d x)]+4\,\text{Cos}[4\,(c+d x)]+4\,\text{Cos}[5\,(c+d x)])$$
$$\text{Sec}[c+d x]^5\sqrt{a\,(1+\text{Sec}[c+d x])}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{5544\,d}$$
$$5\,(151+302\,\text{Cos}[c+d x]+104\,\text{Cos}[2\,(c+d x)]+104\,\text{Cos}[3\,(c+d x)]+16\,\text{Cos}[4\,(c+d x)]+16\,\text{Cos}[5\,(c+d x)])$$
$$\text{Sec}[c+d x]^5\sqrt{a\,(1+\text{Sec}[c+d x])}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{2464\,d}$$

$$(71 + 604 \text{Cos}[c + d x] + 208 \text{Cos}[2 (c + d x)] + 208 \text{Cos}[3 (c + d x)] + 32 \text{Cos}[4 (c + d x)] + 32 \text{Cos}[5 (c + d x)])$$
$$\text{Sec}[c + d x]^5 \sqrt{a (1 + \text{Sec}[c + d x])} \text{Tan}\left[\frac{1}{2} (c + d x)\right] + \frac{1}{18480 d}$$
$$(-587 + 2522 \text{Cos}[c + d x] - 646 \text{Cos}[2 (c + d x)] + 1664 \text{Cos}[3 (c + d x)] + 256 \text{Cos}[4 (c + d x)] + 256 \text{Cos}[5 (c + d x)])$$
$$\text{Sec}[c + d x]^5 \sqrt{a (1 + \text{Sec}[c + d x])} \text{Tan}\left[\frac{1}{2} (c + d x)\right] - \frac{1}{22176 d}$$
$$(-1867 + 3658 \text{Cos}[c + d x] - 2678 \text{Cos}[2 (c + d x)] + 1942 \text{Cos}[3 (c + d x)] - 874 \text{Cos}[4 (c + d x)] + 512 \text{Cos}[5 (c + d x)])$$
$$\text{Sec}[c + d x]^5 \sqrt{a (1 + \text{Sec}[c + d x])} \text{Tan}\left[\frac{1}{2} (c + d x)\right]$$

- **Problem 142: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{a + a \text{Sec}[c + d x]} \text{Tan}[c + d x]^4 \, dx$$

Optimal (type 3, 160 leaves, 4 steps) :

$$\frac{2 \sqrt{a} \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{d} - \frac{2 a \text{Tan}[c + d x]}{d \sqrt{a + a \text{Sec}[c + d x]}} + \frac{2 a^2 \text{Tan}[c + d x]^3}{3 d (a + a \text{Sec}[c + d x])^{3/2}} + \frac{6 a^3 \text{Tan}[c + d x]^5}{5 d (a + a \text{Sec}[c + d x])^{5/2}} + \frac{2 a^4 \text{Tan}[c + d x]^7}{7 d (a + a \text{Sec}[c + d x])^{7/2}}$$

Result (type 4, 681 leaves) :

$$\frac{1}{16\,d\,\sqrt{\text{Sec}[c+d\,x]}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left(-\frac{2}{105}\,(127+954\,\text{Cos}[c+d\,x]+142\,\text{Cos}[2\,(c+d\,x)]+352\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-128\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\right)-$$

$$\frac{1}{14\,d}(1+2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)]+2\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}[c+d\,x]^3\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{140\,d}$$

$$3\,(9+18\,\text{Cos}[c+d\,x]+4\,\text{Cos}[2\,(c+d\,x)]+4\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}[c+d\,x]^3$$

$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{210\,d}$$

$$(1+72\,\text{Cos}[c+d\,x]+16\,\text{Cos}[2\,(c+d\,x)]+16\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}[c+d\,x]^3\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{1}{280\,d}$$

$$(-33+74\,\text{Cos}[c+d\,x]-38\,\text{Cos}[2\,(c+d\,x)]+32\,\text{Cos}[3\,(c+d\,x)])$$

$$\text{Sec}[c+d\,x]^3\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

- **Problem 143: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]^2\,dx$$

Optimal (type 3, 96 leaves, 4 steps) :

$$-\frac{2\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a\,\text{Tan}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a^2\,\text{Tan}[c+d\,x]^3}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 4, 479 leaves):

$$\frac{1}{4\,d\sqrt{\text{Sec}[c+d\,x]}}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(\frac{2}{3}(1+8\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+32\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\right.$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\right)+$$

$$\frac{(1+2\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{3\,d}-$$

$$\frac{(-1+4\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{6\,d}$$

Problem 147: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^5\,dx$$

Optimal (type 3, 169 leaves, 9 steps):

$$-\frac{2\,a^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}+\frac{2\,a\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}{3\,d}+$$

$$\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}{5\,a\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{7/2}}{7\,a^2\,d}-\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{9/2}}{3\,a^3\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{11/2}}{11\,a^4\,d}$$

Result (type 3, 752 leaves):

$$\frac{1}{352\,d}(-1+2\,\text{Cos}[c+d\,x]-2\,\text{Cos}[2\,(c+d\,x)]+2\,\text{Cos}[3\,(c+d\,x)]-2\,\text{Cos}[4\,(c+d\,x)]+2\,\text{Cos}[5\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}+\frac{1}{6336\,d}5\,(-13+26\,\text{Cos}[c+d\,x]-26\,\text{Cos}[2\,(c+d\,x)]+26\,\text{Cos}[3\,(c+d\,x)]-4\,\text{Cos}[4\,(c+d\,x)]+4\,\text{Cos}[5\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}-\frac{1}{11\,088\,d}5\,(-151+302\,\text{Cos}[c+d\,x]-104\,\text{Cos}[2\,(c+d\,x)]+104\,\text{Cos}[3\,(c+d\,x)]-16\,\text{Cos}[4\,(c+d\,x)]+16\,\text{Cos}[5\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}+\frac{1}{14\,784\,d}5\,(-71+604\,\text{Cos}[c+d\,x]-208\,\text{Cos}[2\,(c+d\,x)]+208\,\text{Cos}[3\,(c+d\,x)]-32\,\text{Cos}[4\,(c+d\,x)]+32\,\text{Cos}[5\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}-\frac{1}{15\,840\,d}(587+2522\,\text{Cos}[c+d\,x]+646\,\text{Cos}[2\,(c+d\,x)]+1664\,\text{Cos}[3\,(c+d\,x)]-256\,\text{Cos}[4\,(c+d\,x)]+256\,\text{Cos}[5\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}+\frac{1}{14\,784\,d}(1867+3658\,\text{Cos}[c+d\,x]+2678\,\text{Cos}[2\,(c+d\,x)]+1942\,\text{Cos}[3\,(c+d\,x)]+874\,\text{Cos}[4\,(c+d\,x)]+512\,\text{Cos}[5\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}-\frac{1}{221\,760\,d}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(-110\,880\,\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,(-208\,256+48\,688\,\text{Sec}[c+d\,x]+32\,784\,\text{Sec}[c+d\,x]^2-8840\,\text{Sec}[c+d\,x]^3-2660\,\text{Sec}[c+d\,x]^4+315\,\text{Sec}[c+d\,x]^5)\right)$$

- **Problem 148: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^3\,dx$$

Optimal (type 3, 121 leaves, 7 steps) :

$$\frac{2\,a^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}-\frac{2\,a\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}-\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}{3\,d}-\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}{5\,a\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{7/2}}{7\,a^2\,d}$$

Result (type 3, 399 leaves) :

$$-\frac{1}{280\,d}3\,(-9+18\,\mathrm{Cos}[c+d\,x]-4\,\mathrm{Cos}[2\,(c+d\,x)]+4\,\mathrm{Cos}[3\,(c+d\,x)])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]^2\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}+$$
$$\frac{1}{210\,d}(-1+72\,\mathrm{Cos}[c+d\,x]-16\,\mathrm{Cos}[2\,(c+d\,x)]+16\,\mathrm{Cos}[3\,(c+d\,x)])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]^2\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}-$$
$$\frac{1}{560\,d}3\,(33+74\,\mathrm{Cos}[c+d\,x]+38\,\mathrm{Cos}[2\,(c+d\,x)]+32\,\mathrm{Cos}[3\,(c+d\,x)])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]^2\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}-$$
$$\frac{1}{1680\,d}\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}$$
$$\left(840\,\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\mathrm{Log}\left[2+\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\right.$$
$$\left.\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(1408-284\,\mathrm{Sec}[c+d\,x]-102\,\mathrm{Sec}[c+d\,x]^2+15\,\mathrm{Sec}[c+d\,x]^3\right)\right)$$

Problem 149: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Tan}[c+d\,x]\,dx$$

Optimal (type 3, 73 leaves, 5 steps) :

$$-\frac{2\,a^{3/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}+\frac{2\,a\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}{d}+\frac{2\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}}{3\,d}$$

Result (type 3, 158 leaves) :

$$\frac{1}{6\,d}\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\left(2+\mathrm{Cos}[c+d\,x]\,\left(8+3\,\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\mathrm{Log}\left[2+\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\right.\right.$$
$$\left.\left.\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}$$

Problem 150: Result more than twice size of optimal antiderivative.

$$\int\mathrm{Cot}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,dx$$

Optimal (type 3, 73 leaves, 6 steps) :

$$\frac{2 a^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}-\frac{2 \sqrt{2} a^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{2} \sqrt{a}}\right]}{d}$$

Result (type 3, 238 leaves) :

$$\frac{1}{2 d} \text{Cos}\left[\frac{1}{4} (c+d x)\right]^6 \left(-\sqrt{2} \text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right]+\text{Log}\left[\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-\text{Log}\left[1+\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-3 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]+\right.$$
$$\left.\sqrt{2} \text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]+\text{Log}\left[3-\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right)$$
$$\left(\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4\right)^{3/2} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}$$

- **Problem 151: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d x]^3 (a+a \text{Sec}[c+d x])^{3/2} \, dx$$

Optimal (type 3, 109 leaves, 7 steps) :

$$-\frac{2 a^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}+\frac{5 a^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{2} \sqrt{a}}\right]}{2 \sqrt{2} d}+\frac{a \sqrt{a+a \text{Sec}[c+d x]}}{2 d (1-\text{Sec}[c+d x])}$$

Result (type 3, 325 leaves) :

$$\frac{1}{d} \text{Cos}[c+d x] \left(\frac{1}{4} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\frac{1}{8} \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}+$$
$$\frac{1}{16 d} \text{Cos}\left[\frac{1}{4} (c+d x)\right]^2 \text{Cos}[c+d x] \left(8 \sqrt{2} \text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right]-5 \text{Log}\left[\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]+\right.$$
$$5 \text{Log}\left[1+\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-3 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-8 \sqrt{2} \text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-$$
$$\left.5 \text{Log}\left[3-\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right) \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}$$

- **Problem 153: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]^6 \, dx$$

Optimal (type 3, 258 leaves, 4 steps):

$$-\frac{2 a^{3/2} \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{d}+\frac{2 a^2 \text{Tan}[c+d x]}{d \sqrt{a+a \text{Sec}[c+d x]}}-\frac{2 a^3 \text{Tan}[c+d x]^3}{3 d (a+a \text{Sec}[c+d x])^{3/2}}+\frac{2 a^4 \text{Tan}[c+d x]^5}{5 d (a+a \text{Sec}[c+d x])^{5/2}}+\frac{30 a^5 \text{Tan}[c+d x]^7}{7 d (a+a \text{Sec}[c+d x])^{7/2}}+\frac{34 a^6 \text{Tan}[c+d x]^9}{9 d (a+a \text{Sec}[c+d x])^{9/2}}+\frac{14 a^7 \text{Tan}[c+d x]^{11}}{11 d (a+a \text{Sec}[c+d x])^{11/2}}+\frac{2 a^8 \text{Tan}[c+d x]^{13}}{13 d (a+a \text{Sec}[c+d x])^{13/2}}$$

Result (type 4, 1214 leaves):

$$\frac{1}{256 d \text{Sec}[c+d x]^{3/2}} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}$$

$$\left(\frac{1}{45045} 2 (1410481+633920 \text{Cos}[c+d x]+2153438 \text{Cos}[2 (c+d x)]+345060 \text{Cos}[3 (c+d x)]+915630 \text{Cos}[4 (c+d x)]+\right.$$

$$86048 \text{Cos}[5 (c+d x)]+176138 \text{Cos}[6 (c+d x)]) \text{Sec}[c+d x]^{13/2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+1024 \left(-3-2 \sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]^4$$

$$\sqrt{\frac{7-5 \sqrt{2}+\left(10-7 \sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]+2 \text{EllipticPi}\left[-3+2 \sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2} \text{Sec}[c+d x]^{3/2} \sqrt{3-2 \sqrt{2}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2}\right)+\frac{1}{1664 d}$$

$$3 (1+2 \text{Cos}[c+d x]+2 \text{Cos}[2 (c+d x)]+2 \text{Cos}[3 (c+d x)]+2 \text{Cos}[4 (c+d x)]+2 \text{Cos}[5 (c+d x)]+2 \text{Cos}[6 (c+d x)])$$

$$\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2$$

$$\text{Sec}[c+d x]^5$$

$$(a (1+\text{Sec}[c+d x]))^{3/2}$$

$$\text{Tan}\left[\frac{1}{2} (c+d x)\right]+\frac{1}{18304 d}$$

$$3 (15+30 \text{Cos}[c+d x]+30 \text{Cos}[2 (c+d x)]+30 \text{Cos}[3 (c+d x)]+30 \text{Cos}[4 (c+d x)]+4 \text{Cos}[5 (c+d x)]+4 \text{Cos}[6 (c+d x)])$$

$$\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}[c+d x]^5$$

$$(a (1+\text{Sec}[c+d x]))^{3/2} \text{Tan}\left[\frac{1}{2} (c+d x)\right]-\frac{1}{164736 d}$$

$$25\,(203+406\,\text{Cos}[c+d\,x]+406\,\text{Cos}[2\,(c+d\,x)]+120\,\text{Cos}[3\,(c+d\,x)]+120\,\text{Cos}[4\,(c+d\,x)]+16\,\text{Cos}[5\,(c+d\,x)]+16\,\text{Cos}[6\,(c+d\,x)])$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{128\,128\,d}$$
$$15\,(835+812\,\text{Cos}[c+d\,x]+812\,\text{Cos}[2\,(c+d\,x)]+240\,\text{Cos}[3\,(c+d\,x)]+240\,\text{Cos}[4\,(c+d\,x)]+32\,\text{Cos}[5\,(c+d\,x)]+32\,\text{Cos}[6\,(c+d\,x)])$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{49\,280\,d}$$
$$(3677+490\,\text{Cos}[c+d\,x]+6496\,\text{Cos}[2\,(c+d\,x)]+1920\,\text{Cos}[3\,(c+d\,x)]+1920\,\text{Cos}[4\,(c+d\,x)]+256\,\text{Cos}[5\,(c+d\,x)]+256\,\text{Cos}[6\,(c+d\,x)])$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{1\,153\,152\,d}$$
$$17\,(4351-5026\,\text{Cos}[c+d\,x]+6986\,\text{Cos}[2\,(c+d\,x)]-2166\,\text{Cos}[3\,(c+d\,x)]+3840\,\text{Cos}[4\,(c+d\,x)]+512\,\text{Cos}[5\,(c+d\,x)]+512\,\text{Cos}[6\,(c+d\,x)])$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{128\,128\,d}$$
$$(14\,401-26\,110\,\text{Cos}[c+d\,x]+21\,938\,\text{Cos}[2\,(c+d\,x)]-14\,670\,\text{Cos}[3\,(c+d\,x)]+9354\,\text{Cos}[4\,(c+d\,x)]-$$
$$3958\,\text{Cos}[5\,(c+d\,x)]+2048\,\text{Cos}[6\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

- **Problem 154: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^4\,dx$$

Optimal (type 3, 194 leaves, 4 steps):

$$\frac{2\,a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}-\frac{2\,a^2\,\text{Tan}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a^3\,\text{Tan}[c+d\,x]^3}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+$$
$$\frac{14\,a^4\,\text{Tan}[c+d\,x]^5}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}+\frac{10\,a^5\,\text{Tan}[c+d\,x]^7}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^{7/2}}+\frac{2\,a^6\,\text{Tan}[c+d\,x]^9}{9\,d\,(a+a\,\text{Sec}[c+d\,x])^{9/2}}$$

Result (type 4, 872 leaves):

$$\frac{1}{64\,d\,\text{Sec}[c+d\,x]^{3/2}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$

$$\left(-\frac{2}{315}\,(2897+1258\,\text{Cos}[c+d\,x]+3988\,\text{Cos}[2\,(c+d\,x)]+496\,\text{Cos}[3\,(c+d\,x)]+1126\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$256\,\left(-3-2\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\right)-$$

$$\frac{1}{288\,d}\,(1+2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)]+2\,\text{Cos}[3\,(c+d\,x)]+2\,\text{Cos}[4\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Sec}[c+d\,x]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{336\,d}$$

$$(11+22\,\text{Cos}[c+d\,x]+22\,\text{Cos}[2\,(c+d\,x)]+4\,\text{Cos}[3\,(c+d\,x)]+4\,\text{Cos}[4\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{1}{720\,d}\,(107+88\,\text{Cos}[c+d\,x]+88\,\text{Cos}[2\,(c+d\,x)]+16\,\text{Cos}[3\,(c+d\,x)]+16\,\text{Cos}[4\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{10\,080\,d}$$

$$11\,(109-34\,\text{Cos}[c+d\,x]+176\,\text{Cos}[2\,(c+d\,x)]+32\,\text{Cos}[3\,(c+d\,x)]+32\,\text{Cos}[4\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{3360\,d}$$

$$(557-902\,\text{Cos}[c+d\,x]+778\,\text{Cos}[2\,(c+d\,x)]-374\,\text{Cos}[3\,(c+d\,x)]+256\,\text{Cos}[4\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

Problem 155: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Sec}[c + d x])^{3/2} \operatorname{Tan}[c + d x]^2 \, dx$$

Optimal (type 3, 128 leaves, 4 steps):

$$-\frac{2 a^{3/2} \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{d} + \frac{2 a^2 \operatorname{Tan}[c + d x]}{d \sqrt{a + a \operatorname{Sec}[c + d x]}} + \frac{2 a^3 \operatorname{Tan}[c + d x]^3}{d (a + a \operatorname{Sec}[c + d x])^{3/2}} + \frac{2 a^4 \operatorname{Tan}[c + d x]^5}{5 d (a + a \operatorname{Sec}[c + d x])^{5/2}}$$

Result (type 4, 604 leaves):

$$\frac{1}{16 d \operatorname{Sec}[c + d x]^{3/2}} \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^3 (a (1 + \operatorname{Sec}[c + d x]))^{3/2}$$
$$\left(\frac{2}{15} (43 + 16 \operatorname{Cos}[c + d x] + 46 \operatorname{Cos}[2 (c + d x)]) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] + 64 \left(-3 - 2 \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4} (c + d x)\right]^4\right.$$
$$\sqrt{\frac{7 - 5 \sqrt{2} + \left(10 - 7 \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]}{1 + \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]}} \sqrt{\frac{-1 + \sqrt{2} - \left(-2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]}{1 + \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]}} \left(1 - \sqrt{2} + \left(-2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]\right)$$
$$\left(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4} (c + d x)\right]}{\sqrt{3 - 2 \sqrt{2}}}\right], 17 - 12 \sqrt{2}\right] + 2 \operatorname{EllipticPi}\left[-3 + 2 \sqrt{2}, -\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4} (c + d x)\right]}{\sqrt{3 - 2 \sqrt{2}}}\right], 17 - 12 \sqrt{2}\right]\right)$$
$$\left.\sqrt{\left(-1 - \sqrt{2} + \left(2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]\right) \operatorname{Sec}\left[\frac{1}{4} (c + d x)\right]^2} \operatorname{Sec}[c + d x]^{3/2} \sqrt{3 - 2 \sqrt{2} - \operatorname{Tan}\left[\frac{1}{4} (c + d x)\right]^2}\right) -$$
$$\frac{1}{40 d} (1 + 2 \operatorname{Cos}[c + d x] + 2 \operatorname{Cos}[2 (c + d x)]) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sec}[c + d x] (a (1 + \operatorname{Sec}[c + d x]))^{3/2}$$
$$\operatorname{Tan}\left[\frac{1}{2} (c + d x)\right] + \frac{1}{24 d}$$
$$(7 + 4 \operatorname{Cos}[c + d x] + 4 \operatorname{Cos}[2 (c + d x)]) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sec}[c + d x]$$
$$(a (1 + \operatorname{Sec}[c + d x]))^{3/2} \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right] - \frac{1}{40 d}$$
$$(13 - 14 \operatorname{Cos}[c + d x] + 16 \operatorname{Cos}[2 (c + d x)]) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Sec}[c + d x] (a (1 + \operatorname{Sec}[c + d x]))^{3/2} \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]$$

- **Problem 156: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d x]^2 (a+a \text{Sec}[c+d x])^{3/2} \, dx$$

Optimal (type 3, 64 leaves, 3 steps):

$$-\frac{2 a^{3/2} \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{d}-\frac{2 a \text{Cot}[c+d x] \sqrt{a+a \text{Sec}[c+d x]}}{d}$$

Result (type 4, 389 leaves):

$$\frac{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2} \left(-\frac{1}{2} \text{Csc}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}{d}+$$

$$\frac{1}{d} 4 \left(-3-2 \sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]^4 \sqrt{\frac{7-5 \sqrt{2}+\left(10-7 \sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]+2 \text{EllipticPi}\left[-3+2 \sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2} \sqrt{3-2 \sqrt{2}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2}$$

- **Problem 159: Result more than twice size of optimal antiderivative.**

$$\int (a+a \text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x]^5 \, dx$$

Optimal (type 3, 193 leaves, 10 steps):

$$-\frac{2 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}+\frac{2 a^2 \sqrt{a+a \text{Sec}[c+d x]}}{d}+\frac{2 a (a+a \text{Sec}[c+d x])^{3/2}}{3 d}+\frac{2 (a+a \text{Sec}[c+d x])^{5/2}}{5 d}+$$

$$\frac{2 (a+a \text{Sec}[c+d x])^{7/2}}{7 a d}+\frac{2 (a+a \text{Sec}[c+d x])^{9/2}}{9 a^2 d}-\frac{6 (a+a \text{Sec}[c+d x])^{11/2}}{11 a^3 d}+\frac{2 (a+a \text{Sec}[c+d x])^{13/2}}{13 a^4 d}$$

Result (type 3, 925 leaves):

$$-\frac{1}{3328\,d}5\,(1-2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)]-2\,\text{Cos}[3\,(c+d\,x)]+2\,\text{Cos}[4\,(c+d\,x)]-2\,\text{Cos}[5\,(c+d\,x)]+2\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}+\frac{1}{36\,608\,d}$$

$$35\,(15-30\,\text{Cos}[c+d\,x]+30\,\text{Cos}[2\,(c+d\,x)]-30\,\text{Cos}[3\,(c+d\,x)]+30\,\text{Cos}[4\,(c+d\,x)]-4\,\text{Cos}[5\,(c+d\,x)]+4\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}-\frac{1}{25\,344\,d}$$

$$5\,(203-406\,\text{Cos}[c+d\,x]+406\,\text{Cos}[2\,(c+d\,x)]-120\,\text{Cos}[3\,(c+d\,x)]+120\,\text{Cos}[4\,(c+d\,x)]-16\,\text{Cos}[5\,(c+d\,x)]+16\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}+\frac{1}{256\,256\,d}$$

$$15\,(835-812\,\text{Cos}[c+d\,x]+812\,\text{Cos}[2\,(c+d\,x)]-240\,\text{Cos}[3\,(c+d\,x)]+240\,\text{Cos}[4\,(c+d\,x)]-32\,\text{Cos}[5\,(c+d\,x)]+32\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}+\frac{1}{3\,843\,840\,d}$$

$$(3677-490\,\text{Cos}[c+d\,x]+6496\,\text{Cos}[2\,(c+d\,x)]-1920\,\text{Cos}[3\,(c+d\,x)]+1920\,\text{Cos}[4\,(c+d\,x)]-256\,\text{Cos}[5\,(c+d\,x)]+256\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}-\frac{1}{768\,768\,d}$$

$$5\,(4351+5026\,\text{Cos}[c+d\,x]+6986\,\text{Cos}[2\,(c+d\,x)]+2166\,\text{Cos}[3\,(c+d\,x)]+3840\,\text{Cos}[4\,(c+d\,x)]-512\,\text{Cos}[5\,(c+d\,x)]+512\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}+\frac{1}{768\,768\,d}5\,(14\,401+26\,110\,\text{Cos}[c+d\,x]+$$

$$21\,938\,\text{Cos}[2\,(c+d\,x)]+14\,670\,\text{Cos}[3\,(c+d\,x)]+9354\,\text{Cos}[4\,(c+d\,x)]+3958\,\text{Cos}[5\,(c+d\,x)]+2048\,\text{Cos}[6\,(c+d\,x)])$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}-\frac{1}{11\,531\,520\,d}\,\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$

$$\left(-2\,882\,880\,\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\right.$$

$$\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,(-5\,636\,416+1\,376\,768\,\text{Sec}[c+d\,x]+$$

$$\left.1\,129\,584\,\text{Sec}[c+d\,x]^2-340\,720\,\text{Sec}[c+d\,x]^3-152\,320\,\text{Sec}[c+d\,x]^4+28\,980\,\text{Sec}[c+d\,x]^5+3465\,\text{Sec}[c+d\,x]^6)\right)$$

- **Problem 160: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^3\,dx$$

Optimal (type 3, 145 leaves, 8 steps) :

$$\frac{2 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}-\frac{2 a^2 \sqrt{a+a \text{Sec}[c+d x]}}{d}-\frac{2 a (a+a \text{Sec}[c+d x])^{3/2}}{3 d}-\frac{2 (a+a \text{Sec}[c+d x])^{5/2}}{5 d}-\frac{2 (a+a \text{Sec}[c+d x])^{7/2}}{7 a d}+\frac{2 (a+a \text{Sec}[c+d x])^{9/2}}{9 a^2 d}$$

Result (type 3, 603 leaves) :

$$\frac{1}{576 d}7 (1-2 \text{Cos}[c+d x]+2 \text{Cos}[2 (c+d x)]-2 \text{Cos}[3 (c+d x)]+2 \text{Cos}[4 (c+d x)]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Sec}[c+d x]^2 (a (1+\text{Sec}[c+d x]))^{5/2}-\frac{1}{2016 d}11 (11-22 \text{Cos}[c+d x]+22 \text{Cos}[2 (c+d x)]-4 \text{Cos}[3 (c+d x)]+4 \text{Cos}[4 (c+d x)]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Sec}[c+d x]^2 (a (1+\text{Sec}[c+d x]))^{5/2}+\frac{1}{1440 d}(107-88 \text{Cos}[c+d x]+88 \text{Cos}[2 (c+d x)]-16 \text{Cos}[3 (c+d x)]+16 \text{Cos}[4 (c+d x)]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Sec}[c+d x]^2 (a (1+\text{Sec}[c+d x]))^{5/2}+\frac{1}{4032 d}(109+34 \text{Cos}[c+d x]+176 \text{Cos}[2 (c+d x)]-32 \text{Cos}[3 (c+d x)]+32 \text{Cos}[4 (c+d x)]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Sec}[c+d x]^2 (a (1+\text{Sec}[c+d x]))^{5/2}-\frac{1}{4032 d}(557+902 \text{Cos}[c+d x]+778 \text{Cos}[2 (c+d x)]+374 \text{Cos}[3 (c+d x)]+256 \text{Cos}[4 (c+d x)]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Sec}[c+d x]^2 (a (1+\text{Sec}[c+d x]))^{5/2}-\frac{1}{20160 d}\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\left(5040 \sqrt{2} \text{Cos}\left[\frac{1}{4} (c+d x)\right]^2 \left(\text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right]-\text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}+\text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(9008-1984 \text{Sec}[c+d x]-1032 \text{Sec}[c+d x]^2+230 \text{Sec}[c+d x]^3+35 \text{Sec}[c+d x]^4\right)\right)$$

Problem 161: Result more than twice size of optimal antiderivative.

$$\int (a+a \text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x] \, dx$$

Optimal (type 3, 97 leaves, 6 steps) :

$$-\frac{2 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}+\frac{2 a^2 \sqrt{a+a \text{Sec}[c+d x]}}{d}+\frac{2 a (a+a \text{Sec}[c+d x])^{3/2}}{3 d}+\frac{2 (a+a \text{Sec}[c+d x])^{5/2}}{5 d}$$

Result (type 3, 337 leaves) :

$$-\frac{9\,(1-2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{80\,d}+$$

$$\frac{(7-4\,\text{Cos}[c+d\,x]+4\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{48\,d}+$$

$$\frac{(13+14\,\text{Cos}[c+d\,x]+16\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{48\,d}-$$

$$\frac{1}{240\,d}\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$

$$\left(60\,\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(-\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]+\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\right.$$

$$\left.\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-92+16\,\text{Sec}[c+d\,x]+3\,\text{Sec}[c+d\,x]^2\right)\right)$$

- **Problem 162: Result more than twice size of optimal antiderivative.**

$$\int\text{Cot}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 95 leaves, 7 steps):

$$\frac{2\,a^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{d}-\frac{4\,\sqrt{2}\,a^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{2}\,\sqrt{a}}\right]}{d}+\frac{2\,a^2\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}$$

Result (type 3, 268 leaves):

$$-\frac{1}{4\,d}a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\left(-2+\right.$$

$$\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\left(\sqrt{2}\,\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-2\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]+2\,\text{Log}\left[1+\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-3\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\right.$$

$$\left.\sqrt{2}\,\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-2\,\text{Log}\left[3-\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)$$

$$\left.\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

Problem 163: Result more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d x]^3 (a+a \text{Sec}[c+d x])^{5/2} \, dx$$

Optimal (type 3, 106 leaves, 7 steps):

$$-\frac{2 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}+\frac{3 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{2} \sqrt{a}}\right]}{\sqrt{2} d}+\frac{a^2 \sqrt{a+a \text{Sec}[c+d x]}}{d (1-\text{Sec}[c+d x])}$$

Result (type 3, 329 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2 \left(\frac{1}{4} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\frac{1}{8} \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}+$$
$$\frac{1}{16 d} \text{Cos}\left[\frac{1}{4} (c+d x)\right]^2 \text{Cos}[c+d x]^2 \left(4 \sqrt{2} \text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right]-3 \text{Log}\left[\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]+\right.$$
$$3 \text{Log}\left[1+\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-3 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-4 \sqrt{2} \text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-$$
$$\left.3 \text{Log}\left[3-\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right) \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}$$

Problem 164: Result more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d x]^5 (a+a \text{Sec}[c+d x])^{5/2} \, dx$$

Optimal (type 3, 147 leaves, 8 steps):

$$\frac{2 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{d}-\frac{43 a^{5/2} \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{2} \sqrt{a}}\right]}{16 \sqrt{2} d}-\frac{a^2 \sqrt{a+a \text{Sec}[c+d x]}}{4 d (1-\text{Sec}[c+d x])^2}-\frac{11 a^2 \sqrt{a+a \text{Sec}[c+d x]}}{16 d (1-\text{Sec}[c+d x])}$$

Result (type 3, 355 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2 \left(-\frac{15}{64}\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\frac{19}{128}\text{Cot}\left[\frac{1}{2}(c+d x)\right]\text{Csc}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{64}\text{Cot}\left[\frac{1}{2}(c+d x)\right]\text{Csc}\left[\frac{1}{2}(c+d x)\right]^3\right)$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}+\frac{1}{256 d}\text{Cos}\left[\frac{1}{4}(c+d x)\right]^2\text{Cos}[c+d x]^2$$
$$\left(-64\sqrt{2}\,\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2\right]+43\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]-43\,\text{Log}\left[1+\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{4}(c+d x)\right]^4}-3\,\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]+\right.$$
$$64\sqrt{2}\,\text{Log}\left[2+\sqrt{2}\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{4}(c+d x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]+$$
$$\left.43\,\text{Log}\left[3-\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{4}(c+d x)\right]^4}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{4}(c+d x)\right]^4}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}$$

- **Problem 165: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Tan}[c+d x]^6\,dx$$

Optimal (type 3, 290 leaves, 4 steps):

$$-\frac{2 a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2 a^3\,\text{Tan}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}-\frac{2 a^4\,\text{Tan}[c+d x]^3}{3 d (a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{2 a^5\,\text{Tan}[c+d x]^5}{5 d (a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{62 a^6\,\text{Tan}[c+d x]^7}{7 d (a+a\,\text{Sec}[c+d x])^{7/2}}+$$
$$\frac{98 a^7\,\text{Tan}[c+d x]^9}{9 d (a+a\,\text{Sec}[c+d x])^{9/2}}+\frac{62 a^8\,\text{Tan}[c+d x]^{11}}{11 d (a+a\,\text{Sec}[c+d x])^{11/2}}+\frac{18 a^9\,\text{Tan}[c+d x]^{13}}{13 d (a+a\,\text{Sec}[c+d x])^{13/2}}+\frac{2 a^{10}\,\text{Tan}[c+d x]^{15}}{15 d (a+a\,\text{Sec}[c+d x])^{15/2}}$$

Result (type 4, 1415 leaves):

$$\frac{1}{1024\,d\,\text{Sec}[c+d x]^{5/2}}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(\frac{1}{45045}2\,(636923+4980406\,\text{Cos}[c+d x]+984986\,\text{Cos}[2(c+d x)]+3075074\,\text{Cos}[3(c+d x)]+\right.$$
$$437114\,\text{Cos}[4(c+d x)]+1097774\,\text{Cos}[5(c+d x)]+92054\,\text{Cos}[6(c+d x)]+182144\,\text{Cos}[7(c+d x)])$$
$$\text{Sec}[c+d x]^{15/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+2048\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\;\mathrm{Sec}[c+d\,x]^{3/2}\,\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\right)-\frac{1}{1920\,d}$$

$$(1+2\,\mathrm{Cos}[c+d\,x]+2\,\mathrm{Cos}[2\,(c+d\,x)]+2\,\mathrm{Cos}[3\,(c+d\,x)]+2\,\mathrm{Cos}[4\,(c+d\,x)]+2\,\mathrm{Cos}[5\,(c+d\,x)]+2\,\mathrm{Cos}[6\,(c+d\,x)]+2\,\mathrm{Cos}[7\,(c+d\,x)])$$

$$\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4$$

$$\mathrm{Sec}[c+d\,x]^5$$

$$(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{2496\,d}$$

$$(17+34\,\mathrm{Cos}[c+d\,x]+34\,\mathrm{Cos}[2\,(c+d\,x)]+34\,\mathrm{Cos}[3\,(c+d\,x)]+34\,\mathrm{Cos}[4\,(c+d\,x)]+34\,\mathrm{Cos}[5\,(c+d\,x)]+4\,\mathrm{Cos}[6\,(c+d\,x)]+4\,\mathrm{Cos}[7\,(c+d\,x)])$$

$$\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]^5$$

$$(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{54\,912\,d}$$

$$5\,(263+526\,\mathrm{Cos}[c+d\,x]+526\,\mathrm{Cos}[2\,(c+d\,x)]+526\,\mathrm{Cos}[3\,(c+d\,x)]+136\,\mathrm{Cos}[4\,(c+d\,x)]+$$
$$136\,\mathrm{Cos}[5\,(c+d\,x)]+16\,\mathrm{Cos}[6\,(c+d\,x)]+16\,\mathrm{Cos}[7\,(c+d\,x)])$$

$$\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{29\,952\,d}$$

$$(1241+2482\,\mathrm{Cos}[c+d\,x]+1052\,\mathrm{Cos}[2\,(c+d\,x)]+1052\,\mathrm{Cos}[3\,(c+d\,x)]+272\,\mathrm{Cos}[4\,(c+d\,x)]+272\,\mathrm{Cos}[5\,(c+d\,x)]+$$
$$32\,\mathrm{Cos}[6\,(c+d\,x)]+32\,\mathrm{Cos}[7\,(c+d\,x)])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$\frac{1}{524\,160\,d}(3493+19\,856\,\mathrm{Cos}[c+d\,x]+8416\,\mathrm{Cos}[2\,(c+d\,x)]+8416\,\mathrm{Cos}[3\,(c+d\,x)]+2176\,\mathrm{Cos}[4\,(c+d\,x)]+2176\,\mathrm{Cos}[5\,(c+d\,x)]+$$
$$256\,\mathrm{Cos}[6\,(c+d\,x)]+256\,\mathrm{Cos}[7\,(c+d\,x)])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$\frac{1}{1\,441\,440\,d}(-2023+21\,694\,\mathrm{Cos}[c+d\,x]-1186\,\mathrm{Cos}[2\,(c+d\,x)]+16\,832\,\mathrm{Cos}[3\,(c+d\,x)]+4352\,\mathrm{Cos}[4\,(c+d\,x)]+$$
$$4352\,\mathrm{Cos}[5\,(c+d\,x)]+512\,\mathrm{Cos}[6\,(c+d\,x)]+512\,\mathrm{Cos}[7\,(c+d\,x)])$$

$$\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{1\,153\,152\,d}$$

$$(-23\,107+56\,746\,\mathrm{Cos}[c+d\,x]-34\,774\,\mathrm{Cos}[2\,(c+d\,x)]+37\,298\,\mathrm{Cos}[3\,(c+d\,x)]-$$

$$12622 \cos[4 (c+d x)] + 17408 \cos[5 (c+d x)] + 2048 \cos[6 (c+d x)] + 2048 \cos[7 (c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \operatorname{Sec}[c+d x]^5 (a (1+\operatorname{Sec}[c+d x]))^{5/2} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right] - \frac{1}{658944 d} (-52649 + 100622 \cos[c+d x] - 82418 \cos[2 (c+d x)] + 61726 \cos[3 (c+d x)] - 38114 \cos[4 (c+d x)] + 21946 \cos[5 (c+d x)] - 8774 \cos[6 (c+d x)] + 4096 \cos[7 (c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \operatorname{Sec}[c+d x]^5 (a (1+\operatorname{Sec}[c+d x]))^{5/2} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]$$

Problem 166: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Sec}[c+d x])^{5/2} \operatorname{Tan}[c+d x]^4 \, dx$$

Optimal (type 3, 224 leaves, 4 steps):

$$\frac{2 a^{5/2} \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{d} - \frac{2 a^3 \operatorname{Tan}[c+d x]}{d \sqrt{a+a \operatorname{Sec}[c+d x]}} + \frac{2 a^4 \operatorname{Tan}[c+d x]^3}{3 d (a+a \operatorname{Sec}[c+d x])^{3/2}} + \frac{6 a^5 \operatorname{Tan}[c+d x]^5}{d (a+a \operatorname{Sec}[c+d x])^{5/2}} + \frac{34 a^6 \operatorname{Tan}[c+d x]^7}{7 d (a+a \operatorname{Sec}[c+d x])^{7/2}} + \frac{14 a^7 \operatorname{Tan}[c+d x]^9}{9 d (a+a \operatorname{Sec}[c+d x])^{9/2}} + \frac{2 a^8 \operatorname{Tan}[c+d x]^{11}}{11 d (a+a \operatorname{Sec}[c+d x])^{11/2}}$$

Result (type 4, 1033 leaves):

$$\frac{1}{256 d \operatorname{Sec}[c+d x]^{5/2}} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(-\frac{1}{3465} 2 (14153 + 108232 \cos[c+d x] + 19924 \cos[2 (c+d x)] + 56884 \cos[3 (c+d x)] + 6086 \cos[4 (c+d x)] + 13016 \cos[5 (c+d x)]) \operatorname{Sec}[c+d x]^{11/2} \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right] - 512 \left(-3-2\sqrt{2}\right) \cos\left[\frac{1}{4}(c+d x)\right]^4 \sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\cos\left[\frac{1}{2}(c+d x)\right]}{1+\cos\left[\frac{1}{2}(c+d x)\right]}} \sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\cos\left[\frac{1}{2}(c+d x)\right]}{1+\cos\left[\frac{1}{2}(c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\cos\left[\frac{1}{2}(c+d x)\right]\right) \left(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right] + 2 \operatorname{EllipticPi}\left[-3+2\sqrt{2}, -\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right) \sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\cos\left[\frac{1}{2}(c+d x)\right]\right) \operatorname{Sec}\left[\frac{1}{4}(c+d x)\right]^2} \operatorname{Sec}[c+d x]^{3/2} \sqrt{3-2\sqrt{2}-\operatorname{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right) + \frac{1}{704 d} 3 (1 + 2 \cos[c+d x] + 2 \cos[2 (c+d x)] + 2 \cos[3 (c+d x)] + 2 \cos[4 (c+d x)] + 2 \cos[5 (c+d x)])$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4$$
$$\text{Sec}[c+d x]^3$$
$$(a(1+\text{Sec}[c+d x]))^{5/2}$$
$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{12672 d}$$
$$29(13+26\,\text{Cos}[c+d x]+26\,\text{Cos}[2(c+d x)]+26\,\text{Cos}[3(c+d x)]+4\,\text{Cos}[4(c+d x)]+4\,\text{Cos}[5(c+d x)])$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\text{Sec}[c+d x]^3(a(1+\text{Sec}[c+d x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$
$$\frac{1}{2464 d}(151+302\,\text{Cos}[c+d x]+104\,\text{Cos}[2(c+d x)]+104\,\text{Cos}[3(c+d x)]+16\,\text{Cos}[4(c+d x)]+16\,\text{Cos}[5(c+d x)])$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\text{Sec}[c+d x]^3(a(1+\text{Sec}[c+d x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{49280 d}$$
$$3(71+604\,\text{Cos}[c+d x]+208\,\text{Cos}[2(c+d x)]+208\,\text{Cos}[3(c+d x)]+32\,\text{Cos}[4(c+d x)]+32\,\text{Cos}[5(c+d x)])$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\text{Sec}[c+d x]^3(a(1+\text{Sec}[c+d x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\frac{1}{44352 d}$$
$$(-587+2522\,\text{Cos}[c+d x]-646\,\text{Cos}[2(c+d x)]+1664\,\text{Cos}[3(c+d x)]+256\,\text{Cos}[4(c+d x)]+256\,\text{Cos}[5(c+d x)])$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\text{Sec}[c+d x]^3(a(1+\text{Sec}[c+d x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{88704 d}$$
$$5(-1867+3658\,\text{Cos}[c+d x]-2678\,\text{Cos}[2(c+d x)]+1942\,\text{Cos}[3(c+d x)]-874\,\text{Cos}[4(c+d x)]+512\,\text{Cos}[5(c+d x)])$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\text{Sec}[c+d x]^3(a(1+\text{Sec}[c+d x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

- **Problem 167: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Tan}[c+d x]^2\,dx$$

Optimal (type 3, 160 leaves, 4 steps):

$$-\frac{2 a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2 a^3\,\text{Tan}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{14 a^4\,\text{Tan}[c+d x]^3}{3 d(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{2 a^5\,\text{Tan}[c+d x]^5}{d(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{2 a^6\,\text{Tan}[c+d x]^7}{7 d(a+a\,\text{Sec}[c+d x])^{7/2}}$$

Result (type 4, 644 leaves):

$$\frac{1}{64\, d\, \text{Sec}[c+d\, x]^{5/2}} \text{Sec}\left[\frac{1}{2}(c+d\, x)\right]^5 (a\,(1+\text{Sec}[c+d\, x]))^{5/2}$$

$$\left(\frac{2}{105}(127+954\,\text{Cos}[c+d\,x]+142\,\text{Cos}[2\,(c+d\,x)]+352\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+128\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\ \text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\right)-$$

$$\frac{1}{28\,d}(1+2\,\text{Cos}[c+d\,x]+2\,\text{Cos}[2\,(c+d\,x)]+2\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Sec}[c+d\,x]$$

$$(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{80\,d}$$

$$(9+18\,\text{Cos}[c+d\,x]+4\,\text{Cos}[2\,(c+d\,x)]+4\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4$$

$$\text{Sec}[c+d\,x]\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{224\,d}$$

$$(-33+74\,\text{Cos}[c+d\,x]-38\,\text{Cos}[2\,(c+d\,x)]+32\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4$$

$$\text{Sec}[c+d\,x]\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

- **Problem 168: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,dx$$

Optimal (type 3, 66 leaves, 3 steps):

$$-\frac{2\,a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}-\frac{4\,a^2\,\text{Cot}[c+d\,x]\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}{d}$$

Result (type 4, 397 leaves):

$$\frac{\text{Cos}[c+d x]^2 \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \left(-\frac{1}{2}\text{Csc}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{d}+$$

$$\frac{1}{d} 2 \left(-3-2\sqrt{2}\right) \text{Cos}\left[\frac{1}{4}(c+d x)\right]^4 \sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right) \text{Cos}[c+d x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)} \,\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 169: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{5/2} \, dx$$

Optimal (type 3, 96 leaves, 4 steps):

$$\frac{2 a^{5/2} \text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2 a^2 \text{Cot}[c+d x] \sqrt{a+a\,\text{Sec}[c+d x]}}{d}-\frac{2 a \,\text{Cot}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^{3/2}}{3 d}$$

Result (type 4, 417 leaves):

$$\frac{1}{d}\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5 (a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\frac{5}{12}\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{24}\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^3-\frac{2}{3}\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$

$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Cos}[c+d\,x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 172: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]^3}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 78 leaves, 5 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{\sqrt{a}\,d}-\frac{2\sqrt{a+a\,\text{Sec}[c+d\,x]}}{a\,d}+\frac{2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}{3\,a^2\,d}$$

Result (type 3, 165 leaves):

$$-\frac{1}{3\,d\sqrt{a\,(1+\text{Sec}[c+d\,x])}}2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right](-2+4\,\text{Cos}[c+d\,x])+\right.$$

$$3\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^6\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\right)$$

$$\left.\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4\right)^{3/2}\right)\text{Sec}[c+d\,x]^2$$

Problem 173: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 31 leaves, 3 steps):

$$-\frac{2 \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{\sqrt{a}\, d}$$

Result (type 3, 131 leaves):

$$\left(2 \sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(\text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right] - \text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} - 2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right) \Big/ \left(d \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} \sqrt{a (1+\text{Sec}[c+d x])}\right)$$

Problem 174: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 92 leaves, 7 steps):

$$\frac{2 \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{\sqrt{a}\, d} - \frac{\text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{2} \sqrt{a}}\right]}{\sqrt{2} \sqrt{a}\, d} - \frac{1}{d \sqrt{a+a \text{Sec}[c+d x]}}$$

Result (type 3, 263 leaves):

$$\frac{1}{2 d \sqrt{a (1+\text{Sec}[c+d x])}} \left(2 - 4 \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 - \text{Cos}\left[\frac{1}{4} (c+d x)\right]^2 \text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(4 \sqrt{2} \text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right] - \text{Log}\left[\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right] + \text{Log}\left[1+\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} - 3 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right] - 4 \sqrt{2} \text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} - 2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right] - \text{Log}\left[3-\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} - \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right) \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}\right) \text{Sec}[c+d x]$$

- **Problem 175: Result more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Cot}[c+d\,x]^3}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 152 leaves, 9 steps):

$$-\frac{2\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{\sqrt{a}\,d}+\frac{9\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}{\sqrt{2}\,\sqrt{a}}\right]}{8\,\sqrt{2}\,\sqrt{a}\,d}-\frac{a}{12\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}}+\frac{a}{2\,d\,(1-\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}}+\frac{7}{8\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 351 leaves):

$$\frac{1}{16\,d\,\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}}\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]$$
$$\left(32\,\sqrt{2}\,\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-9\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]+9\,\mathrm{Log}\left[1+\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-3\,\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\right.$$
$$\left.32\,\sqrt{2}\,\mathrm{Log}\left[2+\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-9\,\mathrm{Log}\left[3-\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)$$
$$\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\,\mathrm{Sec}[c+d\,x]+\frac{1}{d\,\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}}$$
$$\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\frac{31}{12}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{8}\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{4}{3}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{12}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\right)\mathrm{Sec}[c+d\,x]$$

- **Problem 177: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Tan}[c+d\,x]^6}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 189 leaves, 4 steps):

$$-\frac{2\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,\mathrm{Tan}[c+d\,x]}{d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}-\frac{2\,a\,\mathrm{Tan}[c+d\,x]^3}{3\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}}+\frac{2\,a^2\,\mathrm{Tan}[c+d\,x]^5}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}}+\frac{6\,a^3\,\mathrm{Tan}[c+d\,x]^7}{7\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{7/2}}+\frac{2\,a^4\,\mathrm{Tan}[c+d\,x]^9}{9\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{9/2}}$$

Result (type 4, 469 leaves):

$$\frac{1}{d\sqrt{a(1+\mathrm{Sec}[c+d x])}}\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\mathrm{Sec}[c+d x]\left(\frac{1532}{315}\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{136}{315}\mathrm{Sec}[c+d x]\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]-\frac{176}{105}\mathrm{Sec}[c+d x]^2\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]-\frac{4}{63}\mathrm{Sec}[c+d x]^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{4}{9}\mathrm{Sec}[c+d x]^4\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d\sqrt{a(1+\mathrm{Sec}[c+d x])}}16\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]^4\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\mathrm{Sec}[c+d x]^2\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 178: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Tan}[c+d x]^4}{\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 125 leaves, 5 steps):

$$\frac{2\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d x]}{\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}-\frac{2\,\mathrm{Tan}[c+d x]}{d\sqrt{a+a\,\mathrm{Sec}[c+d x]}}+\frac{2\,a\,\mathrm{Tan}[c+d x]^3}{3\,d\,(a+a\,\mathrm{Sec}[c+d x])^{3/2}}+\frac{2\,a^2\,\mathrm{Tan}[c+d x]^5}{5\,d\,(a+a\,\mathrm{Sec}[c+d x])^{5/2}}$$

Result (type 4, 425 leaves):

$$\frac{1}{d\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}}\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\mathrm{Sec}[c+d\,x]\left(-\frac{68}{15}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{4}{15}\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{4}{5}\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-$$

$$\frac{1}{d\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}}16\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]^2}\,\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 179: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Tan}[c+d\,x]^2}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 63 leaves, 3 steps):

$$-\frac{2\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,\mathrm{Tan}[c+d\,x]}{d\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 379 leaves):

$$\frac{4\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{d\sqrt{a\,(1+\text{Sec}[c+d\,x])}}+$$

$$\frac{1}{d\sqrt{a\,(1+\text{Sec}[c+d\,x])}}16\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\text{Sec}[c+d\,x]^2\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 184: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]^3}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 54 leaves, 4 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{3/2}\,d}+\frac{2\sqrt{a+a\,\text{Sec}[c+d\,x]}}{a^2\,d}$$

Result (type 3, 155 leaves):

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}4\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3$$

$$\left(2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^2\left(-\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2\right]+\text{Log}\left[2+\sqrt{2}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\right.\right.$$

$$\left.\left.\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}\right)\right)\text{Sec}[c+d\,x]^2$$

- **Problem 185: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 54 leaves, 4 steps):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{3/2}\,d}+\frac{2}{a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 179 leaves):

$$\left(4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(-1+2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\right)\text{Sec}[c+d\,x]\right)\Big/\left(a\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)$$

Problem 186: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cot}[c+d\,x]}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 120 leaves, 8 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{3/2}\,d}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{2}\,\sqrt{a}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{1}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}-\frac{3}{2\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 292 leaves):

$$\frac{1}{6\,a\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}}\left(-2+26\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2-44\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4-3\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(8\,\sqrt{2}\,\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]+\text{Log}\left[1+\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-3\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-8\,\sqrt{2}\,\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[3-\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\,\text{Sec}[c+d\,x]\right)$$

Problem 187: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d x]^3}{(a+a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 176 leaves, 10 steps):

$$-\frac{2 \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{a}}\right]}{a^{3/2} d}+\frac{11 \text{ArcTanh}\left[\frac{\sqrt{a+a \text{Sec}[c+d x]}}{\sqrt{2} \sqrt{a}}\right]}{16 \sqrt{2} a^{3/2} d}-\frac{3 a}{20 d (a+a \text{Sec}[c+d x])^{5/2}}+\frac{a}{2 d (1-\text{Sec}[c+d x]) (a+a \text{Sec}[c+d x])^{5/2}}+\frac{5}{24 d (a+a \text{Sec}[c+d x])^{3/2}}+\frac{21}{16 a d \sqrt{a+a \text{Sec}[c+d x]}}$$

Result (type 3, 375 leaves):

$$\frac{1}{16 d (a (1+\text{Sec}[c+d x]))^{3/2}} \text{Cos}\left[\frac{1}{4} (c+d x)\right]^2 \text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(64 \sqrt{2} \text{Log}\left[\text{Sec}\left[\frac{1}{4} (c+d x)\right]^2\right]-11 \text{Log}\left[\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]+11 \text{Log}\left[1+\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-3 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-64 \sqrt{2} \text{Log}\left[2+\sqrt{2} \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-2 \text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]-11 \text{Log}\left[3-\sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2\right]\right) \sqrt{\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{4} (c+d x)\right]^4} \text{Sec}[c+d x]^2+\frac{1}{d (a (1+\text{Sec}[c+d x]))^{3/2}} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(\frac{449}{60} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\frac{1}{8} \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]-\frac{281}{60} \text{Sec}\left[\frac{1}{2} (c+d x)\right]+\frac{19}{30} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3-\frac{1}{20} \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5\right) \text{Sec}[c+d x]^2$$

Problem 189: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]^6}{(a+a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 157 leaves, 5 steps):

$$-\frac{2 \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{a^{3/2} d}+\frac{2 \text{Tan}[c+d x]}{a d \sqrt{a+a \text{Sec}[c+d x]}}-\frac{2 \text{Tan}[c+d x]^3}{3 d (a+a \text{Sec}[c+d x])^{3/2}}+\frac{2 a \text{Tan}[c+d x]^5}{5 d (a+a \text{Sec}[c+d x])^{5/2}}+\frac{2 a^2 \text{Tan}[c+d x]^7}{7 d (a+a \text{Sec}[c+d x])^{7/2}}$$

Result (type 4, 453 leaves):

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Sec}[c+d\,x]^2$$
$$\left(\frac{1168}{105}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{256}{105}\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{64}{35}\,\text{Sec}[c+d\,x]^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{8}{7}\,\text{Sec}[c+d\,x]^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$
$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}\,32\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\text{Sec}[c+d\,x]^3\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 190: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]^4}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 95 leaves, 4 steps):

$$\frac{2\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{3/2}\,d}-\frac{2\,\text{Tan}[c+d\,x]}{a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,\text{Tan}[c+d\,x]^3}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 4, 409 leaves):

$$\frac{\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3 \text{Sec}[c+dx]^2 \left(-\frac{32}{3}\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{8}{3}\text{Sec}[c+dx]\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}} -$$

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}} 32\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4 \text{Cos}\left[\frac{1}{2}(c+dx)\right]^3$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\ \text{Sec}[c+dx]^3\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

Problem 195: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+dx]^5}{(a+a\,\text{Sec}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 78 leaves, 5 steps):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+dx]}}{\sqrt{a}}\right]}{a^{5/2}\,d}-\frac{6\sqrt{a+a\,\text{Sec}[c+dx]}}{a^3\,d}+\frac{2\,(a+a\,\text{Sec}[c+dx])^{3/2}}{3\,a^4\,d}$$

Result (type 3, 215 leaves):

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+dx]))^{5/2}}8\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^2\text{Cos}\left[\frac{1}{2}(c+dx)\right]^5$$

$$\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2\right]\right)\sqrt{\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{4}(c+dx)\right]^4}\ \text{Sec}[c+dx]^3+$$

$$\frac{\text{Cos}\left[\frac{1}{2}(c+dx)\right]^5\text{Sec}[c+dx]^3\left(-\frac{128}{3}\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\frac{16}{3}\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\right)}{d\,(a\,(1+\text{Sec}[c+dx]))^{5/2}}$$

Problem 196: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+dx]^3}{(a+a\,\text{Sec}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 54 leaves, 4 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{5/2}\,d}-\frac{4}{a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 179 leaves) :

$$-\left(8\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\left(-2+4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\right)\text{Sec}[c+d\,x]\right)\Big/\left(a^2\,d\,(1+\text{Cos}[c+d\,x])^2\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)$$

Problem 197: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tan}[c+d\,x]}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 78 leaves, 5 steps) :

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{5/2}\,d}+\frac{2}{3\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2}{a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 197 leaves) :

$$\left(4\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2-10\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4+16\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^6+6\,\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^2\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(\text{Log}\left[\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]-\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^4}\right)\text{Sec}[c+d\,x]\right)\Big/\left(3\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)$$

Problem 198: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cot}[c+d\,x]}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 144 leaves, 9 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{5/2}\,d}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}}{\sqrt{2}\,\sqrt{a}}\right]}{4\,\sqrt{2}\,a^{5/2}\,d}-\frac{1}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{1}{2\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}-\frac{7}{4\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 347 leaves):

$$\frac{1}{2\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^2\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5$$
$$\left(-16\,\sqrt{2}\,\text{Log}\left[\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2\right]+\text{Log}\left[\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]-\text{Log}\left[1+\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}-3\,\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]+\right.$$
$$\left.16\,\sqrt{2}\,\text{Log}\left[2+\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}-2\,\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]+\text{Log}\left[3-\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2\right]\right)$$
$$\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^4}\,\text{Sec}[c+d\,x]^3+\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$
$$\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\left(-\frac{98}{5}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\frac{67}{5}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]-\frac{11}{5}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3+\frac{1}{5}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\right)\text{Sec}[c+d\,x]^3$$

- **Problem 201: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]^6}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 127 leaves, 4 steps):

$$-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{2\,\text{Tan}[c+d\,x]}{a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{2\,\text{Tan}[c+d\,x]^3}{3\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,\text{Tan}[c+d\,x]^5}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}$$

Result (type 4, 431 leaves):

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\text{Sec}[c+d\,x]^3\left(\frac{368}{15}\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{176}{15}\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{16}{5}\text{Sec}[c+d\,x]^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}64\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\;\text{Sec}[c+d\,x]^4\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 208: Unable to integrate problem.**

$$\int(a+a\,\text{Sec}[c+d\,x])^n\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

Optimal (type 6, 125 leaves, 1 step):

$$\frac{1}{d\,e\,(1+m)}2^{1+m+n}\,\text{AppellF1}\left[\frac{1+m}{2},m+n,1,\frac{3+m}{2},-\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]},\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\right]$$

$$\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{1+m+n}(a+a\,\text{Sec}[c+d\,x])^n\,(e\,\text{Tan}[c+d\,x])^{1+m}$$

Result (type 8, 25 leaves):

$$\int(a+a\,\text{Sec}[c+d\,x])^n\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

- **Problem 209: Unable to integrate problem.**

$$\int(a+a\,\text{Sec}[c+d\,x])^3\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

Optimal (type 5, 243 leaves, 8 steps):

$$\frac{3 a^3 (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}+\frac{a^3 \operatorname{Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, -\operatorname{Tan}[c+d x]^2\right] (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}+\frac{1}{d e (1+m)}$$

$$3 a^3 \left(\operatorname{Cos}[c+d x]^2\right)^{\frac{2+m}{2}} \operatorname{Hypergeometric2F1}\left[\frac{1+m}{2}, \frac{2+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] \operatorname{Sec}[c+d x] (e \operatorname{Tan}[c+d x])^{1+m}+$$

$$\frac{a^3 \left(\operatorname{Cos}[c+d x]^2\right)^{\frac{4+m}{2}} \operatorname{Hypergeometric2F1}\left[\frac{1+m}{2}, \frac{4+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] \operatorname{Sec}[c+d x]^3 (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}$$

Result (type 8, 25 leaves) :

$$\int (a+a \operatorname{Sec}[c+d x])^3 (e \operatorname{Tan}[c+d x])^m \, dx$$

Problem 210: Unable to integrate problem.

$$\int (a+a \operatorname{Sec}[c+d x])^2 (e \operatorname{Tan}[c+d x])^m \, dx$$

Optimal (type 5, 161 leaves, 7 steps) :

$$\frac{a^2 (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}+\frac{a^2 \operatorname{Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, -\operatorname{Tan}[c+d x]^2\right] (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}+\frac{1}{d e (1+m)}$$

$$2 a^2 \left(\operatorname{Cos}[c+d x]^2\right)^{\frac{2+m}{2}} \operatorname{Hypergeometric2F1}\left[\frac{1+m}{2}, \frac{2+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] \operatorname{Sec}[c+d x] (e \operatorname{Tan}[c+d x])^{1+m}$$

Result (type 8, 25 leaves) :

$$\int (a+a \operatorname{Sec}[c+d x])^2 (e \operatorname{Tan}[c+d x])^m \, dx$$

Problem 211: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Sec}[c+d x]) (e \operatorname{Tan}[c+d x])^m \, dx$$

Optimal (type 5, 129 leaves, 4 steps) :

$$\frac{a \operatorname{Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, -\operatorname{Tan}[c+d x]^2\right] (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}+$$

$$\frac{a \left(\operatorname{Cos}[c+d x]^2\right)^{\frac{2+m}{2}} \operatorname{Hypergeometric2F1}\left[\frac{1+m}{2}, \frac{2+m}{2}, \frac{3+m}{2}, \operatorname{Sin}[c+d x]^2\right] \operatorname{Sec}[c+d x] (e \operatorname{Tan}[c+d x])^{1+m}}{d e (1+m)}$$

Result (type 6, 2548 leaves) :

$$\left(a (1+\operatorname{Sec}[c+d x]) \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right] \left(\operatorname{Hypergeometric2F1}\left[\frac{1+m}{2}, 1+m, \frac{3+m}{2}, \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \left(\operatorname{Cos}[c+d x] \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right)^m+\right.\right.$$

$$\left(\left(3+m\right) \operatorname{AppellF1}\left[\frac{1+m}{2}, m, 1, \frac{3+m}{2}, \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^2\right) \Big/$$

$$\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\text{Tan}[c+d\,x]^m\,(e\,\text{Tan}[c+d\,x])^m\Big)\Big/$$

$$\Bigg(d\,(1+m)\left(\frac{1}{1+m}m\,\text{Sec}[c+d\,x]^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^m+\right.\right.$$

$$\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\text{Tan}[c+d\,x]^{-1+m}+$$

$$\frac{1}{2\,(1+m)}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^m+\right.$$

$$\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/$$

$$\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)$$

$$\text{Tan}[c+d\,x]^m+\frac{1}{1+m}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(m\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},1+m,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.$$

$$\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-1+m}\left(-\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$

$$\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/$$

$$\left((3+m)\,\text{AppellF1}\left[\frac{1+m}{2},m,1,\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+m}{2},m,2,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3+m}{2},1+m,1,\frac{5+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left((3+m)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-1/(3+m)(1+m)\,\text{AppellF1}\left[1+\frac{1+m}{2},m,2,1+\frac{3+m}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+1/(3+m)m\,(1+m)\,\text{AppellF1}\left[1+\frac{1+m}{2},1+m,1,\right.$$

$$1+\frac{3+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big/$$

$$\Big((3+m)\ \mathrm{AppellF1}\left[\frac{1+m}{2},\ m,\ 1,\ \frac{3+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-2\ \Big(\mathrm{AppellF1}\left[\frac{3+m}{2},\ m,\ 2,\ \frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-m\ \mathrm{AppellF1}\left[\frac{3+m}{2},\ 1+m,\ 1,\ \frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)+$$

$$\frac{1}{2}(1+m)\ \mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]\ \left(\mathrm{Cos}[c+d x]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^m$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1+m}{2},\ 1+m,\ \frac{3+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-1-m}\right)-$$

$$\Big((3+m)\ \mathrm{AppellF1}\left[\frac{1+m}{2},\ m,\ 1,\ \frac{3+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\ \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\Big(-2\ \Big(\mathrm{AppellF1}\left[\frac{3+m}{2},\ m,\ 2,\ \frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-m\ \mathrm{AppellF1}\Big[\frac{3+m}{2},\ 1+m,\ 1,$$

$$\frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\Big)\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+(3+m)\ \Big(-\frac{1}{3+m}$$

$$(1+m)\ \mathrm{AppellF1}\left[1+\frac{1+m}{2},\ m,\ 2,\ 1+\frac{3+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{3+m}$$

$$m\ (1+m)\ \mathrm{AppellF1}\left[1+\frac{1+m}{2},\ 1+m,\ 1,\ 1+\frac{3+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)-$$

$$2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\ \Big(-\frac{1}{5+m}2\ (3+m)\ \mathrm{AppellF1}\left[1+\frac{3+m}{2},\ m,\ 3,\ 1+\frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{5+m}m\ (3+m)\ \mathrm{AppellF1}\left[1+\frac{3+m}{2},\ 1+m,\ 2,\ 1+\frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-m\ \Big(-\frac{1}{5+m}(3+m)\ \mathrm{AppellF1}\Big[1+\frac{3+m}{2},\ 1+m,\ 2,\ 1+\frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{5+m}(1+m)\ (3+m)\ \mathrm{AppellF1}\Big[1+\frac{3+m}{2},\ 2+m,\ 1,\ 1+\frac{5+m}{2},$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\ \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big)\Big/\ \Big((3+m)\ \mathrm{AppellF1}\Big[\frac{1+m}{2},\ m,\ 1,\ \frac{3+m}{2},$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]-2\ \Big(\mathrm{AppellF1}\left[\frac{3+m}{2},\ m,\ 2,\ \frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-$$

$$m\ \mathrm{AppellF1}\left[\frac{3+m}{2},\ 1+m,\ 1,\ \frac{5+m}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\ \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2\ \mathrm{Tan}[c+d x]^m\Big)\Big)$$

- **Problem 212: Unable to integrate problem.**

$$\int \frac{(e\,\mathrm{Tan}[c+d\,x])^m}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 5, 130 leaves, 5 steps):

$$\frac{e\,\mathrm{Hypergeometric2F1}\left[1,\frac{1}{2}(-1+m),\frac{1+m}{2},-\mathrm{Tan}[c+d\,x]^2\right](e\,\mathrm{Tan}[c+d\,x])^{-1+m}}{a\,d\,(1-m)}-\frac{1}{a\,d\,(1-m)}$$
$$e\left(\mathrm{Cos}[c+d\,x]^2\right)^{m/2}\mathrm{Hypergeometric2F1}\left[\frac{1}{2}(-1+m),\frac{m}{2},\frac{1+m}{2},\mathrm{Sin}[c+d\,x]^2\right]\mathrm{Sec}[c+d\,x]\,(e\,\mathrm{Tan}[c+d\,x])^{-1+m}$$

Result (type 8, 25 leaves):

$$\int \frac{(e\,\mathrm{Tan}[c+d\,x])^m}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

- **Problem 213: Unable to integrate problem.**

$$\int \frac{(e\,\mathrm{Tan}[c+d\,x])^m}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 5, 169 leaves, 8 steps):

$$-\frac{e^3\,(e\,\mathrm{Tan}[c+d\,x])^{-3+m}}{a^2\,d\,(3-m)}-\frac{e^3\,\mathrm{Hypergeometric2F1}\left[1,\frac{1}{2}(-3+m),\frac{1}{2}(-1+m),-\mathrm{Tan}[c+d\,x]^2\right](e\,\mathrm{Tan}[c+d\,x])^{-3+m}}{a^2\,d\,(3-m)}+\frac{1}{a^2\,d\,(3-m)}$$
$$2\,e^3\left(\mathrm{Cos}[c+d\,x]^2\right)^{\frac{1}{2}(-2+m)}\mathrm{Hypergeometric2F1}\left[\frac{1}{2}(-3+m),\frac{1}{2}(-2+m),\frac{1}{2}(-1+m),\mathrm{Sin}[c+d\,x]^2\right]\mathrm{Sec}[c+d\,x]\,(e\,\mathrm{Tan}[c+d\,x])^{-3+m}$$

Result (type 8, 25 leaves):

$$\int \frac{(e\,\mathrm{Tan}[c+d\,x])^m}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

- **Problem 214: Unable to integrate problem.**

$$\int \frac{(e\,\mathrm{Tan}[c+d\,x])^m}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 5, 252 leaves, 9 steps):

$$\frac{3\,e^5\,(e\,\mathrm{Tan}[c+d\,x])^{-5+m}}{a^3\,d\,(5-m)}+\frac{e^5\,\mathrm{Hypergeometric2F1}\left[1,\frac{1}{2}(-5+m),\frac{1}{2}(-3+m),-\mathrm{Tan}[c+d\,x]^2\right](e\,\mathrm{Tan}[c+d\,x])^{-5+m}}{a^3\,d\,(5-m)}-\frac{1}{a^3\,d\,(5-m)}$$
$$3\,e^5\left(\mathrm{Cos}[c+d\,x]^2\right)^{\frac{1}{2}(-4+m)}\mathrm{Hypergeometric2F1}\left[\frac{1}{2}(-5+m),\frac{1}{2}(-4+m),\frac{1}{2}(-3+m),\mathrm{Sin}[c+d\,x]^2\right]\mathrm{Sec}[c+d\,x]\,(e\,\mathrm{Tan}[c+d\,x])^{-5+m}-$$
$$\frac{1}{a^3\,d\,(5-m)}e^5\left(\mathrm{Cos}[c+d\,x]^2\right)^{\frac{1}{2}(-2+m)}\mathrm{Hypergeometric2F1}\left[\frac{1}{2}(-5+m),\frac{1}{2}(-2+m),\frac{1}{2}(-3+m),\mathrm{Sin}[c+d\,x]^2\right]\mathrm{Sec}[c+d\,x]^3\,(e\,\mathrm{Tan}[c+d\,x])^{-5+m}$$

Result (type 8, 25 leaves):

$$\int \frac{(e\,\text{Tan}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Problem 215: Unable to integrate problem.

$$\int (a+a\,\text{Sec}[c+d\,x])^{3/2}\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

Optimal (type 6, 131 leaves, 1 step):

$$\frac{1}{d\,e\,(1+m)}2^{\frac{5}{2}+m}\,\text{AppellF1}\left[\frac{1+m}{2},\,\frac{3}{2}+m,\,1,\,\frac{3+m}{2},\,-\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]},\,\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\right]$$
$$\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{\frac{5}{2}+m}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,(e\,\text{Tan}[c+d\,x])^{1+m}$$

Result (type 8, 27 leaves):

$$\int (a+a\,\text{Sec}[c+d\,x])^{3/2}\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

Problem 216: Unable to integrate problem.

$$\int \sqrt{a+a\,\text{Sec}[c+d\,x]}\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

Optimal (type 6, 131 leaves, 1 step):

$$\frac{1}{d\,e\,(1+m)}$$
$$2^{\frac{3}{2}+m}\,\text{AppellF1}\left[\frac{1+m}{2},\,\frac{1}{2}+m,\,1,\,\frac{3+m}{2},\,-\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]},\,\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{\frac{3}{2}+m}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(e\,\text{Tan}[c+d\,x])^{1+m}$$

Result (type 8, 27 leaves):

$$\int \sqrt{a+a\,\text{Sec}[c+d\,x]}\,(e\,\text{Tan}[c+d\,x])^m\,dx$$

Problem 217: Unable to integrate problem.

$$\int \frac{(e\,\text{Tan}[c+d\,x])^m}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 6, 131 leaves, 1 step):

$$\frac{2^{\frac{1}{2}+m}\,\text{AppellF1}\left[\frac{1+m}{2},\,-\frac{1}{2}+m,\,1,\,\frac{3+m}{2},\,-\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]},\,\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{\frac{1}{2}+m}(e\,\text{Tan}[c+d\,x])^{1+m}}{d\,e\,(1+m)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int \frac{(e\,\text{Tan}[c+d\,x])^m}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 218: Unable to integrate problem.**

$$\int \frac{(e\,\text{Tan}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 6, 131 leaves, 1 step):

$$\frac{2^{-\frac{1}{2}+m}\,\text{AppellF1}\left[\frac{1+m}{2},\,-\frac{3}{2}+m,\,1,\,\frac{3+m}{2},\,-\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]},\,\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{-\frac{1}{2}+m}(e\,\text{Tan}[c+d\,x])^{1+m}}{d\,e\,(1+m)\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 8, 27 leaves):

$$\int \frac{(e\,\text{Tan}[c+d\,x])^m}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

- **Problem 219: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^7\,dx$$

Optimal (type 5, 123 leaves, 4 steps):

$$\frac{7\,(a+a\,\text{Sec}[c+d\,x])^{4+n}}{a^4\,d\,(4+n)}+\frac{\text{Hypergeometric2F1}[1,\,4+n,\,5+n,\,1+\text{Sec}[c+d\,x]]\,(a+a\,\text{Sec}[c+d\,x])^{4+n}}{a^4\,d\,(4+n)}-\frac{5\,(a+a\,\text{Sec}[c+d\,x])^{5+n}}{a^5\,d\,(5+n)}+\frac{(a+a\,\text{Sec}[c+d\,x])^{6+n}}{a^6\,d\,(6+n)}$$

Result (type 8, 23 leaves):

$$\int (a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^7\,dx$$

- **Problem 220: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^5\,dx$$

Optimal (type 5, 97 leaves, 4 steps):

$$-\frac{3\,(a+a\,\text{Sec}[c+d\,x])^{3+n}}{a^3\,d\,(3+n)}-\frac{\text{Hypergeometric2F1}[1,\,3+n,\,4+n,\,1+\text{Sec}[c+d\,x]]\,(a+a\,\text{Sec}[c+d\,x])^{3+n}}{a^3\,d\,(3+n)}+\frac{(a+a\,\text{Sec}[c+d\,x])^{4+n}}{a^4\,d\,(4+n)}$$

Result (type 8, 23 leaves):

$$\int (a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^5\,dx$$

Problem 221: Unable to integrate problem.

$$\int (a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^3\,dx$$

Optimal (type 5, 69 leaves, 3 steps):

$$\frac{(a+a\,\text{Sec}[c+d\,x])^{2+n}}{a^2\,d\,(2+n)}+\frac{\text{Hypergeometric2F1}[1,\,2+n,\,3+n,\,1+\text{Sec}[c+d\,x]]\,(a+a\,\text{Sec}[c+d\,x])^{2+n}}{a^2\,d\,(2+n)}$$

Result (type 8, 23 leaves):

$$\int (a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^3\,dx$$

Problem 223: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cot}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^n\,dx$$

Optimal (type 5, 74 leaves, 4 steps):

$$-\frac{\text{Hypergeometric2F1}\left[1,\,n,\,1+n,\,\frac{1}{2}\,(1+\text{Sec}[c+d\,x])\right]\,(a+a\,\text{Sec}[c+d\,x])^n}{2\,d\,n}+\frac{\text{Hypergeometric2F1}[1,\,n,\,1+n,\,1+\text{Sec}[c+d\,x]]\,(a+a\,\text{Sec}[c+d\,x])^n}{d\,n}$$

Result (type 6, 2553 leaves):

$$\left(2^{-2+n}\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(a\,(1+\text{Sec}[c+d\,x]))^n\,\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)^n\right.$$
$$\left(-\frac{1}{n}\left(1-\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^n\,\text{Hypergeometric2F1}\left[n,\,n,\,1+n,\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+\right.$$
$$\left(4\,\text{AppellF1}\left[1,\,n,\,1,\,2,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/$$
$$\left(-2\,\text{AppellF1}\left[1,\,n,\,1,\,2,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\left(\text{AppellF1}\left[2,\,n,\,2,\,3,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.\right.$$
$$\left.\left.\left.\left.n\,\text{AppellF1}\left[2,\,1+n,\,1,\,3,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\Big/$$
$$\left(d\,\left(\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\right)\,\left(-\frac{1}{\left(\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\right)^2}\,2^{-1+n}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)^n\right.\right.$$
$$\left(\frac{1}{2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{3}{2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\left(-\frac{1}{n}\left(1-\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^n\,\text{Hypergeometric2F1}\left[n,\,n,\,1+n,\right.\right.$$

$$\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\Big]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\left(4\,\text{AppellF1}\left[1,n,1,2,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(-2\,\text{AppellF1}\left[1,n,1,2,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(\text{AppellF1}\left[2,n,2,3,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.\right.$$

$$\left.\left.n\,\text{AppellF1}\left[2,1+n,1,3,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big)+$$

$$\left(2^{-2+n}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^n\left(-1/n\left(1-\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)^n\text{Hypergeometric2F1}\left[n,n,1+n,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right]\right.\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\left(4\,\text{AppellF1}\left[1,n,1,2,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(-2\,\text{AppellF1}\left[1,n,1,2,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(\text{AppellF1}\left[2,n,2,3,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.\right.$$

$$\left.\left.\left.\left.n\,\text{AppellF1}\left[2,1+n,1,3,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\Big/$$

$$\left(\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3\right)+\left(2^{-1+n}\,n\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{1+n}\right.$$

$$\left(-1/n\left(1-\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)^n\text{Hypergeometric2F1}\left[n,n,1+n,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\right.$$

$$\left(4\,\text{AppellF1}\left[1,n,1,2,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(-2\,\text{AppellF1}\left[1,n,1,2,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(\text{AppellF1}\left[2,n,2,3,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.\right.$$

$$\left.\left.\left.\left.n\,\text{AppellF1}\left[2,1+n,1,3,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\Big/$$

$$\left(\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3\right)+\frac{1}{\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3}\,2^{-1+n}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^n$$

$$\left(-\frac{1}{n}\left(1-\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)^n\text{Hypergeometric2F1}\left[n,n,1+n,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$

$$\text{Cot}\left[\frac{1}{2}(c+d x)\right]\left(1-\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-1+n}\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2\text{Hypergeometric2F1}\left[n,n,1+n,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\left(1-\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)^n \text{Csc}\left[\frac{1}{2}(c+d x)\right]$$

$$\left(\left(1-\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-n}-\text{Hypergeometric2F1}\left[n, n, 1+n, \text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right] \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(4\,\text{AppellF1}\left[1, n, 1, 2, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(-2\,\text{AppellF1}\left[1, n, 1, 2, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(\text{AppellF1}\left[2, n, 2, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-n\,\text{AppellF1}\left[2, 1+n, 1, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(4\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \left(-\frac{1}{2}\text{AppellF1}\left[2, n, 2, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$\left.\left.\frac{1}{2} n\,\text{AppellF1}\left[2, 1+n, 1, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(-2\,\text{AppellF1}\left[1, n, 1, 2, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(\text{AppellF1}\left[2, n, 2, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-n\,\text{AppellF1}\left[2, 1+n, 1, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(4\,\text{AppellF1}\left[1, n, 1, 2, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \left(\left(\text{AppellF1}\left[2, n, 2, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-n\,\text{AppellF1}\left[2, 1+n, 1, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\Big[$$

$$\frac{1}{2}(c+d x)\Big]-2\left(-\frac{1}{2}\text{AppellF1}\left[2, n, 2, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\frac{1}{2} n\,\text{AppellF1}\left[2, 1+n, 1, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \left(-\frac{4}{3}\text{AppellF1}\left[3, n, 3, 4, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\frac{2}{3} n\,\text{AppellF1}\left[3, 1+n, 2, 4, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$n\left(-\frac{2}{3}\text{AppellF1}\left[3, 1+n, 2, 4, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\left.\left.\left.\frac{2}{3}(1+n)\,\text{AppellF1}\left[3, 2+n, 1, 4, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)\Big/$$

$$\left(-2\,\text{AppellF1}\left[1, n, 1, 2, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\left(\text{AppellF1}\left[2, n, 2, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big] - n\,\text{AppellF1}\left[2, 1+n, 1, 3, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2\Big)\Big)\Big)$$

Problem 224: Unable to integrate problem.

$$\int \text{Cot}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^n \, dx$$

Optimal (type 5, 127 leaves, 5 steps):

$$-\frac{a (4-n)\,\text{Hypergeometric2F1}\left[1, -1+n, n, \frac{1}{2}(1+\text{Sec}[c+d x])\right] (a+a\,\text{Sec}[c+d x])^{-1+n}}{4 d (1-n)} + \frac{a\,\text{Hypergeometric2F1}[1, -1+n, n, 1+\text{Sec}[c+d x]] (a+a\,\text{Sec}[c+d x])^{-1+n}}{d (1-n)} + \frac{a (a+a\,\text{Sec}[c+d x])^{-1+n}}{2 d (1-\text{Sec}[c+d x])}$$

Result (type 8, 23 leaves):

$$\int \text{Cot}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^n \, dx$$

Problem 225: Unable to integrate problem.

$$\int (a+a\,\text{Sec}[c+d x])^n \,\text{Tan}[c+d x]^4 \, dx$$

Optimal (type 6, 106 leaves, 1 step):

$$\frac{1}{5 d} 2^{5+n} \text{AppellF1}\left[\frac{5}{2}, 4+n, 1, \frac{7}{2}, -\frac{a-a\,\text{Sec}[c+d x]}{a+a\,\text{Sec}[c+d x]}, \frac{a-a\,\text{Sec}[c+d x]}{a+a\,\text{Sec}[c+d x]}\right] \left(\frac{1}{1+\text{Sec}[c+d x]}\right)^{5+n} (a+a\,\text{Sec}[c+d x])^n \,\text{Tan}[c+d x]^5$$

Result (type 8, 23 leaves):

$$\int (a+a\,\text{Sec}[c+d x])^n \,\text{Tan}[c+d x]^4 \, dx$$

Problem 226: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Sec}[c+d x])^n \,\text{Tan}[c+d x]^2 \, dx$$

Optimal (type 6, 106 leaves, 1 step):

$$\frac{1}{3 d} 2^{3+n} \text{AppellF1}\left[\frac{3}{2}, 2+n, 1, \frac{5}{2}, -\frac{a-a\,\text{Sec}[c+d x]}{a+a\,\text{Sec}[c+d x]}, \frac{a-a\,\text{Sec}[c+d x]}{a+a\,\text{Sec}[c+d x]}\right] \left(\frac{1}{1+\text{Sec}[c+d x]}\right)^{3+n} (a+a\,\text{Sec}[c+d x])^n \,\text{Tan}[c+d x]^3$$

Result (type 6, 2419 leaves):

$$\Big(2^{3+n} \text{Cos}\left[\frac{1}{2}(c+d x)\right] \text{Sec}[c+d x]^2 \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]\right)^n (a (1+\text{Sec}[c+d x]))^n \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^3$$

$$\Big(-\Big(\text{Hypergeometric2F1}\left[\frac{1}{2}, 1+n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] - 2\,\text{Hypergeometric2F1}\left[\frac{1}{2}, 2+n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)$$

$$\left(\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^n+\left(3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(-3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$2\left(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-n\ \text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)$$

$$\left.\left.\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\Big/\left(d\left(2^n\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n\right.\right.$$

$$\left(-\left(\text{Hypergeometric2F1}\left[\frac{1}{2},1+n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-2\ \text{Hypergeometric2F1}\left[\frac{1}{2},2+n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\right.$$

$$\left(\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^n+\left(3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(-3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.\right.$$

$$\left.\left.n\ \text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+2^{1+n}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^n$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-n\left(\text{Hypergeometric2F1}\left[\frac{1}{2},1+n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-2\ \text{Hypergeometric2F1}\left[\frac{1}{2},2+n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\right.$$

$$\left(\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-1+n}\left(-\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Sin}[c+d x]+\text{Cos}[c+d x]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)-$$

$$\left(3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(-3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.\right.$$

$$\left.\left.n\ \text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(3\ \text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}n\ \text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(-3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\right.\right.$$

$$\left.\left.n\ \text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(3\ \text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\left(2\left(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.\right.$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-n\,\text{AppellF1}\Big[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2$$

$$\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]-3\,\Big(-\frac{1}{3}\text{AppellF1}\Big[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{1}{3}n\,\text{AppellF1}\Big[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)+$$

$$2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\,\Big(-\frac{6}{5}\text{AppellF1}\Big[\frac{5}{2},n,3,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{3}{5}n\,\text{AppellF1}\Big[\frac{5}{2},1+n,2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]-$$

$$n\,\Big(-\frac{3}{5}\text{AppellF1}\Big[\frac{5}{2},1+n,2,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{3}{5}(1+n)\,\text{AppellF1}\Big[\frac{5}{2},2+n,1,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(-3\,\text{AppellF1}\Big[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+2\,\Big(\text{AppellF1}\Big[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-$$

$$n\,\text{AppellF1}\Big[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^2-\Big(\text{Cos}[c+d x]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^n$$

$$\Big(-\text{Csc}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]\,\Big(-\text{Hypergeometric2F1}\Big[\frac{1}{2},2+n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\Big(1-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^{-2-n}\Big)+$$

$$\frac{1}{2}\text{Csc}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]\,\Big(-\text{Hypergeometric2F1}\Big[\frac{1}{2},1+n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+\Big(1-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^{-1-n}\Big)\Big)\Big)+$$

$$2^{1+n}n\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^{-1+n}\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\,\Big(-\Big(\text{Hypergeometric2F1}\Big[\frac{1}{2},1+n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-$$

$$2\,\text{Hypergeometric2F1}\Big[\frac{1}{2},2+n,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\Big(\text{Cos}[c+d x]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^n+$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big/$$

$$\Big(-3\,\text{AppellF1}\Big[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+2\,\Big(\text{AppellF1}\Big[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]-$$

$$n\,\text{AppellF1}\Big[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)$$

$$\Big(-\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Sec}[c+d x]\,\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]+\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]\Big)\Big)\Big)$$

- **Problem 227: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d x]^2 (a+a \text{Sec}[c+d x])^n \, dx$$

Optimal (type 6, 102 leaves, 1 step):

$$-\frac{1}{d}2^{-1+n} \text{AppellF1}\left[-\frac{1}{2}, -2+n, 1, \frac{1}{2}, -\frac{a-a \text{Sec}[c+d x]}{a+a \text{Sec}[c+d x]}, \frac{a-a \text{Sec}[c+d x]}{a+a \text{Sec}[c+d x]}\right] \text{Cot}[c+d x] \left(\frac{1}{1+\text{Sec}[c+d x]}\right)^{-1+n} (a+a \text{Sec}[c+d x])^n$$

Result (type 6, 2492 leaves):

$$\left(2^{-3+n} \text{Cos}[c+d x]^2 \text{Csc}\left[\frac{1}{2} (c+d x)\right]^3 \text{Sec}\left[\frac{1}{2} (c+d x)\right] \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}[c+d x]\right)^n \right.$$
$$(a (1+\text{Sec}[c+d x]))^n \left(\left(12 \text{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^2\right) \Big/ \right.$$
$$\left(-3 \text{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + 2 \left(\text{AppellF1}\left[\frac{3}{2}, n, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] - \right.\right.$$
$$\left.\left. n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) + \left(\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right)^n$$
$$\left.\left.\left(-\text{Hypergeometric2F1}\left[-\frac{1}{2}, n, \frac{1}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + \text{Hypergeometric2F1}\left[\frac{1}{2}, n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)\right)\right) \Big/$$
$$\left(d \left(-2^{-2+n} \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}[c+d x]\right)^n \right.\right.$$
$$\left(\left(12 \text{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^2\right) \Big/ \right.$$
$$\left(-3 \text{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + 2 \left(\text{AppellF1}\left[\frac{3}{2}, n, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] - \right.\right.$$
$$\left.\left. n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) + \left(\text{Cos}[c+d x] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right)^n$$
$$\left.\left(-\text{Hypergeometric2F1}\left[-\frac{1}{2}, n, \frac{1}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + \text{Hypergeometric2F1}\left[\frac{1}{2}, n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)\right) +$$
$$2^{-1+n} \text{Cot}\left[\frac{1}{2} (c+d x)\right] \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}[c+d x]\right)^n$$
$$\left(\left(12 \text{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) \Big/ \right.$$
$$\left(-3 \text{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + 2 \left(\text{AppellF1}\left[\frac{3}{2}, n, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] - \right.\right.$$
$$\left.\left. n \text{AppellF1}\left[\frac{3}{2}, 1+n, 1, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) +$$
$$\left(12 \text{Sin}\left[\frac{1}{2} (c+d x)\right]^2 \left(-\frac{1}{3} \text{AppellF1}\left[\frac{3}{2}, n, 2, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right] + \right.\right.$$

$$\frac{1}{3}\,n\,\text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(-3\,\text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\Bigg(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-$$

$$n\,\text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)+$$

$$n\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-1+n}\left(-\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(-\text{Hypergeometric2F1}\left[-\frac{1}{2},n,\frac{1}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\text{Hypergeometric2F1}\left[\frac{1}{2},n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\Bigg(12\,\text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(2\,\Bigg(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-3\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},n,3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\frac{3}{5}n\,\text{AppellF1}\left[\frac{5}{2},1+n,2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$n\left(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},1+n,2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\left.\frac{3}{5}(1+n)\,\text{AppellF1}\left[\frac{5}{2},2+n,1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(-3\,\text{AppellF1}\left[\frac{1}{2},n,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\Bigg(\text{AppellF1}\left[\frac{3}{2},n,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3}{2},1+n,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)^2+$$

$$\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^n\left(\text{Hypergeometric2F1}\left[\frac{1}{2},n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\frac{1}{2}\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\left(\text{Hypergeometric2F1}\left[-\frac{1}{2},n,\frac{1}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\left(1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-n}\right)+$$

$$\left.\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\left(1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-n}\right)\right)\Bigg)+$$

$$2^{-1+n}\, n \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right] \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x]\right)^{-1+n}$$
$$\left(\left(12 \operatorname{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^2\right) \Big/\right.$$
$$\left(-3 \operatorname{AppellF1}\left[\frac{1}{2}, n, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + 2 \left(\operatorname{AppellF1}\left[\frac{3}{2}, n, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] -\right.\right.$$
$$\left.\left. n \operatorname{AppellF1}\left[\frac{3}{2}, 1+n, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) + \left(\operatorname{Cos}[c+d x] \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^n$$
$$\left(-\operatorname{Hypergeometric2F1}\left[-\frac{1}{2}, n, \frac{1}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, n, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)$$
$$\left.\left(-\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] \operatorname{Sec}[c+d x] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]\right)\right)\right)$$

- **Problem 228: Unable to integrate problem.**

$$\int \operatorname{Cot}[c+d x]^4 (a+a \operatorname{Sec}[c+d x])^n \, dx$$

Optimal (type 6, 106 leaves, 1 step):

$$-\frac{1}{3 d} 2^{-3+n} \operatorname{AppellF1}\left[-\frac{3}{2}, -4+n, 1, -\frac{1}{2}, -\frac{a-a \operatorname{Sec}[c+d x]}{a+a \operatorname{Sec}[c+d x]}, \frac{a-a \operatorname{Sec}[c+d x]}{a+a \operatorname{Sec}[c+d x]}\right] \operatorname{Cot}[c+d x]^3 \left(\frac{1}{1+\operatorname{Sec}[c+d x]}\right)^{-3+n} (a+a \operatorname{Sec}[c+d x])^n$$

Result (type 8, 23 leaves):

$$\int \operatorname{Cot}[c+d x]^4 (a+a \operatorname{Sec}[c+d x])^n \, dx$$

- **Problem 229: Result more than twice size of optimal antiderivative.**

$$\int (a+a \operatorname{Sec}[c+d x])^n \operatorname{Tan}[c+d x]^{3/2} \, dx$$

Optimal (type 6, 114 leaves, 1 step):

$$\frac{1}{5 d} 2^{\frac{7}{2}+n} \operatorname{AppellF1}\left[\frac{5}{4}, \frac{3}{2}+n, 1, \frac{9}{4}, -\frac{a-a \operatorname{Sec}[c+d x]}{a+a \operatorname{Sec}[c+d x]}, \frac{a-a \operatorname{Sec}[c+d x]}{a+a \operatorname{Sec}[c+d x]}\right] \left(\frac{1}{1+\operatorname{Sec}[c+d x]}\right)^{\frac{5}{2}+n} (a+a \operatorname{Sec}[c+d x])^n \operatorname{Tan}[c+d x]^{5/2}$$

Result (type 6, 11753 leaves): Display of huge result suppressed!

- **Problem 230: Result more than twice size of optimal antiderivative.**

$$\int (a+a \operatorname{Sec}[c+d x])^n \sqrt{\operatorname{Tan}[c+d x]} \, dx$$

Optimal (type 6, 114 leaves, 1 step):

$$\frac{1}{3 d} 2^{\frac{5}{2}+n} \operatorname{AppellF1}\left[\frac{3}{4}, \frac{1}{2}+n, 1, \frac{7}{4}, -\frac{a-a \operatorname{Sec}[c+d x]}{a+a \operatorname{Sec}[c+d x]}, \frac{a-a \operatorname{Sec}[c+d x]}{a+a \operatorname{Sec}[c+d x]}\right] \left(\frac{1}{1+\operatorname{Sec}[c+d x]}\right)^{\frac{3}{2}+n} (a+a \operatorname{Sec}[c+d x])^n \operatorname{Tan}[c+d x]^{3/2}$$

Result (type 6, 2079 leaves) :

$$\Big(7\times 2^{1+n}\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]$$

$$\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^n\,(a\,(1+\text{Sec}[c+d x]))^n\,\text{Sin}[c+d x]\,\text{Tan}[c+d x]\Big)\Big/$$

$$\Big(d\,\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+6\,\Big(-2\,\text{AppellF1}\Big[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+(1+2n)\,\text{AppellF1}\Big[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)$$

$$\Big(\Big(7\times 2^{1+n}\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Cos}[c+d x]\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^n\,\sqrt{\text{Tan}[c+d x]}\Big)\Big/$$

$$\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+6\,\Big(-2\,\text{AppellF1}\Big[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+(1+2n)\,\text{AppellF1}\Big[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)+$$

$$\Big(7\times 2^{n}\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}[c+d x]\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^n\,\sqrt{\text{Tan}[c+d x]}\Big)\Big/$$

$$\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+$$

$$6\,\Big(-2\,\text{AppellF1}\Big[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+(1+2n)$$

$$\text{AppellF1}\Big[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)+\Big(7\times 2^{1+n}\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^n$$

$$\text{Sin}[c+d x]\,\Big(-\frac{3}{7}\,\text{AppellF1}\Big[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]+$$

$$\frac{3}{7}\,\Big(\frac{1}{2}+n\Big)\,\text{AppellF1}\Big[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big)\,\sqrt{\text{Tan}[c+d x]}\Big)\Big/$$

$$\Big(21\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+6\,\Big(-2\,\text{AppellF1}\Big[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+(1+2n)\,\text{AppellF1}\Big[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)-$$

$$\Big(7\times 2^{1+n}\,\text{AppellF1}\Big[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\,\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]\Big)^n$$

$$\text{Sin}[c+d x]\,\Big(6\,\Big(-2\,\text{AppellF1}\Big[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]+$$

$$(1+2n)\,\text{AppellF1}\left[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$21\left(-\frac{3}{7}\text{AppellF1}\left[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\frac{3}{7}\left(\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$6\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(-2\left(-\frac{14}{11}\text{AppellF1}\left[\frac{11}{4},\frac{1}{2}+n,3,\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$\left.\frac{7}{11}\left(\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2}+n,2,\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+(1+2n)$$

$$\left(-\frac{7}{11}\text{AppellF1}\left[\frac{11}{4},\frac{3}{2}+n,2,\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{7}{11}\left(\frac{3}{2}+n\right)\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{11}{4},\frac{5}{2}+n,1,\frac{15}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\Big)\sqrt{\text{Tan}[c+d x]}\Big)\Big/$$

$$\left(21\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+6\left(-2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+(1+2n)\,\text{AppellF1}\left[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2+$$

$$\left(7\times 2^{1+n}\,n\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\right)^{-1+n}\text{Sin}[c+d x]\right.$$

$$\left.\sqrt{\text{Tan}[c+d x]}\left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)\right)\Big/$$

$$\left(21\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2}+n,1,\frac{7}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$6\left(-2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2}+n,2,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\left.\left.(1+2n)\,\text{AppellF1}\left[\frac{7}{4},\frac{3}{2}+n,1,\frac{11}{4},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big)\Big)$$

- **Problem 231: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^n}{\sqrt{\text{Tan}[c+d x]}}\,dx$$

Optimal (type 6, 111 leaves, 1 step):

$$\frac{1}{d}2^{\frac{3}{2}+n}\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2}+n,1,\frac{5}{4},-\frac{a-a\,\text{Sec}[c+d x]}{a+a\,\text{Sec}[c+d x]},\frac{a-a\,\text{Sec}[c+d x]}{a+a\,\text{Sec}[c+d x]}\right]\left(\frac{1}{1+\text{Sec}[c+d x]}\right)^{\frac{1}{2}+n}(a+a\,\text{Sec}[c+d x])^n\sqrt{\text{Tan}[c+d x]}$$

Result (type 6, 2073 leaves) :

$$\Big(5\times 2^{1+n}\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]$$

$$\text{Cos}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\,(a\,(1+\text{Sec}[c+d\,x]))^n\Big)\Big/$$

$$\Big(d\,\Big(5\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-2\,\Big(2\,\text{AppellF1}\Big[\frac{5}{4},\,-\frac{1}{2}+n,\,2,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+(1-2\,n)\,\text{AppellF1}\Big[\frac{5}{4},\,\frac{1}{2}+n,\,1,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)$$

$$\Big(\Big(5\times 2^{n}\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\Big)\Big/$$

$$\Big(\Big(5\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-$$

$$2\,\Big(2\,\text{AppellF1}\Big[\frac{5}{4},\,-\frac{1}{2}+n,\,2,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+$$

$$(1-2\,n)\,\text{AppellF1}\Big[\frac{5}{4},\,\frac{1}{2}+n,\,1,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)\,\sqrt{\text{Tan}[c+d\,x]}\Big)-$$

$$\Big(5\times 2^{1+n}\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n\,\text{Sin}[c+d\,x]\,\sqrt{\text{Tan}[c+d\,x]}\Big)\Big/$$

$$\Big(5\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-$$

$$2\,\Big(2\,\text{AppellF1}\Big[\frac{5}{4},\,-\frac{1}{2}+n,\,2,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+(1-2\,n)\,\text{AppellF1}\Big[\frac{5}{4},\,\frac{1}{2}+n,\,1,\,\frac{9}{4},$$

$$\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)+\Big(5\times 2^{1+n}\,\text{Cos}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n$$

$$\Big(-\frac{1}{5}\,\text{AppellF1}\Big[\frac{5}{4},\,-\frac{1}{2}+n,\,2,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$\frac{1}{5}\,\Big(-\frac{1}{2}+n\Big)\,\text{AppellF1}\Big[\frac{5}{4},\,\frac{1}{2}+n,\,1,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\,\sqrt{\text{Tan}[c+d\,x]}\Big)\Big/$$

$$\Big(5\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]-2\,\Big(2\,\text{AppellF1}\Big[\frac{5}{4},\,-\frac{1}{2}+n,\,2,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]+(1-2\,n)\,\text{AppellF1}\Big[\frac{5}{4},\,\frac{1}{2}+n,\,1,\,\frac{9}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)-$$

$$\Big(5\times 2^{1+n}\,\text{AppellF1}\Big[\frac{1}{4},\,-\frac{1}{2}+n,\,1,\,\frac{5}{4},\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\,\text{Cos}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]\Big)^n$$

$$\left(-2\left(2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2}+n,2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$
$$\left.(1-2\,n)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2}+n,1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$5\left(-\frac{1}{5}\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2}+n,2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$
$$\left.\frac{1}{5}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2}+n,1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$
$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(2\left(-\frac{10}{9}\text{AppellF1}\left[\frac{9}{4},-\frac{1}{2}+n,3,\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$
$$\left.\frac{5}{9}\left(-\frac{1}{2}+n\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2}+n,2,\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$
$$(1-2\,n)\left(-\frac{5}{9}\text{AppellF1}\left[\frac{9}{4},\frac{1}{2}+n,2,\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{5}{9}\left(\frac{1}{2}+n\right)\right.$$
$$\left.\left.\left.\text{AppellF1}\left[\frac{9}{4},\frac{3}{2}+n,1,\frac{13}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\sqrt{\text{Tan}[c+d\,x]}\Bigg)\Bigg/$$
$$\left(5\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2}+n,1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2}+n,2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(1-2\,n)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2}+n,1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2+$$
$$\left(5\times2^{1+n}\,n\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2}+n,1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{-1+n}\right.$$
$$\left.\sqrt{\text{Tan}[c+d\,x]}\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Bigg/$$
$$\left(5\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2}+n,1,\frac{5}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.$$
$$2\left(2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2}+n,2,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$
$$\left.\left.\left.(1-2\,n)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2}+n,1,\frac{9}{4},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 232: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^n}{\text{Tan}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 6, 112 leaves, 1 step):

$$-\frac{2^{\frac{1}{2}+n}\,\text{AppellF1}\left[-\frac{1}{4},-\frac{3}{2}+n,1,\frac{3}{4},-\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]},\frac{a-a\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\right]\left(\frac{1}{1+\text{Sec}[c+d\,x]}\right)^{-\frac{1}{2}+n}(a+a\,\text{Sec}[c+d\,x])^n}{d\sqrt{\text{Tan}[c+d\,x]}}$$

Result (type 6, 5312 leaves) : Display of huge result suppressed!

Problem 233: Result unnecessarily involves imaginary or complex numbers.

$$\int (e\,\text{Cot}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 320 leaves, 17 steps) :

$$-\frac{2\,(e\,\text{Cot}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{3\,d}-\frac{a\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}\,\text{Tan}[c+d\,x]^2}{3\,d}+$$
$$\frac{a\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}{\sqrt{2}\,d}-\frac{a\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}{\sqrt{2}\,d}+$$
$$\frac{a\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{5/2}}{2\,\sqrt{2}\,d}-$$
$$\frac{a\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{5/2}}{2\,\sqrt{2}\,d}$$

Result (type 4, 185 leaves) :

$$-\frac{1}{6\,d\,\text{Cot}[c+d\,x]^{5/2}}$$
$$a\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]\left(\sqrt{\text{Cot}[c+d\,x]}\,\left(4\,(1+\text{Cos}[c+d\,x])\,\text{Cot}[c+d\,x]-3\,\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\,+\right.\right.$$
$$\left.3\,\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\right)+$$
$$\left.2\,(-1)^{1/4}\,\sqrt{\text{Csc}[c+d\,x]^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]\,\text{Sin}[2\,(c+d\,x)]\right)$$

Problem 234: Result unnecessarily involves imaginary or complex numbers.

$$\int (e\,\text{Cot}[c+d\,x])^{3/2}\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 346 leaves, 18 steps) :

$$-\frac{2\,(e\,\text{Cot}[c+d\,x])^{3/2}\,(a+a\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{d}-\frac{2\,a\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sin}[c+d\,x]\,\text{Tan}[c+d\,x]}{d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+$$
$$\frac{a\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}{\sqrt{2}\,d}-\frac{a\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}{\sqrt{2}\,d}-$$
$$\frac{a\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{3/2}}{2\,\sqrt{2}\,d}+$$
$$\frac{a\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{3/2}}{2\,\sqrt{2}\,d}+\frac{2\,a\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\,\text{Tan}[c+d\,x]^2}{d}$$

Result (type 4, 210 leaves) :

$$\frac{1}{2\,d\,\sqrt{\text{Csc}[c+d\,x]^2}}\,a\,e\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\Big(4\,(-1)^{3/4}\,\sqrt{\text{Cot}[c+d\,x]}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],\,-1\right]-$$
$$4\,(-1)^{3/4}\,\sqrt{\text{Cot}[c+d\,x]}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],\,-1\right]+\sqrt{\text{Csc}[c+d\,x]^2}\,\Big(-4\,\text{Cos}[c+d\,x]+$$
$$\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}+\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\Big)\Big)$$

Problem 235: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{e\,\text{Cot}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 274 leaves, 16 steps) :

$$\frac{a\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{d}-\frac{a\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,d}+$$
$$\frac{a\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,d}-\frac{a\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\sqrt{\text{Tan}[c+d\,x]}}{2\,\sqrt{2}\,d}+$$
$$\frac{a\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\sqrt{\text{Tan}[c+d\,x]}}{2\,\sqrt{2}\,d}$$

Result (type 4, 169 leaves) :

$$\frac{1}{4\,d\,\sqrt{\mathrm{Csc}[c+d\,x]^2}}\,a\,(1+\mathrm{Cos}[c+d\,x])\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}\;\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\mathrm{Sec}[c+d\,x]\,\Big(4\,(-1)^{1/4}\,\sqrt{\mathrm{Cot}[c+d\,x]}\;\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\mathrm{Cot}[c+d\,x]}\right],-1\right]+$$

$$\sqrt{\mathrm{Csc}[c+d\,x]^2}\,\left(-\mathrm{ArcSin}[\mathrm{Cos}[c+d\,x]-\mathrm{Sin}[c+d\,x]]+\mathrm{Log}\left[\mathrm{Cos}[c+d\,x]+\mathrm{Sin}[c+d\,x]+\sqrt{\mathrm{Sin}[2\,(c+d\,x)]}\right]\right)\sqrt{\mathrm{Sin}[2\,(c+d\,x)]}\Big)$$

- **Problem 236: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{a+a\,\mathrm{Sec}[c+d\,x]}{\sqrt{e\,\mathrm{Cot}[c+d\,x]}}\,dx$$

Optimal (type 4, 299 leaves, 17 steps):

$$\frac{2\,a\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}}-\frac{2\,a\,\mathrm{Cos}[c+d\,x]\,\mathrm{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]}{d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}\,\sqrt{\mathrm{Sin}[2\,c+2\,d\,x]}}-\frac{a\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right]}{\sqrt{2}\,d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}\,\sqrt{\mathrm{Tan}[c+d\,x]}}+$$

$$\frac{a\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right]}{\sqrt{2}\,d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}\,\sqrt{\mathrm{Tan}[c+d\,x]}}+\frac{a\,\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}\,\sqrt{\mathrm{Tan}[c+d\,x]}}-\frac{a\,\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}\,\sqrt{\mathrm{Tan}[c+d\,x]}}$$

Result (type 4, 200 leaves):

$$-\frac{1}{2\,d\,\sqrt{e\,\mathrm{Cot}[c+d\,x]}}\,a\,\mathrm{Csc}[c+d\,x]\,\left(-4-\frac{4\,(-1)^{3/4}\,\sqrt{\mathrm{Cot}[c+d\,x]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\mathrm{Cot}[c+d\,x]}\right],-1\right]}{\sqrt{\mathrm{Csc}[c+d\,x]^2}}+\right.$$

$$\frac{4\,(-1)^{3/4}\,\sqrt{\mathrm{Cot}[c+d\,x]}\;\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\mathrm{Cot}[c+d\,x]}\right],-1\right]}{\sqrt{\mathrm{Csc}[c+d\,x]^2}}+$$

$$\left.\mathrm{ArcSin}[\mathrm{Cos}[c+d\,x]-\mathrm{Sin}[c+d\,x]]\,\sqrt{\mathrm{Sin}[2\,(c+d\,x)]}+\mathrm{Log}\left[\mathrm{Cos}[c+d\,x]+\mathrm{Sin}[c+d\,x]+\sqrt{\mathrm{Sin}[2\,(c+d\,x)]}\right]\sqrt{\mathrm{Sin}[2\,(c+d\,x)]}\right)$$

- **Problem 237: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{a+a\,\mathrm{Sec}[c+d\,x]}{(e\,\mathrm{Cot}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 320 leaves, 17 steps):

$$\frac{2\,\text{Cot}[c+d\,x]\,(3\,a+a\,\text{Sec}[c+d\,x])}{3\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}}-\frac{a\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}}+$$
$$\frac{a\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}-\frac{a\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}+$$
$$\frac{a\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}-\frac{a\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}$$

Result (type 4, 224 leaves) :

$$\frac{1}{12\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\left(-1+\text{Cot}[c+d\,x]^2\right)}\,a\,(1+\text{Cos}[c+d\,x])\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[c+d\,x]$$
$$\sqrt{\text{Csc}[c+d\,x]^2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(-4\,(-1)^{1/4}\,\text{Cot}[c+d\,x]^{3/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],\,-1\right]+\right.$$
$$\sqrt{\text{Csc}[c+d\,x]^2}\,\left(4+12\,\text{Cos}[c+d\,x]+3\,\text{ArcSin}[\text{Cos}[c+d\,x]-\text{Sin}[c+d\,x]]\,\text{Cot}[c+d\,x]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}-\right.$$
$$\left.\left.3\,\text{Cot}[c+d\,x]\,\text{Log}\left[\text{Cos}[c+d\,x]+\text{Sin}[c+d\,x]+\sqrt{\text{Sin}[2\,(c+d\,x)]}\right]\,\sqrt{\text{Sin}[2\,(c+d\,x)]}\right)\right)$$

- **Problem 238: Result unnecessarily involves imaginary or complex numbers.**

$$\int (e\,\text{Cot}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 357 leaves, 21 steps) :

$$-\frac{4\,a^2\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{3\,d}-\frac{4\,a^2\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,d}-$$
$$\frac{2\,a^2\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}\,\text{Tan}[c+d\,x]^2}{3\,d}+$$
$$\frac{a^2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}{\sqrt{2}\,d}-\frac{a^2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}{\sqrt{2}\,d}+$$
$$\frac{a^2\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{5/2}}{2\,\sqrt{2}\,d}-$$
$$\frac{a^2\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{5/2}}{2\,\sqrt{2}\,d}$$

Result (type 4, 332 leaves) :

$$\left(\left(1+\mathrm{Cos}\left[2\left(\frac{c}{2}+\frac{d\,x}{2}\right)\right]\right)^2 (e\,\mathrm{Cot}[c+d\,x])^{5/2}\,\mathrm{Csc}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\right.$$

$$(a+a\,\mathrm{Sec}[c+d\,x])^2\left(-\frac{4\,\mathrm{Cot}[c+d\,x]^{3/2}\left(1+\sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right)}{3\,d}-\frac{1}{d}2\left(1\Big/\left(4\sqrt{2}\right)\left(2\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Cot}[c+d\,x]}\right]-\right.\right.\right.$$

$$2\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Cot}[c+d\,x]}\right]-\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Cot}[c+d\,x]}+\mathrm{Cot}[c+d\,x]\right]+\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Cot}[c+d\,x]}+\mathrm{Cot}[c+d\,x]\right]\Big)+$$

$$\left.\left.\left.\frac{2\,(-1)^{1/4}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[(-1)^{1/4}\sqrt{\mathrm{Cot}[c+d\,x]}\right],-1\right]\sqrt{1+\mathrm{Tan}[c+d\,x]^2}}{3\sqrt{1+\mathrm{Cot}[c+d\,x]^2}}\right)\right)\right)\Big/$$

$$\left(4\left(1+\mathrm{Cos}\left[2\left(\frac{c}{2}+\frac{1}{2}(-c+\mathrm{ArcCot}[\mathrm{Cot}[c+d\,x]])\right)\right]\right)^2\sqrt{\mathrm{Cot}[c+d\,x]}\left(1+\mathrm{Cot}[c+d\,x]^2\right)^2\right)$$

- **Problem 239: Result unnecessarily involves imaginary or complex numbers.**

$$\int(e\,\mathrm{Cot}[c+d\,x])^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 343 leaves, 21 steps):

$$-\frac{4\,a^2\,(e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{d}-\frac{4\,a^2\,(e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{Tan}[c+d\,x]}{d}-$$

$$\frac{4\,a^2\,(e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\mathrm{Sin}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{d\sqrt{\mathrm{Sin}[2\,c+2\,d\,x]}}+$$

$$\frac{a^2\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right](e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{Tan}[c+d\,x]^{3/2}}{\sqrt{2}\,d}-\frac{a^2\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\right](e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{Tan}[c+d\,x]^{3/2}}{\sqrt{2}\,d}-$$

$$\frac{a^2\,(e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{Log}\left[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]\mathrm{Tan}[c+d\,x]^{3/2}}{2\sqrt{2}\,d}+$$

$$\frac{a^2\,(e\,\mathrm{Cot}[c+d\,x])^{3/2}\,\mathrm{Log}\left[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\right]\mathrm{Tan}[c+d\,x]^{3/2}}{2\sqrt{2}\,d}$$

Result (type 4, 410 leaves):

$$\left(\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{d\,x}{2}\right)\right]\right)^2\sqrt{\text{Cot}[c+d\,x]}\;(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Csc}[c+d\,x]^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\right.$$

$$\left(-\frac{4\sqrt{\text{Cot}[c+d\,x]}}{d}-\frac{1}{d}2\left(-\frac{\text{ArcTan}\left[\frac{-\sqrt{2}+2\sqrt{\text{Cot}[c+d\,x]}}{\sqrt{2}}\right]}{2\sqrt{2}}-\frac{\text{ArcTan}\left[\frac{\sqrt{2}+2\sqrt{\text{Cot}[c+d\,x]}}{\sqrt{2}}\right]}{2\sqrt{2}}+\frac{\text{Log}\left[1-\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]}{4\sqrt{2}}-\right.\right.$$

$$\frac{\text{Log}\left[1+\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]}{4\sqrt{2}}-1\Big/\left(1+\text{Cot}[c+d\,x]^2\right)2\,(-1)^{3/4}\sqrt{1-i\,\text{Cot}[c+d\,x]}\;\sqrt{1+i\,\text{Cot}[c+d\,x]}$$

$$\text{Cot}[c+d\,x]\left(\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]-\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]\right)$$

$$\left.\left.\left.\sqrt{\left(1+\text{Cot}[c+d\,x]^2\right)\text{Tan}[c+d\,x]^2}\right)\right)\right)\Big/\left(4\left(1+\text{Cos}\left[2\left(\frac{c}{2}+\frac{1}{2}(-c+\text{ArcCot}[\text{Cot}[c+d\,x]])\right)\right]\right)^2\left(1+\text{Cot}[c+d\,x]^2\right)^2\right)$$

- **Problem 240: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{e\,\text{Cot}[c+d\,x]}\;(a+a\,\text{Sec}[c+d\,x])^2\,dx$$

Optimal (type 4, 311 leaves, 19 steps):

$$\frac{2\,a^2\sqrt{e\,\text{Cot}[c+d\,x]}\;\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\text{Sec}[c+d\,x]\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{d}-\frac{a^2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]\sqrt{e\,\text{Cot}[c+d\,x]}\;\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,d}+$$

$$\frac{a^2\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]\sqrt{e\,\text{Cot}[c+d\,x]}\;\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,d}-\frac{a^2\sqrt{e\,\text{Cot}[c+d\,x]}\;\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\sqrt{\text{Tan}[c+d\,x]}}{2\sqrt{2}\,d}+$$

$$\frac{a^2\sqrt{e\,\text{Cot}[c+d\,x]}\;\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\sqrt{\text{Tan}[c+d\,x]}}{2\sqrt{2}\,d}+\frac{2\,a^2\sqrt{e\,\text{Cot}[c+d\,x]}\;\text{Tan}[c+d\,x]}{d}$$

Result (type 4, 284 leaves):

$$\frac{1}{16\,d\sqrt{e\,\text{Cot}[c+d\,x]}\;\sqrt{\text{Csc}[c+d\,x]^2}}a^2\,e\,(1+\text{Cos}[c+d\,x])^2$$

$$\left(\sqrt{\text{Csc}[c+d\,x]^2}\left(8+2\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}\right]\sqrt{\text{Cot}[c+d\,x]}-2\sqrt{2}\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}\right]\sqrt{\text{Cot}[c+d\,x]}-\right.\right.$$

$$\left.\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}\;\text{Log}\left[1-\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]+\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}\;\text{Log}\left[1+\sqrt{2}\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]\right)+$$

$$\left.16\,(-1)^{1/4}\,\text{Cot}[c+d\,x]^{3/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]^2}\right)\text{Sec}\left[\frac{1}{2}\text{ArcCot}[\text{Cot}[c+d\,x]]\right]^4$$

Problem 241: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^2}{\sqrt{e \operatorname{Cot}[c + d x]}} \, dx$$

Optimal (type 4, 339 leaves, 20 steps):

$$\frac{4 a^2 \operatorname{Sin}[c + d x]}{d \sqrt{e \operatorname{Cot}[c + d x]}} - \frac{4 a^2 \operatorname{Cos}[c + d x] \operatorname{EllipticE}\left[c - \frac{\pi}{4} + d x, 2\right]}{d \sqrt{e \operatorname{Cot}[c + d x]} \sqrt{\operatorname{Sin}[2 c + 2 d x]}} - \frac{a^2 \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{\operatorname{Tan}[c + d x]}\right]}{\sqrt{2} d \sqrt{e \operatorname{Cot}[c + d x]} \sqrt{\operatorname{Tan}[c + d x]}} + \frac{a^2 \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{\operatorname{Tan}[c + d x]}\right]}{\sqrt{2} d \sqrt{e \operatorname{Cot}[c + d x]} \sqrt{\operatorname{Tan}[c + d x]}} + \frac{a^2 \operatorname{Log}\left[1 - \sqrt{2} \sqrt{\operatorname{Tan}[c + d x]} + \operatorname{Tan}[c + d x]\right]}{2 \sqrt{2} d \sqrt{e \operatorname{Cot}[c + d x]} \sqrt{\operatorname{Tan}[c + d x]}} - \frac{a^2 \operatorname{Log}\left[1 + \sqrt{2} \sqrt{\operatorname{Tan}[c + d x]} + \operatorname{Tan}[c + d x]\right]}{2 \sqrt{2} d \sqrt{e \operatorname{Cot}[c + d x]} \sqrt{\operatorname{Tan}[c + d x]}} + \frac{2 a^2 \operatorname{Tan}[c + d x]}{3 d \sqrt{e \operatorname{Cot}[c + d x]}}$$

Result (type 4, 441 leaves):

$$\left(\left(1 + \operatorname{Cos}\left[2 \left(\frac{c}{2} + \frac{d x}{2}\right)\right]\right)^2 \operatorname{Cot}[c + d x]^{5/2} \operatorname{Csc}[c + d x]^2 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \operatorname{Sec}[c + d x])^2 \left(-\frac{1}{d} 2 \left(\frac{\operatorname{ArcTan}\left[\frac{-\sqrt{2} + 2 \sqrt{\operatorname{Cot}[c+d x]}}{\sqrt{2}}\right]}{2 \sqrt{2}} + \frac{\operatorname{ArcTan}\left[\frac{\sqrt{2} + 2 \sqrt{\operatorname{Cot}[c+d x]}}{\sqrt{2}}\right]}{2 \sqrt{2}} - \frac{\operatorname{Log}\left[1 - \sqrt{2} \sqrt{\operatorname{Cot}[c + d x]} + \operatorname{Cot}[c + d x]\right]}{4 \sqrt{2}} + \frac{\operatorname{Log}\left[1 + \sqrt{2} \sqrt{\operatorname{Cot}[c + d x]} + \operatorname{Cot}[c + d x]\right]}{4 \sqrt{2}} - 1 \Big/ \left(\left(1 + \operatorname{Cot}[c + d x]^2\right) 2 (-1)^{3/4} \sqrt{1 - i \operatorname{Cot}[c + d x]} \sqrt{1 + i \operatorname{Cot}[c + d x]} \operatorname{Cot}[c + d x] \left(\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[(-1)^{1/4} \sqrt{\operatorname{Cot}[c + d x]}\right], -1\right] - \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[(-1)^{1/4} \sqrt{\operatorname{Cot}[c + d x]}\right], -1\right]\right) \sqrt{\left(1 + \operatorname{Cot}[c + d x]^2\right) \operatorname{Tan}[c + d x]^2}\right) - \frac{2 \left(-\frac{1}{3 \operatorname{Cot}[c+d x]^{3/2}} - 2 \sqrt{\operatorname{Cot}[c + d x]} \sqrt{1 + \operatorname{Tan}[c + d x]^2}\right)}{d}\right)\right)\right) \Big/ \left(4 \left(1 + \operatorname{Cos}\left[2 \left(\frac{c}{2} + \frac{1}{2} (-c + \operatorname{ArcCot}[\operatorname{Cot}[c + d x]])\right)\right]\right)^2 \sqrt{e \operatorname{Cot}[c + d x]} \left(1 + \operatorname{Cot}[c + d x]^2\right)^2\right)$$

Problem 242: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^2}{(e \operatorname{Cot}[c + d x])^{3/2}} \, dx$$

Optimal (type 4, 375 leaves, 21 steps):

$$\frac{2 a^2 \operatorname{Cot}[c+d x]}{d (e \operatorname{Cot}[c+d x])^{3/2}}+\frac{4 a^2 \operatorname{Csc}[c+d x]}{3 d (e \operatorname{Cot}[c+d x])^{3/2}}-\frac{2 a^2 \operatorname{Cot}[c+d x] \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[c-\frac{\pi}{4}+d x, 2\right] \sqrt{\operatorname{Sin}[2 c+2 d x]}}{3 d (e \operatorname{Cot}[c+d x])^{3/2}}+$$

$$\frac{a^2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[c+d x]}\right]}{\sqrt{2} d (e \operatorname{Cot}[c+d x])^{3/2} \operatorname{Tan}[c+d x]^{3/2}}-\frac{a^2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[c+d x]}\right]}{\sqrt{2} d (e \operatorname{Cot}[c+d x])^{3/2} \operatorname{Tan}[c+d x]^{3/2}}+$$

$$\frac{a^2 \operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Tan}[c+d x]}+\operatorname{Tan}[c+d x]\right]}{2 \sqrt{2} d (e \operatorname{Cot}[c+d x])^{3/2} \operatorname{Tan}[c+d x]^{3/2}}-\frac{a^2 \operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Tan}[c+d x]}+\operatorname{Tan}[c+d x]\right]}{2 \sqrt{2} d (e \operatorname{Cot}[c+d x])^{3/2} \operatorname{Tan}[c+d x]^{3/2}}+\frac{2 a^2 \operatorname{Tan}[c+d x]}{5 d (e \operatorname{Cot}[c+d x])^{3/2}}$$

Result (type 4, 346 leaves):

$$\left(\left(1+\operatorname{Cos}\left[2\left(\frac{c}{2}+\frac{d x}{2}\right)\right]\right)^2 \operatorname{Cot}[c+d x]^{7/2} \operatorname{Csc}[c+d x]^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\right.$$

$$(a+a \operatorname{Sec}[c+d x])^2\left(-\frac{1}{d} 2\left(1 \Big/ \left(4 \sqrt{2}\right)\left(2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{\operatorname{Cot}[c+d x]}\right]-2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{\operatorname{Cot}[c+d x]}\right]-\right.\right.\right.$$

$$\left.\operatorname{Log}\left[1-\sqrt{2} \sqrt{\operatorname{Cot}[c+d x]}+\operatorname{Cot}[c+d x]\right]+\operatorname{Log}\left[1+\sqrt{2} \sqrt{\operatorname{Cot}[c+d x]}+\operatorname{Cot}[c+d x]\right]\right)+$$

$$\left.\frac{2 (-1)^{1/4} \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[(-1)^{1/4} \sqrt{\operatorname{Cot}[c+d x]}\right],-1\right] \sqrt{1+\operatorname{Tan}[c+d x]^2}}{3 \sqrt{1+\operatorname{Cot}[c+d x]^2}}\right)+$$

$$\left.\left.\frac{2\left(3+5 \operatorname{Cot}[c+d x]^2\left(3+2 \sqrt{1+\operatorname{Tan}[c+d x]^2}\right)\right)}{15 d \operatorname{Cot}[c+d x]^{5/2}}\right)\right) \Big/ \left(4\left(1+\operatorname{Cos}\left[2\left(\frac{c}{2}+\frac{1}{2}(-c+\operatorname{ArcCot}[\operatorname{Cot}[c+d x]])\right)\right]\right)^2\right.$$

$$\left.(e \operatorname{Cot}[c+d x])^{3/2}\left(1+\operatorname{Cot}[c+d x]^2\right)^2\right)$$

- **Problem 243: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(e \operatorname{Cot}[c+d x])^{3/2}}{a+a \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 4, 405 leaves, 20 steps):

$$\frac{2\,\text{Cot}[c+d\,x]\,(e\,\text{Cot}[c+d\,x])^{3/2}\,(1-\text{Sec}[c+d\,x])}{5\,a\,d}-\frac{2\,(e\,\text{Cot}[c+d\,x])^{3/2}\,(5-3\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{5\,a\,d}+$$
$$\frac{6\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sin}[c+d\,x]\,\text{Tan}[c+d\,x]}{5\,a\,d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}{\sqrt{2}\,a\,d}-$$
$$\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}{\sqrt{2}\,a\,d}-\frac{(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{3/2}}{2\,\sqrt{2}\,a\,d}+$$
$$\frac{(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\text{Tan}[c+d\,x]^{3/2}}{2\,\sqrt{2}\,a\,d}-\frac{6\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\,\text{Tan}[c+d\,x]^2}{5\,a\,d}$$

Result (type 4, 424 leaves) :

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]\,\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\right.$$
$$\left(-\frac{1}{d}2\left(-\frac{\text{ArcTan}\left[\frac{-\sqrt{2}+2\sqrt{\text{Cot}[c+d\,x]}}{\sqrt{2}}\right]}{2\,\sqrt{2}}-\frac{\text{ArcTan}\left[\frac{\sqrt{2}+2\sqrt{\text{Cot}[c+d\,x]}}{\sqrt{2}}\right]}{2\,\sqrt{2}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]}{4\,\sqrt{2}}-\right.\right.$$
$$\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]}{4\,\sqrt{2}}+1\Big/\left(5\,\left(1+\text{Cot}[c+d\,x]^2\right)\right)3\,(-1)^{3/4}\,\sqrt{1-i\,\text{Cot}[c+d\,x]}\,\sqrt{1+i\,\text{Cot}[c+d\,x]}$$
$$\text{Cot}[c+d\,x]\,\left(\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],\,-1\right]-\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],\,-1\right]\right)$$
$$\left.\left.\left.\sqrt{\left(1+\text{Cot}[c+d\,x]^2\right)\,\text{Tan}[c+d\,x]^2}\right)-\frac{2\,\left(\sqrt{\text{Cot}[c+d\,x]}+\frac{1}{5}\,\text{Cot}[c+d\,x]^{5/2}\,\left(-1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\right)}{d}\right)\right)\Big/$$
$$\left((1+\text{Cos}[c+d\,x])\,\sqrt{\text{Cot}[c+d\,x]}\,\left(1+\text{Cot}[c+d\,x]^2\right)\,(a+a\,\text{Sec}[c+d\,x])\right)$$

Problem 244: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{e\,\text{Cot}[c+d\,x]}}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 325 leaves, 18 steps) :

$$\frac{2\,\text{Cot}[c+d\,x]\,\sqrt{e\,\text{Cot}[c+d\,x]}\,(1-\text{Sec}[c+d\,x])}{3\,a\,d}-\frac{\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a\,d}-$$
$$\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,a\,d}+\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,a\,d}-$$
$$\frac{\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\sqrt{\text{Tan}[c+d\,x]}}{2\,\sqrt{2}\,a\,d}+$$
$$\frac{\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]\,\sqrt{\text{Tan}[c+d\,x]}}{2\,\sqrt{2}\,a\,d}$$

Result (type 4, 313 leaves) :

$$\frac{1}{(1+\text{Cos}[c+d\,x])\,\left(1+\text{Cot}[c+d\,x]^2\right)\,(a+a\,\text{Sec}[c+d\,x])}$$
$$2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\sqrt{\text{Cot}[c+d\,x]}\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]\,\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\,\left(-\frac{2\,\text{Cot}[c+d\,x]^{3/2}\,\left(-1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{3\,d}-\frac{1}{d}\right.$$
$$2\,\left(1\Big/\left(4\,\sqrt{2}\right)\,\left(-2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\right]+2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\right]+\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]-\text{Log}\left[\right.\right.\right.$$
$$\left.\left.\left.\left.1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]\right)+\frac{(-1)^{1/4}\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],\,-1\right]\,\sqrt{1+\text{Tan}[c+d\,x]^2}}{3\,\sqrt{1+\text{Cot}[c+d\,x]^2}}\right)\right)$$

Problem 245: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{\sqrt{e\,\text{Cot}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 347 leaves, 19 steps) :

$$\frac{2\,\text{Cot}[c+d\,x]\,(1-\text{Sec}[c+d\,x])}{a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}+\frac{2\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}-\frac{2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]}{a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}+$$
$$\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}$$

Result (type 4, 310 leaves) :

$$\frac{1}{4\,a\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}\text{Cot}[c+d\,x]^{3/2}\left(1+\sqrt{\text{Sec}[c+d\,x]^2}\right)\Big(2\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\right]-2\sqrt{2}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\right]+8\sqrt{\text{Cot}[c+d\,x]}+\sqrt{2}\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]-\sqrt{2}\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]+4\,(-1)^{3/4}\sqrt{\text{Csc}[c+d\,x]^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]^2}\,\text{Sin}[2\,(c+d\,x)]-4\,(-1)^{3/4}\sqrt{\text{Csc}[c+d\,x]^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]^2}\,\text{Sin}[2\,(c+d\,x)]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

- **Problem 246: Unable to integrate problem.**

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{3/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 290 leaves, 17 steps):

$$\frac{\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{a\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}}+\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}-\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{3/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

- **Problem 247: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 325 leaves, 18 steps):

$$\frac{2\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]}{a\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}}-\frac{2\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^2\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]}{a\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}-\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}-\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}+\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}$$

Result (type 4, 324 leaves):

$$\frac{1}{2\sqrt{2}\,a\,d\,e^3}\sqrt{\text{Cot}[c+d\,x]}\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\left(1+\sqrt{\text{Sec}[c+d\,x]^2}\right)\,\Big(-2\,\text{ArcTan}\Big[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\Big]+2\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\Big]-\text{Log}\Big[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\Big]+\text{Log}\Big[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\Big]+4\,\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]^2}+2\,(-1)^{3/4}\,\sqrt{2}\,\sqrt{\text{Csc}[c+d\,x]^2}\,\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\Big],-1\Big]\,\sqrt{\text{Sec}[c+d\,x]^2}\,\text{Sin}[2\,(c+d\,x)]-2\,(-1)^{3/4}\,\sqrt{2}\,\sqrt{\text{Csc}[c+d\,x]^2}\,\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\Big],-1\Big]\,\sqrt{\text{Sec}[c+d\,x]^2}\,\text{Sin}[2\,(c+d\,x)]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]$$

Problem 248: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(e\,\text{Cot}[c+d\,x])^{7/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 335 leaves, 18 steps):

$$-\frac{2\,\text{Cot}[c+d\,x]^3\,(3-\text{Sec}[c+d\,x])}{3\,a\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}}-\frac{\text{Cot}[c+d\,x]^3\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[c-\frac{\pi}{4}+d\,x,2\Big]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}}-\frac{\text{ArcTan}\Big[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\Big]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}+\frac{\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\Big]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}-\frac{\text{Log}\Big[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\Big]}{2\,\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}+\frac{\text{Log}\Big[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\Big]}{2\,\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}$$

Result (type 4, 313 leaves):

$$\left(2\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\text{Cot}[c+d\,x]^{9/2}\,\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\left(\frac{2\left(-3+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{3\,d\,\sqrt{\text{Cot}[c+d\,x]}}-1/d2\left(1\Big/\left(4\,\sqrt{2}\right)\Big(-2\,\text{ArcTan}\Big[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\Big]+2\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}\Big]+\text{Log}\Big[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\Big]-\text{Log}\Big[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\Big]\Big)+\frac{(-1)^{1/4}\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\Big],-1\Big]\,\sqrt{1+\text{Tan}[c+d\,x]^2}}{3\,\sqrt{1+\text{Cot}[c+d\,x]^2}}\right)\right)\right)\Big/\left((1+\text{Cos}[c+d\,x])\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\left(1+\text{Cot}[c+d\,x]^2\right)\,(a+a\,\text{Sec}[c+d\,x])\right)$$

Problem 249: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(e\,\text{Cot}[c+d\,x])^{9/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 371 leaves, 19 steps):

$$-\frac{6\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^3}{5\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}}-\frac{2\,\text{Cot}[c+d\,x]^3\,(5-3\,\text{Sec}[c+d\,x])}{15\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}}+\frac{6\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^4\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]}{5\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}+\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}$$

Result (type 4, 425 leaves):

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cot}[c+d\,x]^{11/2}\,\text{Csc}[c+d\,x]\,\text{Sec}[c+d\,x]\,\left(1+\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\left(-\frac{1}{d}2\left(\frac{\text{ArcTan}\left[\frac{-\sqrt{2}+2\,\sqrt{\text{Cot}[c+d\,x]}}{\sqrt{2}}\right]}{2\,\sqrt{2}}+\frac{\text{ArcTan}\left[\frac{\sqrt{2}+2\,\sqrt{\text{Cot}[c+d\,x]}}{\sqrt{2}}\right]}{2\,\sqrt{2}}-\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]}{4\,\sqrt{2}}+\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Cot}[c+d\,x]}+\text{Cot}[c+d\,x]\right]}{4\,\sqrt{2}}+1\Big/\left(5\,\left(1+\text{Cot}[c+d\,x]^2\right)\right)3\,(-1)^{3/4}\,\sqrt{1-i\,\text{Cot}[c+d\,x]}\,\sqrt{1+i\,\text{Cot}[c+d\,x]}\,\text{Cot}[c+d\,x]\,\left(\text{EllipticE}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]-\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}\,\sqrt{\text{Cot}[c+d\,x]}\right],-1\right]\right)\sqrt{\left(1+\text{Cot}[c+d\,x]^2\right)\,\text{Tan}[c+d\,x]^2}\right)-\frac{2\left(5+3\,\left(-1+3\,\text{Cot}[c+d\,x]^2\right)\,\sqrt{1+\text{Tan}[c+d\,x]^2}\right)}{15\,d\,\text{Cot}[c+d\,x]^{3/2}}\right)\right)\Big/\left((1+\text{Cos}[c+d\,x])\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\left(1+\text{Cot}[c+d\,x]^2\right)\,(a+a\,\text{Sec}[c+d\,x])\right)$$

Problem 250: Unable to integrate problem.

$$\int \frac{1}{\sqrt{e\,\text{Cot}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 413 leaves, 24 steps):

$$\frac{2\,\text{Cot}[c+d\,x]}{a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}-\frac{12\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]}{5\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}-\frac{4\,\text{Cot}[c+d\,x]^3}{5\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}+$$
$$\frac{4\,\text{Cot}[c+d\,x]^2\,\text{Csc}[c+d\,x]}{5\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}}-\frac{12\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]}{5\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}+$$
$$\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,\sqrt{e\,\text{Cot}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{\sqrt{e\,\text{Cot}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

- **Problem 251: Unable to integrate problem.**

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 359 leaves, 22 steps):

$$-\frac{4\,\text{Cot}[c+d\,x]^3}{3\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}}+\frac{4\,\text{Cot}[c+d\,x]^2\,\text{Csc}[c+d\,x]}{3\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}}+\frac{2\,\text{Cot}[c+d\,x]\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}}+$$
$$\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}-\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}+$$
$$\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]^{3/2}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

- **Problem 252: Unable to integrate problem.**

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 355 leaves, 22 steps):

$$-\frac{4\,\text{Cot}[c+d\,x]^3}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}}+\frac{4\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^3}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}}+\frac{4\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^2\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+$$
$$\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}-\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}-$$
$$\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}+\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]^{5/2}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 253: Unable to integrate problem.

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 321 leaves, 20 steps):

$$\frac{2\,\text{Cot}[c+d\,x]^3}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}}-\frac{2\,\text{Cot}[c+d\,x]^3\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}}-\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}+$$
$$\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}-\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}+\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]^{7/2}}$$

Result (type 8, 27 leaves):

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 254: Unable to integrate problem.

$$\int\frac{1}{(e\,\text{Cot}[c+d\,x])^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 357 leaves, 21 steps):

$$\frac{2\,\text{Cot}[c+d\,x]^3}{3\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}}-\frac{4\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^3}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}}+\frac{4\,\text{Cos}[c+d\,x]\,\text{Cot}[c+d\,x]^4\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,\,2\right]}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}-\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}+\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{9/2}\,\text{Tan}[c+d\,x]^{9/2}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{(e\,\text{Cot}[c+d\,x])^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 255: Unable to integrate problem.

$$\int \frac{1}{(e\,\text{Cot}[c+d\,x])^{11/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 389 leaves, 22 steps):

$$\frac{2\,\text{Cot}[c+d\,x]^3}{5\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}}+\frac{2\,\text{Cot}[c+d\,x]^5}{a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}}-\frac{4\,\text{Cot}[c+d\,x]^4\,\text{Csc}[c+d\,x]}{3\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}}+\frac{2\,\text{Cot}[c+d\,x]^5\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}}+\frac{\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}\,\text{Tan}[c+d\,x]^{11/2}}-\frac{\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}\right]}{\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}\,\text{Tan}[c+d\,x]^{11/2}}+\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}\,\text{Tan}[c+d\,x]^{11/2}}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\,\sqrt{2}\,a^2\,d\,(e\,\text{Cot}[c+d\,x])^{11/2}\,\text{Tan}[c+d\,x]^{11/2}}$$

Result (type 8, 27 leaves):

$$\int \frac{1}{(e\,\text{Cot}[c+d\,x])^{11/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Problem 265: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^4\,dx$$

Optimal (type 3, 73 leaves, 4 steps):

$$a\,x+\frac{3\,b\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}-\frac{(8\,a+3\,b\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{8\,d}+\frac{(4\,a+3\,b\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^3}{12\,d}$$

Result (type 3, 230 leaves):

$$a x-\frac{3 b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{3 b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{b}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{5 b}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{b}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{5 b}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{4 a \operatorname{Tan}[c+d x]}{3 d}+\frac{a \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Problem 266: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Sec}[c+d x]) \operatorname{Tan}[c+d x]^2 \, dx$$

Optimal (type 3, 45 leaves, 3 steps):

$$-a x-\frac{b \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 d}+\frac{(2 a+b \operatorname{Sec}[c+d x]) \operatorname{Tan}[c+d x]}{2 d}$$

Result (type 3, 142 leaves):

$$-a x+\frac{b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}-\frac{b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+\frac{b}{4 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{b}{4 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{a \operatorname{Tan}[c+d x]}{d}$$

Problem 268: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Cot}[c+d x]^4 (a+b \operatorname{Sec}[c+d x]) \, dx$$

Optimal (type 3, 55 leaves, 3 steps):

$$a x-\frac{\operatorname{Cot}[c+d x]^3 (a+b \operatorname{Sec}[c+d x])}{3 d}+\frac{\operatorname{Cot}[c+d x] (3 a+2 b \operatorname{Sec}[c+d x])}{3 d}$$

Result (type 3, 136 leaves):

$$a x+\frac{5 b \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]}{12 d}+\frac{4 a \operatorname{Cot}[c+d x]}{3 d}-\frac{b \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{24 d}-\frac{a \operatorname{Cot}[c+d x] \operatorname{Csc}[c+d x]^2}{3 d}+\frac{5 b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{12 d}-\frac{b \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{24 d}$$

Problem 269: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Cot}[c+d x]^6 (a+b \operatorname{Sec}[c+d x]) \, dx$$

Optimal (type 3, 84 leaves, 4 steps):

$$-a x-\frac{\text{Cot}[c+d x]^5 (a+b \text{Sec}[c+d x])}{5 d}+\frac{\text{Cot}[c+d x]^3 (5 a+4 b \text{Sec}[c+d x])}{15 d}-\frac{\text{Cot}[c+d x] (15 a+8 b \text{Sec}[c+d x])}{15 d}$$

Result (type 3, 219 leaves):

$$-a x-\frac{89 b \text{Cot}\left[\frac{1}{2} (c+d x)\right]}{240 d}-\frac{23 a \text{Cot}[c+d x]}{15 d}+\frac{31 b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{480 d}-\frac{b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^4}{160 d}+\frac{11 a \text{Cot}[c+d x] \text{Csc}[c+d x]^2}{15 d}-\frac{a \text{Cot}[c+d x] \text{Csc}[c+d x]^4}{5 d}-\frac{89 b \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{240 d}+\frac{31 b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{480 d}-\frac{b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{160 d}$$

- **Problem 270: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d x]^8 (a+b \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 111 leaves, 5 steps):

$$a x-\frac{\text{Cot}[c+d x]^7 (a+b \text{Sec}[c+d x])}{7 d}+\frac{\text{Cot}[c+d x]^5 (7 a+6 b \text{Sec}[c+d x])}{35 d}+\frac{\text{Cot}[c+d x] (35 a+16 b \text{Sec}[c+d x])}{35 d}-\frac{\text{Cot}[c+d x]^3 (35 a+24 b \text{Sec}[c+d x])}{105 d}$$

Result (type 3, 300 leaves):

$$a x+\frac{381 b \text{Cot}\left[\frac{1}{2} (c+d x)\right]}{1120 d}+\frac{176 a \text{Cot}[c+d x]}{105 d}-\frac{179 b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{2240 d}+\frac{b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^4}{70 d}-\frac{b \text{Cot}\left[\frac{1}{2} (c+d x)\right] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^6}{896 d}-\frac{122 a \text{Cot}[c+d x] \text{Csc}[c+d x]^2}{105 d}+\frac{22 a \text{Cot}[c+d x] \text{Csc}[c+d x]^4}{35 d}-\frac{a \text{Cot}[c+d x] \text{Csc}[c+d x]^6}{7 d}+\frac{381 b \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{1120 d}-\frac{179 b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{2240 d}+\frac{b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{70 d}-\frac{b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6 \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{896 d}$$

- **Problem 278: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[c+d x]^5 (a+b \text{Sec}[c+d x])^2 \, dx$$

Optimal (type 3, 126 leaves, 5 steps):

$$\frac{a^2 \text{Log}[\text{Cos}[c+d x]]}{d}+\frac{a (4 a+3 b) \text{Log}[1-\text{Sec}[c+d x]]}{8 d}+\frac{a (4 a-3 b) \text{Log}[1+\text{Sec}[c+d x]]}{8 d}+\frac{a \text{Cot}[c+d x]^2 (2 a+3 b \text{Sec}[c+d x])}{4 d}-\frac{\text{Cot}[c+d x]^4 \left(a^2+b^2+2 a b \text{Sec}[c+d x]\right)}{4 d}$$

Result (type 3, 385 leaves) :

$$\frac{\left(7 a^2+10 a b+3 b^2\right) \operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2 (a+b \operatorname{Sec}[c+d x])^2}{32 d (b+a \operatorname{Cos}[c+d x])^2}+\frac{\left(-a^2-2 a b-b^2\right) \operatorname{Cos}[c+d x]^2 \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^4 (a+b \operatorname{Sec}[c+d x])^2}{64 d (b+a \operatorname{Cos}[c+d x])^2}+$$
$$\frac{\left(4 a^2-3 a b\right) \operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\right] (a+b \operatorname{Sec}[c+d x])^2}{4 d (b+a \operatorname{Cos}[c+d x])^2}+\frac{\left(4 a^2+3 a b\right) \operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] (a+b \operatorname{Sec}[c+d x])^2}{4 d (b+a \operatorname{Cos}[c+d x])^2}+$$
$$\frac{\left(7 a^2-10 a b+3 b^2\right) \operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a+b \operatorname{Sec}[c+d x])^2}{32 d (b+a \operatorname{Cos}[c+d x])^2}+\frac{\left(-a^2+2 a b-b^2\right) \operatorname{Cos}[c+d x]^2 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a+b \operatorname{Sec}[c+d x])^2}{64 d (b+a \operatorname{Cos}[c+d x])^2}$$

Problem 280: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]^4 \, dx$$

Optimal (type 3, 116 leaves, 10 steps) :

$$a^2 x+\frac{3 a b \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{4 d}-\frac{a^2 \operatorname{Tan}[c+d x]}{d}-\frac{3 a b \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{4 d}+\frac{a^2 \operatorname{Tan}[c+d x]^3}{3 d}+\frac{a b \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]^3}{2 d}+\frac{b^2 \operatorname{Tan}[c+d x]^5}{5 d}$$

Result (type 3, 355 leaves) :

$$\frac{1}{960 d} \operatorname{Sec}[c+d x]^5 \left(60 a^2 c \operatorname{Cos}[5 (c+d x)]+60 a^2 d x \operatorname{Cos}[5 (c+d x)]-\right.$$
$$45 a b \operatorname{Cos}[5 (c+d x)] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+45 a b \operatorname{Cos}[5 (c+d x)] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$150 a \operatorname{Cos}[c+d x] \left(4 a (c+d x)-3 b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+3 b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+$$
$$75 a \operatorname{Cos}[3 (c+d x)] \left(4 a (c+d x)-3 b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+3 b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)-$$
$$80 a^2 \operatorname{Sin}[c+d x]+120 b^2 \operatorname{Sin}[c+d x]-60 a b \operatorname{Sin}[2 (c+d x)]-160 a^2 \operatorname{Sin}[3 (c+d x)]-$$
$$\left.60 b^2 \operatorname{Sin}[3 (c+d x)]-150 a b \operatorname{Sin}[4 (c+d x)]-80 a^2 \operatorname{Sin}[5 (c+d x)]+12 b^2 \operatorname{Sin}[5 (c+d x)]\right)$$

Problem 281: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]^2 \, dx$$

Optimal (type 3, 70 leaves, 8 steps) :

$$-a^2 x-\frac{a b \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}+\frac{a^2 \operatorname{Tan}[c+d x]}{d}+\frac{a b \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{d}+\frac{b^2 \operatorname{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 201 leaves) :

$$\frac{1}{12\,d}\operatorname{Sec}[c+d\,x]^3\left(-9\,a\operatorname{Cos}[c+d\,x]\left(a\,(c+d\,x)-b\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\operatorname{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+b\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\operatorname{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-3\,a\operatorname{Cos}[3\,(c+d\,x)]\left(a\,(c+d\,x)-b\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\operatorname{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+b\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\operatorname{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+2\left(3\,a^2+b^2+6\,a\,b\operatorname{Cos}[c+d\,x]+\left(3\,a^2-b^2\right)\operatorname{Cos}[2\,(c+d\,x)]\right)\operatorname{Sin}[c+d\,x]\right)$$

Problem 286: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Tan}[c+d\,x]^9}{a+b\operatorname{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 250 leaves, 3 steps):

$$-\frac{\operatorname{Log}[\operatorname{Cos}[c+d\,x]]}{a\,d}-\frac{\left(a^2-b^2\right)^4\operatorname{Log}[a+b\operatorname{Sec}[c+d\,x]]}{a\,b^8\,d}+\frac{\left(a^6-4\,a^4\,b^2+6\,a^2\,b^4-4\,b^6\right)\operatorname{Sec}[c+d\,x]}{b^7\,d}-\frac{a\left(a^4-4\,a^2\,b^2+6\,b^4\right)\operatorname{Sec}[c+d\,x]^2}{2\,b^6\,d}+\frac{\left(a^4-4\,a^2\,b^2+6\,b^4\right)\operatorname{Sec}[c+d\,x]^3}{3\,b^5\,d}-\frac{a\left(a^2-4\,b^2\right)\operatorname{Sec}[c+d\,x]^4}{4\,b^4\,d}+\frac{\left(a^2-4\,b^2\right)\operatorname{Sec}[c+d\,x]^5}{5\,b^3\,d}-\frac{a\operatorname{Sec}[c+d\,x]^6}{6\,b^2\,d}+\frac{\operatorname{Sec}[c+d\,x]^7}{7\,b\,d}$$

Result (type 3, 520 leaves):

$$\frac{\left(a^7-4\,a^5\,b^2+6\,a^3\,b^4-4\,a\,b^6\right)(b+a\operatorname{Cos}[c+d\,x])\operatorname{Log}[\operatorname{Cos}[c+d\,x]]\operatorname{Sec}[c+d\,x]}{b^8\,d\,(a+b\operatorname{Sec}[c+d\,x])}+\frac{\left(-a^8+4\,a^6\,b^2-6\,a^4\,b^4+4\,a^2\,b^6-b^8\right)(b+a\operatorname{Cos}[c+d\,x])\operatorname{Log}[b+a\operatorname{Cos}[c+d\,x]]\operatorname{Sec}[c+d\,x]}{a\,b^8\,d\,(a+b\operatorname{Sec}[c+d\,x])}-\frac{\left(-a^2+2\,b^2\right)\left(a^4-2\,a^2\,b^2+2\,b^4\right)(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^2}{b^7\,d\,(a+b\operatorname{Sec}[c+d\,x])}-\frac{a\left(a^4-4\,a^2\,b^2+6\,b^4\right)(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^3}{2\,b^6\,d\,(a+b\operatorname{Sec}[c+d\,x])}+\frac{\left(a^4-4\,a^2\,b^2+6\,b^4\right)(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^4}{3\,b^5\,d\,(a+b\operatorname{Sec}[c+d\,x])}+\frac{a\,(-a+2\,b)\,(a+2\,b)\,(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^5}{4\,b^4\,d\,(a+b\operatorname{Sec}[c+d\,x])}-\frac{(-a+2\,b)\,(a+2\,b)\,(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^6}{5\,b^3\,d\,(a+b\operatorname{Sec}[c+d\,x])}-\frac{a\,(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^7}{6\,b^2\,d\,(a+b\operatorname{Sec}[c+d\,x])}+\frac{(b+a\operatorname{Cos}[c+d\,x])\operatorname{Sec}[c+d\,x]^8}{7\,b\,d\,(a+b\operatorname{Sec}[c+d\,x])}$$

Problem 287: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Tan}[c+d\,x]^7}{a+b\operatorname{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 170 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[c+d x]]}{a d}-\frac{\left(a^2-b^2\right)^3 \text{Log}[a+b \text{Sec}[c+d x]]}{a b^6 d}+\frac{\left(a^4-3 a^2 b^2+3 b^4\right) \text{Sec}[c+d x]}{b^5 d}-\frac{a \left(a^2-3 b^2\right) \text{Sec}[c+d x]^2}{2 b^4 d}+\frac{\left(a^2-3 b^2\right) \text{Sec}[c+d x]^3}{3 b^3 d}-\frac{a \text{Sec}[c+d x]^4}{4 b^2 d}+\frac{\text{Sec}[c+d x]^5}{5 b d}$$

Result (type 3, 371 leaves):

$$\frac{\left(a^5-3 a^3 b^2+3 a b^4\right) (b+a \text{Cos}[c+d x]) \text{Log}[\text{Cos}[c+d x]] \text{Sec}[c+d x]}{b^6 d (a+b \text{Sec}[c+d x])}+\frac{\left(-a^6+3 a^4 b^2-3 a^2 b^4+b^6\right) (b+a \text{Cos}[c+d x]) \text{Log}[b+a \text{Cos}[c+d x]] \text{Sec}[c+d x]}{a b^6 d (a+b \text{Sec}[c+d x])}+\frac{\left(a^4-3 a^2 b^2+3 b^4\right) (b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^2}{b^5 d (a+b \text{Sec}[c+d x])}+\frac{a \left(-a^2+3 b^2\right) (b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^3}{2 b^4 d (a+b \text{Sec}[c+d x])}+\frac{\left(a^2-3 b^2\right) (b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^4}{3 b^3 d (a+b \text{Sec}[c+d x])}-\frac{a (b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^5}{4 b^2 d (a+b \text{Sec}[c+d x])}+\frac{(b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^6}{5 b d (a+b \text{Sec}[c+d x])}$$

- **Problem 293: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cot}[c+d x]^5}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 234 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[c+d x]]}{a d}+\frac{\left(8 a^2+21 a b+15 b^2\right) \text{Log}[1-\text{Sec}[c+d x]]}{16 (a+b)^3 d}+\frac{\left(8 a^2-21 a b+15 b^2\right) \text{Log}[1+\text{Sec}[c+d x]]}{16 (a-b)^3 d}-\frac{b^6 \text{Log}[a+b \text{Sec}[c+d x]]}{a \left(a^2-b^2\right)^3 d}-\frac{1}{16 (a+b) d (1-\text{Sec}[c+d x])^2}-\frac{5 a+7 b}{16 (a+b)^2 d (1-\text{Sec}[c+d x])}-\frac{1}{16 (a-b) d (1+\text{Sec}[c+d x])^2}-\frac{5 a-7 b}{16 (a-b)^2 d (1+\text{Sec}[c+d x])}$$

Result (type 3, 625 leaves):

$$\frac{2\,\mathrm{i}\,\left(a^5-3\,a^3\,b^2+3\,a\,b^4\right)\,(c+d\,x)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{(a-b)^3\,(a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}-\frac{\mathrm{i}\,\left(-8\,a^2+21\,a\,b-15\,b^2\right)\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{8\,(-a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}-$$

$$\frac{\mathrm{i}\,\left(8\,a^2+21\,a\,b+15\,b^2\right)\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{8\,(a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+\frac{(7\,a+9\,b)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}{32\,(a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}-$$

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]}{64\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+\frac{\left(-8\,a^2+21\,a\,b-15\,b^2\right)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\mathrm{Sec}[c+d\,x]}{16\,(-a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+$$

$$\frac{b^6\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]\,\mathrm{Sec}[c+d\,x]}{a\,\left(-a^2+b^2\right)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+\frac{\left(8\,a^2+21\,a\,b+15\,b^2\right)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\mathrm{Sec}[c+d\,x]}{16\,(a+b)^3\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+$$

$$\frac{(7\,a-9\,b)\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}{32\,(-a+b)^2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}+\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\mathrm{Sec}[c+d\,x]}{64\,(-a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

- **Problem 294: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Tan}[c+d\,x]^6}{a+b\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 198 leaves, 15 steps) :

$$-\frac{x}{a}+\frac{\left(8\,a^4-20\,a^2\,b^2+15\,b^4\right)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,b^5\,d}-\frac{2\,(a-b)^{5/2}\,(a+b)^{5/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a-b}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a\,b^5\,d}-$$

$$\frac{a\,\left(a^2-2\,b^2\right)\,\mathrm{Tan}[c+d\,x]}{b^4\,d}+\frac{\left(4\,a^2-7\,b^2\right)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{8\,b^3\,d}-\frac{a\,\mathrm{Tan}[c+d\,x]^3}{3\,b^2\,d}+\frac{\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]^3}{4\,b\,d}$$

Result (type 3, 907 leaves) :

$$-\frac{(c+d x)\,(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{a\,d\,(a+b \operatorname{Sec}[c+d x])}-\frac{2\left(-a^2+b^2\right)^3 \operatorname{ArcTanh}\left[\frac{(-a+b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right](b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{a\,b^5\sqrt{a^2-b^2}\,d\,(a+b \operatorname{Sec}[c+d x])}+$$

$$\frac{\left(-8 a^4+20 a^2 b^2-15 b^4\right)(b+a \operatorname{Cos}[c+d x]) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\operatorname{Sec}[c+d x]}{8 b^5 d\,(a+b \operatorname{Sec}[c+d x])}+$$

$$\frac{\left(8 a^4-20 a^2 b^2+15 b^4\right)(b+a \operatorname{Cos}[c+d x]) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\operatorname{Sec}[c+d x]}{8 b^5 d\,(a+b \operatorname{Sec}[c+d x])}+$$

$$\frac{(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{16 b d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{\left(12 a^2-4 a b-27 b^2\right)(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{48 b^3 d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$

$$\frac{a\,(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 b^2 d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}-\frac{(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{16 b d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-$$

$$\frac{a\,(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 b^2 d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{\left(-12 a^2+4 a b+27 b^2\right)(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{48 b^3 d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]\left(-3 a^3 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+7 a b^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{3 b^4 d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{(b+a \operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]\left(-3 a^3 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+7 a b^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{3 b^4 d\,(a+b \operatorname{Sec}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}$$

- **Problem 295: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Tan}[c+d x]^4}{a+b \operatorname{Sec}[c+d x]}\,dx$$

Optimal (type 3, 126 leaves, 6 steps):

$$\frac{x}{a}+\frac{\left(2 a^2-3 b^2\right)\operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 b^3 d}-\frac{2 (a-b)^{3/2}(a+b)^{3/2}\operatorname{ArcTanh}\left[\frac{\sqrt{a-b}\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a b^3 d}-\frac{a \operatorname{Tan}[c+d x]}{b^2 d}+\frac{\operatorname{Sec}[c+d x]\operatorname{Tan}[c+d x]}{2 b d}$$

Result (type 3, 287 leaves):

$$\frac{1}{4\,d\,(a+b\,\text{Sec}[c+d\,x])}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\left(\frac{4\,c}{a}+\frac{4\,d\,x}{a}+\frac{8\,(a^2-b^2)^{3/2}\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]}{a\,b^3}-\frac{4\,a^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{b^3}+\frac{6\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{b}+\frac{4\,a^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{b^3}-\frac{6\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{b}+\frac{1}{b\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{1}{b\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{4\,a\,\text{Tan}[c+d\,x]}{b^2}\right)$$

- **Problem 298: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cot}[c+d\,x]^4}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 177 leaves, 15 steps):

$$\frac{x}{a}-\frac{2\,b^5\,\text{ArcTanh}\left[\frac{\sqrt{a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{a+b}\right]}{a\,(a^2-b^2)^{5/2}\,d}+\frac{a\,(a^2-2\,b^2)\,\text{Cot}[c+d\,x]}{(a^2-b^2)^2\,d}-\frac{a\,\text{Cot}[c+d\,x]^3}{3\,(a^2-b^2)\,d}-\frac{b\,(a^2-2\,b^2)\,\text{Csc}[c+d\,x]}{(a^2-b^2)^2\,d}+\frac{b\,\text{Csc}[c+d\,x]^3}{3\,(a^2-b^2)\,d}$$

Result (type 3, 416 leaves):

$$\frac{(c+d\,x)\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a\,d\,(a+b\,\text{Sec}[c+d\,x])}+\frac{2\,b^5\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a\,\sqrt{a^2-b^2}\,(-a^2+b^2)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}+$$

$$\frac{\left(8\,a\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+11\,b\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,(b+a\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}[c+d\,x]}{12\,(a+b)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}-$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}{24\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])}+$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}[c+d\,x]\,\left(-8\,a\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+11\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{12\,(-a+b)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}-$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{24\,(-a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Problem 299: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]^9}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 255 leaves, 3 steps):

$$-\frac{\text{Log}[\text{Cos}[c+d x]]}{a^2 d}+\frac{\left(a^2-b^2\right)^3 \left(7 a^2+b^2\right) \text{Log}[a+b \text{Sec}[c+d x]]}{a^2 b^8 d}-\frac{2 a \left(3 a^4-8 a^2 b^2+6 b^4\right) \text{Sec}[c+d x]}{b^7 d}+\frac{\left(5 a^4-12 a^2 b^2+6 b^4\right) \text{Sec}[c+d x]^2}{2 b^6 d}-\frac{4 a \left(a^2-2 b^2\right) \text{Sec}[c+d x]^3}{3 b^5 d}+\frac{\left(3 a^2-4 b^2\right) \text{Sec}[c+d x]^4}{4 b^4 d}-\frac{2 a \text{Sec}[c+d x]^5}{5 b^3 d}+\frac{\text{Sec}[c+d x]^6}{6 b^2 d}+\frac{\left(a^2-b^2\right)^4}{a b^8 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 528 leaves):

$$-\frac{(-a+b)^4 (a+b)^4 (b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^2}{a^2 b^7 d (a+b \text{Sec}[c+d x])^2}+\frac{\left(-7 a^6+20 a^4 b^2-18 a^2 b^4+4 b^6\right) (b+a \text{Cos}[c+d x])^2 \text{Log}[\text{Cos}[c+d x]] \text{Sec}[c+d x]^2}{b^8 d (a+b \text{Sec}[c+d x])^2}+\frac{\left(7 a^8-20 a^6 b^2+18 a^4 b^4-4 a^2 b^6-b^8\right) (b+a \text{Cos}[c+d x])^2 \text{Log}[b+a \text{Cos}[c+d x]] \text{Sec}[c+d x]^2}{a^2 b^8 d (a+b \text{Sec}[c+d x])^2}-\frac{2 a \left(3 a^4-8 a^2 b^2+6 b^4\right) (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^3}{b^7 d (a+b \text{Sec}[c+d x])^2}+\frac{\left(5 a^4-12 a^2 b^2+6 b^4\right) (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^4}{2 b^6 d (a+b \text{Sec}[c+d x])^2}+\frac{4 a \left(-a^2+2 b^2\right) (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^5}{3 b^5 d (a+b \text{Sec}[c+d x])^2}+\frac{\left(3 a^2-4 b^2\right) (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^6}{4 b^4 d (a+b \text{Sec}[c+d x])^2}-\frac{2 a (b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^7}{5 b^3 d (a+b \text{Sec}[c+d x])^2}+\frac{(b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^8}{6 b^2 d (a+b \text{Sec}[c+d x])^2}$$

Problem 300: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]^7}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 179 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[c+d x]]}{a^2 d}+\frac{\left(a^2-b^2\right)^2 \left(5 a^2+b^2\right) \text{Log}[a+b \text{Sec}[c+d x]]}{a^2 b^6 d}-\frac{2 a \left(2 a^2-3 b^2\right) \text{Sec}[c+d x]}{b^5 d}+\frac{3 \left(a^2-b^2\right) \text{Sec}[c+d x]^2}{2 b^4 d}-\frac{2 a \text{Sec}[c+d x]^3}{3 b^3 d}+\frac{\text{Sec}[c+d x]^4}{4 b^2 d}+\frac{\left(a^2-b^2\right)^3}{a b^6 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 383 leaves):

$$\frac{(-a+b)^3 (a+b)^3 (b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^2}{a^2 b^5 d (a+b\,\mathrm{Sec}[c+d\,x])^2}+\frac{\left(-5a^4+9a^2b^2-3b^4\right)(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Log}[\mathrm{Cos}[c+d\,x]]\,\mathrm{Sec}[c+d\,x]^2}{b^6 d (a+b\,\mathrm{Sec}[c+d\,x])^2}+$$
$$\frac{\left(5a^6-9a^4b^2+3a^2b^4+b^6\right)(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]\,\mathrm{Sec}[c+d\,x]^2}{a^2 b^6 d (a+b\,\mathrm{Sec}[c+d\,x])^2}+\frac{2a\left(-2a^2+3b^2\right)(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^3}{b^5 d (a+b\,\mathrm{Sec}[c+d\,x])^2}-$$
$$\frac{3(-a+b)(a+b)(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^4}{2b^4 d (a+b\,\mathrm{Sec}[c+d\,x])^2}-\frac{2a(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^5}{3b^3 d (a+b\,\mathrm{Sec}[c+d\,x])^2}+\frac{(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^6}{4b^2 d (a+b\,\mathrm{Sec}[c+d\,x])^2}$$

- **Problem 305: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\mathrm{Cot}[c+d\,x]^3}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 197 leaves, 3 steps):

$$-\frac{\mathrm{Log}[\mathrm{Cos}[c+d\,x]]}{a^2 d}-\frac{(a+2b)\,\mathrm{Log}[1-\mathrm{Sec}[c+d\,x]]}{2(a+b)^3 d}-\frac{(a-2b)\,\mathrm{Log}[1+\mathrm{Sec}[c+d\,x]]}{2(a-b)^3 d}-\frac{b^4\left(5a^2-b^2\right)\mathrm{Log}[a+b\,\mathrm{Sec}[c+d\,x]]}{a^2\left(a^2-b^2\right)^3 d}+$$
$$\frac{1}{4(a+b)^2 d (1-\mathrm{Sec}[c+d\,x])}+\frac{1}{4(a-b)^2 d (1+\mathrm{Sec}[c+d\,x])}+\frac{b^4}{a\left(a^2-b^2\right)^2 d (a+b\,\mathrm{Sec}[c+d\,x])}$$

Result (type 3, 351 leaves):

$$\frac{1}{8d(a+b\,\mathrm{Sec}[c+d\,x])^2}(b+a\,\mathrm{Cos}[c+d\,x])$$
$$\left(-\frac{8b^5}{a^2(a-b)^2(a+b)^2}-\frac{16\,i\left(a^4-3a^2b^2-2b^4\right)(c+d\,x)(b+a\,\mathrm{Cos}[c+d\,x])}{(a-b)^3(a+b)^3}+\frac{8\,i\,(a-2b)\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\,(b+a\,\mathrm{Cos}[c+d\,x])}{(a-b)^3}+\right.$$
$$\frac{8\,i\,(a+2b)\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]\,(b+a\,\mathrm{Cos}[c+d\,x])}{(a+b)^3}-\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{(a+b)^2}+$$
$$\frac{4(a-2b)(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{(-a+b)^3}+\frac{8b^4\left(-5a^2+b^2\right)(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]}{a^2\left(a^2-b^2\right)^3}-$$
$$\left.\frac{4(a+2b)(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{(a+b)^3}-\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{(a-b)^2}\right)\mathrm{Sec}[c+d\,x]^2$$

- **Problem 306: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\mathrm{Cot}[c+d\,x]^5}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 278 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[c+d x]]}{a^2 d}+\frac{\left(4 a^2+13 a b+12 b^2\right) \text{Log}[1-\text{Sec}[c+d x]]}{8 (a+b)^4 d}+\frac{\left(4 a^2-13 a b+12 b^2\right) \text{Log}[1+\text{Sec}[c+d x]]}{8 (a-b)^4 d}-$$
$$\frac{b^6 \left(7 a^2-b^2\right) \text{Log}[a+b \text{Sec}[c+d x]]}{a^2 \left(a^2-b^2\right)^4 d}-\frac{1}{16 (a+b)^2 d (1-\text{Sec}[c+d x])^2}-\frac{5 a+9 b}{16 (a+b)^3 d (1-\text{Sec}[c+d x])}-$$
$$\frac{1}{16 (a-b)^2 d (1+\text{Sec}[c+d x])^2}-\frac{5 a-9 b}{16 (a-b)^3 d (1+\text{Sec}[c+d x])}+\frac{b^6}{a \left(a^2-b^2\right)^3 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 473 leaves) :

$$\frac{1}{64 d (a+b \text{Sec}[c+d x])^2}(b+a \text{Cos}[c+d x]) \left(\frac{64 b^7}{a^2 (-a+b)^3 (a+b)^3}+\right.$$
$$\frac{128 i \left(a^6-4 a^4 b^2+6 a^2 b^4+3 b^6\right) (c+d x) (b+a \text{Cos}[c+d x])}{(a-b)^4 (a+b)^4}-\frac{16 i \left(4 a^2-13 a b+12 b^2\right) \text{ArcTan}[\text{Tan}[c+d x]] (b+a \text{Cos}[c+d x])}{(a-b)^4}-$$
$$\frac{16 i \left(4 a^2+13 a b+12 b^2\right) \text{ArcTan}[\text{Tan}[c+d x]] (b+a \text{Cos}[c+d x])}{(a+b)^4}+\frac{2 (7 a+11 b) (b+a \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{(a+b)^3}-$$
$$\frac{(b+a \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^4}{(a+b)^2}+\frac{8 \left(4 a^2-13 a b+12 b^2\right) (b+a \text{Cos}[c+d x]) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]^2\right]}{(a-b)^4}+$$
$$\frac{64 \left(-7 a^2 b^6+b^8\right) (b+a \text{Cos}[c+d x]) \text{Log}[b+a \text{Cos}[c+d x]]}{a^2 \left(a^2-b^2\right)^4}+\frac{8 \left(4 a^2+13 a b+12 b^2\right) (b+a \text{Cos}[c+d x]) \text{Log}\left[\text{Sin}\left[\frac{1}{2} (c+d x)\right]^2\right]}{(a+b)^4}+$$
$$\left.\frac{2 (7 a-11 b) (b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2}{(a-b)^3}-\frac{(b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4}{(a-b)^2}\right) \text{Sec}[c+d x]^2$$

Problem 307: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]^6}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 200 leaves, 16 steps) :

$$-\frac{x}{a^2}-\frac{a \left(4 a^2-5 b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{b^5 d}+\frac{2 (a-b)^{3/2} (a+b)^{3/2} \left(4 a^2+b^2\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^2 b^5 d}+$$
$$\frac{\left(a^2-b^2\right)^2 \text{Sin}[c+d x]}{a b^4 d (b+a \text{Cos}[c+d x])}+\frac{\left(3 a^2-2 b^2\right) \text{Tan}[c+d x]}{b^4 d}-\frac{a \text{Sec}[c+d x] \text{Tan}[c+d x]}{b^3 d}+\frac{\text{Tan}[c+d x]^3}{3 b^2 d}$$

Result (type 3, 865 leaves) :

$$-\frac{(c+d x) (b+a \cos[c+d x])^2 \sec[c+d x]^2}{a^2 d (a+b \sec[c+d x])^2}-\frac{2 (-a^2+b^2)^2 (4 a^2+b^2) \text{ArcTanh}\left[\frac{(-a+b) \tan\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right] (b+a \cos[c+d x])^2 \sec[c+d x]^2}{a^2 b^5 \sqrt{a^2-b^2} d (a+b \sec[c+d x])^2}+$$

$$\frac{(4 a^3-5 a b^2) (b+a \cos[c+d x])^2 \text{Log}\left[\cos\left[\frac{1}{2} (c+d x)\right]-\sin\left[\frac{1}{2} (c+d x)\right]\right] \sec[c+d x]^2}{b^5 d (a+b \sec[c+d x])^2}+$$

$$\frac{(-4 a^3+5 a b^2) (b+a \cos[c+d x])^2 \text{Log}\left[\cos\left[\frac{1}{2} (c+d x)\right]+\sin\left[\frac{1}{2} (c+d x)\right]\right] \sec[c+d x]^2}{b^5 d (a+b \sec[c+d x])^2}+$$

$$\frac{(-6 a+b) (b+a \cos[c+d x])^2 \sec[c+d x]^2}{12 b^3 d (a+b \sec[c+d x])^2 \left(\cos\left[\frac{1}{2} (c+d x)\right]-\sin\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{(b+a \cos[c+d x])^2 \sec[c+d x]^2 \sin\left[\frac{1}{2} (c+d x)\right]}{6 b^2 d (a+b \sec[c+d x])^2 \left(\cos\left[\frac{1}{2} (c+d x)\right]-\sin\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{(b+a \cos[c+d x])^2 \sec[c+d x]^2 \sin\left[\frac{1}{2} (c+d x)\right]}{6 b^2 d (a+b \sec[c+d x])^2 \left(\cos\left[\frac{1}{2} (c+d x)\right]+\sin\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{(6 a-b) (b+a \cos[c+d x])^2 \sec[c+d x]^2}{12 b^3 d (a+b \sec[c+d x])^2 \left(\cos\left[\frac{1}{2} (c+d x)\right]+\sin\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{(b+a \cos[c+d x])^2 \sec[c+d x]^2 \left(9 a^2 \sin\left[\frac{1}{2} (c+d x)\right]-7 b^2 \sin\left[\frac{1}{2} (c+d x)\right]\right)}{3 b^4 d (a+b \sec[c+d x])^2 \left(\cos\left[\frac{1}{2} (c+d x)\right]-\sin\left[\frac{1}{2} (c+d x)\right]\right)}+$$

$$\frac{(b+a \cos[c+d x])^2 \sec[c+d x]^2 \left(9 a^2 \sin\left[\frac{1}{2} (c+d x)\right]-7 b^2 \sin\left[\frac{1}{2} (c+d x)\right]\right)}{3 b^4 d (a+b \sec[c+d x])^2 \left(\cos\left[\frac{1}{2} (c+d x)\right]+\sin\left[\frac{1}{2} (c+d x)\right]\right)}+$$

$$\frac{(b+a \cos[c+d x]) \sec[c+d x]^2 \left(a^4 \sin[c+d x]-2 a^2 b^2 \sin[c+d x]+b^4 \sin[c+d x]\right)}{a b^4 d (a+b \sec[c+d x])^2}$$

Problem 308: Result more than twice size of optimal antiderivative.

$$\int \frac{\tan[c+d x]^4}{(a+b \sec[c+d x])^2} \, dx$$

Optimal (type 3, 150 leaves, 6 steps):

$$\frac{x}{a^2}-\frac{2 a \text{ArcTanh}[\sin[c+d x]]}{b^3 d}+\frac{2 \sqrt{a-b} \sqrt{a+b} (2 a^2+b^2) \text{ArcTanh}\left[\frac{\sqrt{a-b} \tan\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^2 b^3 d}+\frac{(2 a^2-b^2) \sin[c+d x]}{a b^2 d (b+a \cos[c+d x])}+\frac{\tan[c+d x]}{b d (b+a \cos[c+d x])}$$

Result (type 3, 327 leaves):

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^2}(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^2\left(\frac{(c+d\,x)\,(b+a\,\text{Cos}[c+d\,x])}{a^2}+\frac{2\,\left(-2\,a^4+a^2\,b^2+b^4\right)\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]\,(b+a\,\text{Cos}[c+d\,x])}{a^2\,b^3\,\sqrt{a^2-b^2}}+\right.$$

$$\frac{2\,a\,(b+a\,\text{Cos}[c+d\,x])\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{b^3}-\frac{2\,a\,(b+a\,\text{Cos}[c+d\,x])\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{b^3}+$$

$$\left.\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{b^2\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{b^2\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+\frac{\left(a^2-b^2\right)\,\text{Sin}[c+d\,x]}{a\,b^2}\right)$$

- **Problem 312: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{5/2}}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 761 leaves, 38 steps):

$$\frac{a\, e^{5/2}\, \text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\, b^2\, d}-\frac{\left(a^2-b^2\right) e^{5/2}\, \text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a\, b^2\, d}-$$

$$\frac{a\, e^{5/2}\, \text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\, b^2\, d}+\frac{\left(a^2-b^2\right) e^{5/2}\, \text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a\, b^2\, d}-$$

$$\frac{a\, e^{5/2}\, \text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\, b^2\, d}+\frac{\left(a^2-b^2\right) e^{5/2}\, \text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\, a\, b^2\, d}+$$

$$\frac{a\, e^{5/2}\, \text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\, b^2\, d}-\frac{\left(a^2-b^2\right) e^{5/2}\, \text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\, a\, b^2\, d}+$$

$$\frac{2\sqrt{2}\,\sqrt{a-b}\,\sqrt{a+b}\, e^2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[-\frac{\sqrt{a-b}}{\sqrt{a+b}},\text{ArcSin}\left[\frac{\sqrt{\text{Sin}[c+d\,x]}}{\sqrt{1+\text{Cos}[c+d\,x]}}\right],-1\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{a\, b\, d\,\sqrt{\text{Sin}[c+d\,x]}}-$$

$$\frac{2\sqrt{2}\,\sqrt{a-b}\,\sqrt{a+b}\, e^2\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{\sqrt{a-b}}{\sqrt{a+b}},\text{ArcSin}\left[\frac{\sqrt{\text{Sin}[c+d\,x]}}{\sqrt{1+\text{Cos}[c+d\,x]}}\right],-1\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{a\, b\, d\,\sqrt{\text{Sin}[c+d\,x]}}-$$

$$\frac{2\, e^2\,\text{Cos}[c+d\,x]\,\text{EllipticE}\left[c-\frac{\pi}{4}+d\,x,2\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{b\, d\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}+\frac{2\, e\,\text{Cos}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{3/2}}{b\, d}$$

Result (type 6, 2965 leaves) :

$$\frac{2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Cot}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{5/2}}{b\, d\,(a+b\,\text{Sec}[c+d\,x])}-\frac{1}{b\, d\,(a+b\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^{5/2}}$$

$$(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,(e\,\text{Tan}[c+d\,x])^{5/2}\left(\frac{1}{(b+a\,\text{Cos}[c+d\,x])\left(1+\text{Tan}[c+d\,x]^2\right)^{3/2}}\,4\, a\,\text{Sec}[c+d\,x]^2\left(a+b\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\right.$$

$$\left(\frac{1}{4\sqrt{2}\,\sqrt{b}\,\left(-a^2+b^2\right)^{1/4}}\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{-a^2+b^2}-\right.\right.\right.$$

$$\left.\left.\sqrt{2}\,\sqrt{b}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+b\,\text{Tan}[c+d\,x]\right]-\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2}\,\sqrt{b}\,\left(-a^2+b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+b\,\text{Tan}[c+d\,x]\right]\right)+$$

$$\left(7\, a\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{3/2}\right)\Big/\left(3\sqrt{1+\text{Tan}[c+d\,x]^2}\left(-7\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]-2\left(2 b^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)\Bigg)+$$

$$\frac{1}{4\left(b+a\,\text{Cos}[c+d x]\right)\left(1+\text{Tan}[c+d x]^2\right)}\,b\,\text{Sec}[c+d x]\left(a+b\sqrt{1+\text{Tan}[c+d x]^2}\right)\left(\frac{1}{a}\left(-6\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d x]}\right]+\right.\right.$$

$$\frac{1}{\left(a^2-b^2\right)^{1/4}}\,3\left(2\sqrt{2}\left(a^2-b^2\right)^{1/4}\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d x]}\right]+(2+2\,i)\sqrt{b}\,\text{ArcTan}\left[1-\frac{(1+i)\sqrt{b}\sqrt{\text{Tan}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]-\right.$$

$$(2+2\,i)\sqrt{b}\,\text{ArcTan}\left[1+\frac{(1+i)\sqrt{b}\sqrt{\text{Tan}[c+d x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\sqrt{2}\left(a^2-b^2\right)^{1/4}\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d x]}+\text{Tan}[c+d x]\right]-$$

$$\sqrt{2}\left(a^2-b^2\right)^{1/4}\text{Log}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d x]}+\text{Tan}[c+d x]\right]-(1+i)\sqrt{b}\,\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{b}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d x]}+\right.$$

$$\left.\left.\left.i\,b\,\text{Tan}[c+d x]\right]+(1+i)\sqrt{b}\,\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{b}\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d x]}+i\,b\,\text{Tan}[c+d x]\right]\right)\right)-$$

$$\left(56\,b\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Tan}[c+d x]^{3/2}\right)\Big/\left(\sqrt{1+\text{Tan}[c+d x]^2}\left(7\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+2\left(2 b^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)\Bigg)+$$

$$\frac{1}{\left(b+a\,\text{Cos}[c+d x]\right)\left(-1+\text{Tan}[c+d x]^2\right)\sqrt{1+\text{Tan}[c+d x]^2}}\,2\,a\,\text{Cos}[2\,(c+d x)]\,\text{Sec}[c+d x]^2\left(a+b\sqrt{1+\text{Tan}[c+d x]^2}\right)$$

$$\left(\frac{b\,\text{ArcTan}\left[\frac{-\sqrt{2}+2\sqrt{\text{Tan}[c+d x]}}{\sqrt{2}}\right]}{\sqrt{2}\,a^2}+\frac{b\,\text{ArcTan}\left[\frac{\sqrt{2}+2\sqrt{\text{Tan}[c+d x]}}{\sqrt{2}}\right]}{\sqrt{2}\,a^2}+\frac{(-1)^{1/4}\left(a^2-b^2\right)^{3/4}\left(-a^2+2 b^2\right)\text{ArcTan}\left[\frac{-\sqrt{2}\left(a^2-b^2\right)^{1/4}+2\,(-1)^{1/4}\sqrt{b}\sqrt{\text{Tan}[c+d x]}}{\sqrt{2}\left(a^2-b^2\right)^{1/4}}\right]}{2\sqrt{2}\,a^2\sqrt{b}\left(-a^2+b^2\right)}+\right.$$

$$\frac{(-1)^{1/4}\left(a^2-b^2\right)^{3/4}\left(-a^2+2 b^2\right)\text{ArcTan}\left[\frac{\sqrt{2}\left(a^2-b^2\right)^{1/4}+2\,(-1)^{1/4}\sqrt{b}\sqrt{\text{Tan}[c+d x]}}{\sqrt{2}\left(a^2-b^2\right)^{1/4}}\right]}{2\sqrt{2}\,a^2\sqrt{b}\left(-a^2+b^2\right)}+$$

$$\frac{b\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a^2}-\frac{b\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a^2}+\frac{1}{4\sqrt{2}\,a^2\sqrt{b}\,\left(-a^2+b^2\right)}$$

$$(-1)^{1/4}\left(a^2-b^2\right)^{3/4}\left(-a^2+2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}-(-1)^{1/4}\sqrt{2}\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+\mathrm{i}\,b\,\text{Tan}[c+d\,x]\right]-$$

$$\frac{1}{4\sqrt{2}\,a^2\sqrt{b}\,\left(-a^2+b^2\right)}(-1)^{1/4}\left(a^2-b^2\right)^{3/4}\left(-a^2+2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}+(-1)^{1/4}\sqrt{2}\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+\mathrm{i}\,b\,\text{Tan}[c+d\,x]\right]-$$

$$\frac{\text{Tan}[c+d\,x]^{3/2}}{a\sqrt{1+\text{Tan}[c+d\,x]^2}}+\left(14\,a\,\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{3/2}\right)\Big/$$

$$\left(3\sqrt{1+\text{Tan}[c+d\,x]^2}\,\left(-7\,\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\left(2\,b^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\right.\right.\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\Big)$$

$$\left.\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\left(7\,b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{3/2}\right)\Big/$$

$$\left(a\sqrt{1+\text{Tan}[c+d\,x]^2}\,\left(-7\,\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\left(2\,b^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\right.\right.\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\Big)$$

$$\left.\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\left(11\,b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{7/2}\right)\Big/$$

$$\left(7\,a\sqrt{1+\text{Tan}[c+d\,x]^2}\,\left(-11\,\left(a^2-b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-\right.\right.$$

$$2\left(2\,b^2\,\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},2,\frac{15}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},1,\frac{15}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)\right)$$

- **Problem 313: Result unnecessarily involves higher level functions.**

$$\int\frac{(e\,\text{Tan}[c+d\,x])^{3/2}}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 740 leaves, 35 steps):

$$\frac{a\,e^{3/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,b^2\,d}-\frac{\left(a^2-b^2\right)e^{3/2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,b^2\,d}-$$
$$\frac{a\,e^{3/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,b^2\,d}+\frac{\left(a^2-b^2\right)e^{3/2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,b^2\,d}+$$
$$\frac{a\,e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,b^2\,d}-\frac{\left(a^2-b^2\right)e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,b^2\,d}-$$
$$\frac{a\,e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,b^2\,d}+\frac{\left(a^2-b^2\right)e^{3/2}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,b^2\,d}-$$
$$\frac{2\sqrt{2}\,\sqrt{a^2-b^2}\,e^2\,\text{EllipticPi}\left[\frac{b}{a-\sqrt{a^2-b^2}},\,\text{ArcSin}\left[\frac{\sqrt{-\text{Cos}[c+d\,x]}}{\sqrt{1+\text{Sin}[c+d\,x]}}\right],\,-1\right]\sqrt{\text{Sin}[c+d\,x]}}{a\,b\,d\,\sqrt{-\text{Cos}[c+d\,x]}\,\sqrt{e\,\text{Tan}[c+d\,x]}}+$$
$$\frac{2\sqrt{2}\,\sqrt{a^2-b^2}\,e^2\,\text{EllipticPi}\left[\frac{b}{a+\sqrt{a^2-b^2}},\,\text{ArcSin}\left[\frac{\sqrt{-\text{Cos}[c+d\,x]}}{\sqrt{1+\text{Sin}[c+d\,x]}}\right],\,-1\right]\sqrt{\text{Sin}[c+d\,x]}}{a\,b\,d\,\sqrt{-\text{Cos}[c+d\,x]}\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{e^2\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{b\,d\,\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 6, 755 leaves) :

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]^{3/2}\,\left(1+\text{Tan}[c+d\,x]^2\right)}$$

$$2\,\text{Sec}[c+d\,x]^2\,(e\,\text{Tan}[c+d\,x])^{3/2}\,\left(a+b\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\left(\frac{1}{8\,a}\left(2\sqrt{2}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]+\right.\right.$$

$$\frac{1}{\sqrt{b}}\left(-2\sqrt{2}\sqrt{b}\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}\right]-(2-2\,i)\,\left(a^2-b^2\right)^{1/4}\text{ArcTan}\left[1-\frac{(1+i)\sqrt{b}\sqrt{\text{Tan}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\right.$$

$$(2-2\,i)\,\left(a^2-b^2\right)^{1/4}\text{ArcTan}\left[1+\frac{(1+i)\sqrt{b}\sqrt{\text{Tan}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\sqrt{2}\sqrt{b}\,\text{Log}\left[1-\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]-\sqrt{2}\sqrt{b}\,\text{Log}\left[\right.$$

$$1+\sqrt{2}\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\left.\right]-(1-i)\,\left(a^2-b^2\right)^{1/4}\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]+$$

$$\left.\left.(1-i)\,\left(a^2-b^2\right)^{1/4}\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]\right)\right)-$$

$$\left(9\,b\,\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{5/2}\right)\Big/\left(5\sqrt{1+\text{Tan}[c+d\,x]^2}\right.$$

$$\left(9\,\left(a^2-b^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,b^2\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\left(-a^2+b^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)\right)$$

Problem 314: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{e\,\text{Tan}[c+d\,x]}}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 415 leaves, 21 steps):

$$-\frac{\sqrt{e}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{\sqrt{e}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,d}+\frac{\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}-$$

$$\frac{\sqrt{e}\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\sqrt{2}\,a\,d}+\frac{2\sqrt{2}\,b\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[-\frac{\sqrt{a-b}}{\sqrt{a+b}},\text{ArcSin}\left[\frac{\sqrt{\text{Sin}[c+d\,x]}}{\sqrt{1+\text{Cos}[c+d\,x]}}\right],-1\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{a\sqrt{a-b}\sqrt{a+b}\,d\sqrt{\text{Sin}[c+d\,x]}}-$$

$$\frac{2\sqrt{2}\,b\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{\sqrt{a-b}}{\sqrt{a+b}},\text{ArcSin}\left[\frac{\sqrt{\text{Sin}[c+d\,x]}}{\sqrt{1+\text{Cos}[c+d\,x]}}\right],-1\right]\sqrt{e\,\text{Tan}[c+d\,x]}}{a\sqrt{a-b}\sqrt{a+b}\,d\sqrt{\text{Sin}[c+d\,x]}}$$

Result (type 4, 232 leaves):

$$-\Bigg(4\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c+d\,x]\\ \Bigg(i\,\mathrm{EllipticPi}\Big[-i,\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}\Big],\,-1\Big]-i\,\mathrm{EllipticPi}\Big[i,\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}\Big],\,-1\Big]+1\Big/\left(\sqrt{a-b}\,\sqrt{a+b}\right)\\ b\left(\mathrm{EllipticPi}\Big[-\frac{\sqrt{a-b}}{\sqrt{a+b}},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}\Big],\,-1\Big]-\mathrm{EllipticPi}\Big[\frac{\sqrt{a-b}}{\sqrt{a+b}},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}\Big],\,-1\Big]\right)\Bigg)\\ \sqrt{\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}\Bigg)\Big/\left(a\,d\,\sqrt{\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,(a+b\,\mathrm{Sec}[c+d\,x])\right)$$

- **Problem 315: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}\,dx$$

Optimal (type 4, 422 leaves, 19 steps):

$$-\frac{\mathrm{ArcTan}\Big[1-\frac{\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}{\sqrt{e}}\Big]}{\sqrt{2}\,a\,d\,\sqrt{e}}+\frac{\mathrm{ArcTan}\Big[1+\frac{\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}{\sqrt{e}}\Big]}{\sqrt{2}\,a\,d\,\sqrt{e}}-\frac{\mathrm{Log}\Big[\sqrt{e}+\sqrt{e}\,\mathrm{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}\Big]}{2\,\sqrt{2}\,a\,d\,\sqrt{e}}+\\ \frac{\mathrm{Log}\Big[\sqrt{e}+\sqrt{e}\,\mathrm{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}\Big]}{2\,\sqrt{2}\,a\,d\,\sqrt{e}}-\frac{2\,\sqrt{2}\,b\,\mathrm{EllipticPi}\Big[\frac{b}{a-\sqrt{a^2-b^2}},\,\mathrm{ArcSin}\Big[\frac{\sqrt{-\mathrm{Cos}[c+d\,x]}}{\sqrt{1+\mathrm{Sin}[c+d\,x]}}\Big],\,-1\Big]\,\sqrt{\mathrm{Sin}[c+d\,x]}}{a\,\sqrt{a^2-b^2}\,d\,\sqrt{-\mathrm{Cos}[c+d\,x]}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}+\\ \frac{2\,\sqrt{2}\,b\,\mathrm{EllipticPi}\Big[\frac{b}{a+\sqrt{a^2-b^2}},\,\mathrm{ArcSin}\Big[\frac{\sqrt{-\mathrm{Cos}[c+d\,x]}}{\sqrt{1+\mathrm{Sin}[c+d\,x]}}\Big],\,-1\Big]\,\sqrt{\mathrm{Sin}[c+d\,x]}}{a\,\sqrt{a^2-b^2}\,d\,\sqrt{-\mathrm{Cos}[c+d\,x]}\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}$$

Result (type 6, 1860 leaves):

$$\frac{1}{2\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{e\,\mathrm{Tan}[c+d\,x]}}\\ (b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\sqrt{\mathrm{Tan}[c+d\,x]}\,\left(\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1+\mathrm{Tan}[c+d\,x]^2\right)^2}\,2\,\mathrm{Sec}[c+d\,x]^3\,\left(a+b\,\sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right)\right.$$

$$\left(-\frac{1}{\sqrt{b}\,(a^2-b^2)^{3/4}}\left(\frac{1}{8}-\frac{i}{8}\right) a \left(2\,\text{ArcTan}\left[1-\frac{(1+i)\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{(a^2-b^2)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\sqrt{b}\,(a^2-b^2)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\sqrt{b}\,(a^2-b^2)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]\right)+\left(5\,b\,(-a^2+b^2)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Tan}[c+d\,x]}\,\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\Big/\left(\left(5\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\left(2\,b^2\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2},2,\frac{9}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+(a^2-b^2)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\left(a^2-b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Tan}[c+d\,x]^2)\,(1+\text{Tan}[c+d\,x]^2)}\,2\,\text{Cos}[2\,(c+d\,x)]\,\text{Sec}[c+d\,x]^3\left(a+b\sqrt{1+\text{Tan}[c+d\,x]^2}\right)$$

$$\left(-\frac{\text{ArcTan}\left[\frac{-\sqrt{2}+2\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}}\right]}{\sqrt{2}\,a}-\frac{\text{ArcTan}\left[\frac{\sqrt{2}+2\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}}\right]}{\sqrt{2}\,a}-\frac{(-1)^{3/4}\,(a^2-b^2)^{1/4}\,(-a^2+2\,b^2)\,\text{ArcTan}\left[\frac{-\sqrt{2}\,(a^2-b^2)^{1/4}+2\,(-1)^{1/4}\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,(a^2-b^2)^{1/4}}\right]}{2\sqrt{2}\,a\sqrt{b}\,(-a^2+b^2)}-\right.$$

$$\frac{(-1)^{3/4}\,(a^2-b^2)^{1/4}\,(-a^2+2\,b^2)\,\text{ArcTan}\left[\frac{\sqrt{2}\,(a^2-b^2)^{1/4}+2\,(-1)^{1/4}\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{\sqrt{2}\,(a^2-b^2)^{1/4}}\right]}{2\sqrt{2}\,a\sqrt{b}\,(-a^2+b^2)}+$$

$$\frac{\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a}-\frac{\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a}+\frac{1}{4\sqrt{2}\,a\sqrt{b}\,(-a^2+b^2)}$$

$$(-1)^{3/4}\,(a^2-b^2)^{1/4}\,(-a^2+2\,b^2)\,\text{Log}\left[\sqrt{a^2-b^2}-(-1)^{1/4}\sqrt{2}\,\sqrt{b}\,(a^2-b^2)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]-$$

$$\frac{1}{4\sqrt{2}\,a\sqrt{b}\,(-a^2+b^2)}(-1)^{3/4}\,(a^2-b^2)^{1/4}\,(-a^2+2\,b^2)\,\text{Log}\left[\sqrt{a^2-b^2}+(-1)^{1/4}\sqrt{2}\,\sqrt{b}\,(a^2-b^2)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]+$$

$$\left(5\,b\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\sqrt{\text{Tan}[c+d\,x]}\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c+d\,x]^2}\left(-5\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\left(2\,b^2\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+(-a^2+b^2)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\right.$$

$$\left(-a^2+b^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-\left(9 b\left(a^2-b^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Tan}[c+d x]^{5/2}\right)\Big/$$

$$\Bigg(5 \sqrt{1+\text{Tan}[c+d x]^2}\ \Bigg(-9\left(a^2-b^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]-$$

$$2\Bigg(2 b^2 \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(-a^2+b^2\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg) \text{Tan}[c+d x]^2\Bigg)\left(-a^2+b^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)\Bigg)$$

- **Problem 316: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+b \text{Sec}[c+d x])\,(e \text{Tan}[c+d x])^{3/2}}\, dx$$

Optimal (type 4, 863 leaves, 39 steps):

$$\frac{a \text{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\left(a^2-b^2\right) d e^{3/2}}-\frac{b^2 \text{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a\left(a^2-b^2\right) d e^{3/2}}-\frac{a \text{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\left(a^2-b^2\right) d e^{3/2}}+\frac{b^2 \text{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{e \text{Tan}[c+d x]}}{\sqrt{e}}\right]}{\sqrt{2}\, a\left(a^2-b^2\right) d e^{3/2}}-$$

$$\frac{a \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]-\sqrt{2} \sqrt{e \text{Tan}[c+d x]}\right]}{2 \sqrt{2}\left(a^2-b^2\right) d e^{3/2}}+\frac{b^2 \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]-\sqrt{2} \sqrt{e \text{Tan}[c+d x]}\right]}{2 \sqrt{2}\, a\left(a^2-b^2\right) d e^{3/2}}+$$

$$\frac{a \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]+\sqrt{2} \sqrt{e \text{Tan}[c+d x]}\right]}{2 \sqrt{2}\left(a^2-b^2\right) d e^{3/2}}-\frac{b^2 \text{Log}\left[\sqrt{e}+\sqrt{e} \text{Tan}[c+d x]+\sqrt{2} \sqrt{e \text{Tan}[c+d x]}\right]}{2 \sqrt{2}\, a\left(a^2-b^2\right) d e^{3/2}}-$$

$$\frac{2\,(a-b \text{Sec}[c+d x])}{\left(a^2-b^2\right) d\, e \sqrt{e \text{Tan}[c+d x]}}+\frac{2 \sqrt{2}\, b^3 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[-\frac{\sqrt{a-b}}{\sqrt{a+b}},\text{ArcSin}\left[\frac{\sqrt{\text{Sin}[c+d x]}}{\sqrt{1+\text{Cos}[c+d x]}}\right],-1\right] \sqrt{e \text{Tan}[c+d x]}}{a\,(a-b)^{3/2}\,(a+b)^{3/2}\, d\, e^2 \sqrt{\text{Sin}[c+d x]}}-$$

$$\frac{2 \sqrt{2}\, b^3 \sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[\frac{\sqrt{a-b}}{\sqrt{a+b}},\text{ArcSin}\left[\frac{\sqrt{\text{Sin}[c+d x]}}{\sqrt{1+\text{Cos}[c+d x]}}\right],-1\right] \sqrt{e \text{Tan}[c+d x]}}{a\,(a-b)^{3/2}\,(a+b)^{3/2}\, d\, e^2 \sqrt{\text{Sin}[c+d x]}}+$$

$$\frac{2 b \text{Cos}[c+d x] \text{EllipticE}\left[c-\frac{\pi}{4}+d x,2\right] \sqrt{e \text{Tan}[c+d x]}}{\left(a^2-b^2\right) d\, e^2 \sqrt{\text{Sin}[2 c+2 d x]}}-\frac{2 b \text{Cos}[c+d x]\,(e \text{Tan}[c+d x])^{3/2}}{\left(a^2-b^2\right) d\, e^3}$$

Result (type 6, 2483 leaves):

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\left(-\frac{2\,(b-a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c+d\,x]}{-a^2+b^2}+\frac{2\,b\,\mathrm{Sin}[c+d\,x]}{-a^2+b^2}\right)\,\mathrm{Tan}[c+d\,x]^2}{d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Tan}[c+d\,x])^{3/2}}+$$

$$\frac{1}{(a-b)\,(a+b)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])\,(e\,\mathrm{Tan}[c+d\,x])^{3/2}}\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]^{3/2}$$

$$\Bigg(\frac{1}{12\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1+\mathrm{Tan}[c+d\,x]^2\right)}\,\left(-a^2+3\,b^2\right)\,\mathrm{Sec}[c+d\,x]\,\left(a+b\,\sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right)\,\Bigg(\frac{1}{a}\,\Bigg(-6\,\sqrt{2}\,\mathrm{ArcTan}\Big[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\Big]+$$

$$\frac{1}{\left(a^2-b^2\right)^{1/4}}\,3\,\Bigg(2\,\sqrt{2}\,\left(a^2-b^2\right)^{1/4}\,\mathrm{ArcTan}\Big[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}\Big]+(2+2\,i)\,\sqrt{b}\,\mathrm{ArcTan}\Big[1-\frac{(1+i)\,\sqrt{b}\,\sqrt{\mathrm{Tan}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\Big]-$$

$$(2+2\,i)\,\sqrt{b}\,\mathrm{ArcTan}\Big[1+\frac{(1+i)\,\sqrt{b}\,\sqrt{\mathrm{Tan}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\Big]+\sqrt{2}\,\left(a^2-b^2\right)^{1/4}\,\mathrm{Log}\Big[1-\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\Big]-$$

$$\sqrt{2}\,\left(a^2-b^2\right)^{1/4}\,\mathrm{Log}\Big[1+\sqrt{2}\,\sqrt{\mathrm{Tan}[c+d\,x]}+\mathrm{Tan}[c+d\,x]\Big]-(1+i)\,\sqrt{b}\,\mathrm{Log}\Big[\sqrt{a^2-b^2}-(1+i)\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\,\sqrt{\mathrm{Tan}[c+d\,x]}+$$

$$i\,b\,\mathrm{Tan}[c+d\,x]\Big]+(1+i)\,\sqrt{b}\,\mathrm{Log}\Big[\sqrt{a^2-b^2}+(1+i)\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\,\sqrt{\mathrm{Tan}[c+d\,x]}+i\,b\,\mathrm{Tan}[c+d\,x]\Big]\Bigg)\Bigg)\Bigg)-$$

$$\left(56\,b\,\left(-a^2+b^2\right)\,\mathrm{AppellF1}\Big[\frac{3}{4},\,\frac{1}{2},\,1,\,\frac{7}{4},\,-\mathrm{Tan}[c+d\,x]^2,\,\frac{b^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Tan}[c+d\,x]^{3/2}\right)\Big/\Bigg(\sqrt{1+\mathrm{Tan}[c+d\,x]^2}\,\Bigg(7\,\left(a^2-b^2\right)$$

$$\mathrm{AppellF1}\Big[\frac{3}{4},\,\frac{1}{2},\,1,\,\frac{7}{4},\,-\mathrm{Tan}[c+d\,x]^2,\,\frac{b^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+2\,\Bigg(2\,b^2\,\mathrm{AppellF1}\Big[\frac{7}{4},\,\frac{1}{2},\,2,\,\frac{11}{4},\,-\mathrm{Tan}[c+d\,x]^2,\,\frac{b^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$\left(-a^2+b^2\right)\,\mathrm{AppellF1}\Big[\frac{7}{4},\,\frac{3}{2},\,1,\,\frac{11}{4},\,-\mathrm{Tan}[c+d\,x]^2,\,\frac{b^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Bigg)\,\mathrm{Tan}[c+d\,x]^2\Bigg)\,\left(-a^2+b^2\,\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)\Bigg)\Bigg)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])\,\left(-1+\mathrm{Tan}[c+d\,x]^2\right)\,\sqrt{1+\mathrm{Tan}[c+d\,x]^2}}\,2\,a\,b\,\mathrm{Cos}[2\,(c+d\,x)]\,\mathrm{Sec}[c+d\,x]^2\,\left(a+b\,\sqrt{1+\mathrm{Tan}[c+d\,x]^2}\right)$$

$$\Bigg(\frac{b\,\mathrm{ArcTan}\Big[\frac{-\sqrt{2}+2\,\sqrt{\mathrm{Tan}[c+d\,x]}}{\sqrt{2}}\Big]}{\sqrt{2}\,a^2}+\frac{b\,\mathrm{ArcTan}\Big[\frac{\sqrt{2}+2\,\sqrt{\mathrm{Tan}[c+d\,x]}}{\sqrt{2}}\Big]}{\sqrt{2}\,a^2}+\frac{(-1)^{1/4}\,\left(a^2-b^2\right)^{3/4}\,\left(-a^2+2\,b^2\right)\,\mathrm{ArcTan}\Big[\frac{-\sqrt{2}\,\left(a^2-b^2\right)^{1/4}+2\,(-1)^{1/4}\,\sqrt{b}\,\sqrt{\mathrm{Tan}[c+d\,x]}}{\sqrt{2}\,\left(a^2-b^2\right)^{1/4}}\Big]}{2\,\sqrt{2}\,a^2\,\sqrt{b}\,\left(-a^2+b^2\right)}+$$

$$\frac{(-1)^{1/4}\,\left(a^2-b^2\right)^{3/4}\,\left(-a^2+2\,b^2\right)\,\mathrm{ArcTan}\Big[\frac{\sqrt{2}\,\left(a^2-b^2\right)^{1/4}+2\,(-1)^{1/4}\,\sqrt{b}\,\sqrt{\mathrm{Tan}[c+d\,x]}}{\sqrt{2}\,\left(a^2-b^2\right)^{1/4}}\Big]}{2\,\sqrt{2}\,a^2\,\sqrt{b}\,\left(-a^2+b^2\right)}+$$

$$\frac{b\,\text{Log}\left[1-\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a^2}-\frac{b\,\text{Log}\left[1+\sqrt{2}\,\sqrt{\text{Tan}[c+d\,x]}+\text{Tan}[c+d\,x]\right]}{2\sqrt{2}\,a^2}+\frac{1}{4\sqrt{2}\,a^2\sqrt{b}\,\left(-a^2+b^2\right)}$$

$$(-1)^{1/4}\left(a^2-b^2\right)^{3/4}\left(-a^2+2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}-(-1)^{1/4}\sqrt{2}\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]-$$

$$\frac{1}{4\sqrt{2}\,a^2\sqrt{b}\,\left(-a^2+b^2\right)}(-1)^{1/4}\left(a^2-b^2\right)^{3/4}\left(-a^2+2\,b^2\right)\text{Log}\left[\sqrt{a^2-b^2}+(-1)^{1/4}\sqrt{2}\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]-$$

$$\frac{\text{Tan}[c+d\,x]^{3/2}}{a\sqrt{1+\text{Tan}[c+d\,x]^2}}+\left(14\,a\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{3/2}\right)\Big/$$

$$\left(3\sqrt{1+\text{Tan}[c+d\,x]^2}\left(-7\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\left(2\,b^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\right.\right.\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\Big)$$

$$\left.\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\left(7\,b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{3/2}\right)\Big/$$

$$\left(a\sqrt{1+\text{Tan}[c+d\,x]^2}\left(-7\left(a^2-b^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},1,\frac{7}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-2\left(2\,b^2\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},2,\frac{11}{4},\right.\right.\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\Big)$$

$$\left.\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\left(11\,b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Tan}[c+d\,x]^{7/2}\right)\Big/$$

$$\left(7\,a\sqrt{1+\text{Tan}[c+d\,x]^2}\left(-11\left(a^2-b^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},1,\frac{11}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]-\right.\right.$$

$$2\left(2\,b^2\,\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},2,\frac{15}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},1,\frac{15}{4},-\text{Tan}[c+d\,x]^2,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)$$

- **Problem 317: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{(a+b\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 836 leaves, 36 steps):

$$\frac{a\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,\left(a^2-b^2\right)\,d\,e^{5/2}}-\frac{b^2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,\left(a^2-b^2\right)\,d\,e^{5/2}}-\frac{a\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,\left(a^2-b^2\right)\,d\,e^{5/2}}+\frac{b^2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}}{\sqrt{e}}\right]}{\sqrt{2}\,a\,\left(a^2-b^2\right)\,d\,e^{5/2}}+$$

$$\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,\left(a^2-b^2\right)\,d\,e^{5/2}}-\frac{b^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]-\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,\left(a^2-b^2\right)\,d\,e^{5/2}}-$$

$$\frac{a\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,\left(a^2-b^2\right)\,d\,e^{5/2}}+\frac{b^2\,\text{Log}\left[\sqrt{e}+\sqrt{e}\,\text{Tan}[c+d\,x]+\sqrt{2}\,\sqrt{e\,\text{Tan}[c+d\,x]}\right]}{2\,\sqrt{2}\,a\,\left(a^2-b^2\right)\,d\,e^{5/2}}-$$

$$\frac{2\,(a-b\,\text{Sec}[c+d\,x])}{3\,\left(a^2-b^2\right)\,d\,e\,(e\,\text{Tan}[c+d\,x])^{3/2}}-\frac{2\,\sqrt{2}\,b^3\,\text{EllipticPi}\left[\frac{b}{a-\sqrt{a^2-b^2}},\,\text{ArcSin}\left[\frac{\sqrt{-\text{Cos}[c+d\,x]}}{\sqrt{1+\text{Sin}[c+d\,x]}}\right],\,-1\right]\,\sqrt{\text{Sin}[c+d\,x]}}{a\,\left(a^2-b^2\right)^{3/2}\,d\,e^2\,\sqrt{-\text{Cos}[c+d\,x]}\,\sqrt{e\,\text{Tan}[c+d\,x]}}+$$

$$\frac{2\,\sqrt{2}\,b^3\,\text{EllipticPi}\left[\frac{b}{a+\sqrt{a^2-b^2}},\,\text{ArcSin}\left[\frac{\sqrt{-\text{Cos}[c+d\,x]}}{\sqrt{1+\text{Sin}[c+d\,x]}}\right],\,-1\right]\,\sqrt{\text{Sin}[c+d\,x]}}{a\,\left(a^2-b^2\right)^{3/2}\,d\,e^2\,\sqrt{-\text{Cos}[c+d\,x]}\,\sqrt{e\,\text{Tan}[c+d\,x]}}+\frac{b\,\text{EllipticF}\left[c-\frac{\pi}{4}+d\,x,\,2\right]\,\text{Sec}[c+d\,x]\,\sqrt{\text{Sin}[2\,c+2\,d\,x]}}{3\,\left(a^2-b^2\right)\,d\,e^2\,\sqrt{e\,\text{Tan}[c+d\,x]}}$$

Result (type 6, 2554 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\left(\frac{2\,a}{3\,\left(a^2-b^2\right)}-\frac{2\,(-a+b\,\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]^2}{3\,\left(-a^2+b^2\right)}\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]^3}{d\,(a+b\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{5/2}}-$$

$$\frac{1}{6\,(a-b)\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])\,(e\,\text{Tan}[c+d\,x])^{5/2}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]^{5/2}$$

$$\left(\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,\left(1+\text{Tan}[c+d\,x]^2\right)^2}\,2\,\left(3\,a^2-5\,b^2\right)\,\text{Sec}[c+d\,x]^3\,\left(a+b\,\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\,\left(-\frac{1}{\sqrt{b}\,\left(a^2-b^2\right)^{3/4}}\right.\right.$$

$$\left(\frac{1}{8}-\frac{i}{8}\right)\,a\,\left(2\,\text{ArcTan}\left[1-\frac{(1+i)\,\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]-2\,\text{ArcTan}\left[1+\frac{(1+i)\,\sqrt{b}\,\sqrt{\text{Tan}[c+d\,x]}}{\left(a^2-b^2\right)^{1/4}}\right]+\text{Log}\left[\sqrt{a^2-b^2}-(1+i)\,\sqrt{b}\right.\right.$$

$$\left.\left.\left(a^2-b^2\right)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]-\text{Log}\left[\sqrt{a^2-b^2}+(1+i)\,\sqrt{b}\,\left(a^2-b^2\right)^{1/4}\,\sqrt{\text{Tan}[c+d\,x]}+i\,b\,\text{Tan}[c+d\,x]\right]\right)+$$

$$\left(5\,b\,\left(-a^2+b^2\right)\,\text{AppellF1}\left[\frac{1}{4},\,-\frac{1}{2},\,1,\,\frac{5}{4},\,-\text{Tan}[c+d\,x]^2,\,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\sqrt{\text{Tan}[c+d\,x]}\,\sqrt{1+\text{Tan}[c+d\,x]^2}\right)\Big/\left(\left(5\,\left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{1}{4},\,-\frac{1}{2},\,1,\,\frac{5}{4},\,-\text{Tan}[c+d\,x]^2,\,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+2\,\left(2\,b^2\,\text{AppellF1}\left[\frac{5}{4},\,-\frac{1}{2},\,2,\,\frac{9}{4},\,-\text{Tan}[c+d\,x]^2,\,\frac{b^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left(a^2-b^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big) \left(a^2-b^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)\Bigg)+$$

$$\frac{1}{(b+a \text{Cos}[c+d x]) \left(1+\text{Tan}[c+d x]^2\right)^{3/2}} 8 a b \text{Sec}[c+d x]^2 \left(a+b \sqrt{1+\text{Tan}[c+d x]^2}\right) \left(\frac{1}{4 \sqrt{2} \left(-a^2+b^2\right)^{3/4}}\right.$$

$$\sqrt{b} \left(-2 \text{ArcTan}\left[1-\frac{\sqrt{2} \sqrt{b} \sqrt{\text{Tan}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]+2 \text{ArcTan}\left[1+\frac{\sqrt{2} \sqrt{b} \sqrt{\text{Tan}[c+d x]}}{\left(-a^2+b^2\right)^{1/4}}\right]-\text{Log}\left[\sqrt{-a^2+b^2}-\right.\right.$$

$$\left.\left.\sqrt{2} \sqrt{b} \left(-a^2+b^2\right)^{1/4} \sqrt{\text{Tan}[c+d x]}+b \text{Tan}[c+d x]\right]+\text{Log}\left[\sqrt{-a^2+b^2}+\sqrt{2} \sqrt{b} \left(-a^2+b^2\right)^{1/4} \sqrt{\text{Tan}[c+d x]}+b \text{Tan}[c+d x]\right]\right)+$$

$$\left(5 a \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \sqrt{\text{Tan}[c+d x]}\right)\Big/\left(\sqrt{1+\text{Tan}[c+d x]^2} \left(-5 \left(a^2-b^2\right)\right.\right.$$

$$\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]-2 \left(2 b^2 \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(-a^2+b^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\right) \left(-a^2+b^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right)\right)-$$

$$\frac{1}{(b+a \text{Cos}[c+d x]) \left(1-\text{Tan}[c+d x]^2\right) \left(1+\text{Tan}[c+d x]^2\right)} 2 \left(3 a^2-3 b^2\right) \text{Cos}[2 (c+d x)] \text{Sec}[c+d x]^3 \left(a+b \sqrt{1+\text{Tan}[c+d x]^2}\right)$$

$$\left(-\frac{\text{ArcTan}\left[\frac{-\sqrt{2}+2 \sqrt{\text{Tan}[c+d x]}}{\sqrt{2}}\right]}{\sqrt{2} a}-\frac{\text{ArcTan}\left[\frac{\sqrt{2}+2 \sqrt{\text{Tan}[c+d x]}}{\sqrt{2}}\right]}{\sqrt{2} a}-\frac{(-1)^{3/4} \left(a^2-b^2\right)^{1/4} \left(-a^2+2 b^2\right) \text{ArcTan}\left[\frac{-\sqrt{2} \left(a^2-b^2\right)^{1/4}+2 (-1)^{1/4} \sqrt{b} \sqrt{\text{Tan}[c+d x]}}{\sqrt{2} \left(a^2-b^2\right)^{1/4}}\right]}{2 \sqrt{2} a \sqrt{b} \left(-a^2+b^2\right)}-\right.$$

$$\frac{(-1)^{3/4} \left(a^2-b^2\right)^{1/4} \left(-a^2+2 b^2\right) \text{ArcTan}\left[\frac{\sqrt{2} \left(a^2-b^2\right)^{1/4}+2 (-1)^{1/4} \sqrt{b} \sqrt{\text{Tan}[c+d x]}}{\sqrt{2} \left(a^2-b^2\right)^{1/4}}\right]}{2 \sqrt{2} a \sqrt{b} \left(-a^2+b^2\right)}+$$

$$\frac{\text{Log}\left[1-\sqrt{2} \sqrt{\text{Tan}[c+d x]}+\text{Tan}[c+d x]\right]}{2 \sqrt{2} a}-\frac{\text{Log}\left[1+\sqrt{2} \sqrt{\text{Tan}[c+d x]}+\text{Tan}[c+d x]\right]}{2 \sqrt{2} a}+\frac{1}{4 \sqrt{2} a \sqrt{b} \left(-a^2+b^2\right)}$$

$$(-1)^{3/4} \left(a^2-b^2\right)^{1/4} \left(-a^2+2 b^2\right) \text{Log}\left[\sqrt{a^2-b^2}-(-1)^{1/4} \sqrt{2} \sqrt{b} \left(a^2-b^2\right)^{1/4} \sqrt{\text{Tan}[c+d x]}+i b \text{Tan}[c+d x]\right]-$$

$$\frac{1}{4 \sqrt{2} a \sqrt{b} \left(-a^2+b^2\right)} (-1)^{3/4} \left(a^2-b^2\right)^{1/4} \left(-a^2+2 b^2\right) \text{Log}\left[\sqrt{a^2-b^2}+(-1)^{1/4} \sqrt{2} \sqrt{b} \left(a^2-b^2\right)^{1/4} \sqrt{\text{Tan}[c+d x]}+i b \text{Tan}[c+d x]\right]+$$

$$\left(5 b \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d x]^2,\frac{b^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \sqrt{\text{Tan}[c+d x]}\right)\Big/\left(\sqrt{1+\text{Tan}[c+d x]^2} \left(-5 \left(a^2-b^2\right) \text{AppellF1}\left[\right.\right.\right.$$

$$\frac{1}{4},\frac{1}{2},1,\frac{5}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]-2\Big(2 b^2\,\text{AppellF1}\Big[\frac{5}{4},\frac{1}{2},2,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+$$

$$\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{5}{4},\frac{3}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Tan}[c+d x]^2\Big)\left(-a^2+b^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)-$$

$$\Big(9 b\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\,\text{Tan}[c+d x]^{5/2}\Big)\Big/\Big(5\sqrt{1+\text{Tan}[c+d x]^2}\,\Big(-9\left(a^2-b^2\right)$$

$$\text{AppellF1}\Big[\frac{5}{4},\frac{1}{2},1,\frac{9}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]-2\Big(2 b^2\,\text{AppellF1}\Big[\frac{9}{4},\frac{1}{2},2,\frac{13}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+$$

$$\left(-a^2+b^2\right)\text{AppellF1}\Big[\frac{9}{4},\frac{3}{2},1,\frac{13}{4},-\text{Tan}[c+d x]^2,\frac{b^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Tan}[c+d x]^2\Big)\left(-a^2+b^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)\Big)$$

Problem 320: Result more than twice size of optimal antiderivative.

$$\int\sqrt{a+b\,\text{Sec}[c+d x]}\;\text{Tan}[c+d x]\,dx$$

Optimal (type 3, 51 leaves, 4 steps):

$$-\frac{2\sqrt{a}\;\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a}}\Big]}{d}+\frac{2\sqrt{a+b\,\text{Sec}[c+d x]}}{d}$$

Result (type 3, 137 leaves):

$$\frac{1}{d\sqrt{b+a\,\text{Cos}[c+d x]}}\Bigg(2\sqrt{b+a\,\text{Cos}[c+d x]}+\sqrt{a\,\text{Cos}[c+d x]}\;\text{Log}\Big[1-\frac{\sqrt{b+a\,\text{Cos}[c+d x]}}{\sqrt{a\,\text{Cos}[c+d x]}}\Big]-\sqrt{a\,\text{Cos}[c+d x]}\;\text{Log}\Big[1+\frac{\sqrt{b+a\,\text{Cos}[c+d x]}}{\sqrt{a\,\text{Cos}[c+d x]}}\Big]\Bigg)\sqrt{a+b\,\text{Sec}[c+d x]}$$

Problem 321: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\text{Cot}[c+d x]\,\sqrt{a+b\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 106 leaves, 7 steps):

$$\frac{2\sqrt{a}\;\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a}}\Big]}{d}-\frac{\sqrt{a-b}\;\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a-b}}\Big]}{d}-\frac{\sqrt{a+b}\;\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\Big]}{d}$$

Result (type 3, 4527 leaves):

$$-\Bigg(\Bigg(\mathrm{i}\,\mathrm{Cot}[c+d\,x]\,\Bigg((a-b)$$

$$\mathrm{Log}\Big[\frac{2\,\mathrm{i}\,\left(a-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\Big]+$$

$$\sqrt{a-b}\,\Bigg(2\sqrt{a}\,\mathrm{Log}\Big[\Big(2\,\mathrm{i}\,a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-\mathrm{i}\,b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a}\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Big)\Big/\left(4\,a^{3/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big]-\sqrt{a+b}\,\mathrm{Log}\Big[\frac{1}{(a+b)^{3/2}}\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left(2\,\mathrm{i}\,b-2\,\mathrm{i}\,a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-2\sqrt{a+b}\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Big]\Bigg)\Bigg)$$

$$\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg)\Big/\Bigg(2\sqrt{a-b}\,d\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\Bigg(-\Bigg(\Bigg(\mathrm{i}\,\Bigg((a-b)\,\mathrm{Log}\Big[\frac{2\,\mathrm{i}\,\left(a-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\Big]+\sqrt{a-b}\,\Bigg(2\sqrt{a}\,\text{Log}\Big[\Big(2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\mathbb{i}\,b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Big)\Big/$$

$$\left(4\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big]-\sqrt{a+b}\,\text{Log}\Big[\frac{1}{(a+b)^{3/2}}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\Big(2\,\mathbb{i}\,b-2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$2\sqrt{a+b}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Big)\Big]\Bigg)\Bigg)$$

$$\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Bigg/\Bigg(4\sqrt{a-b}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\Bigg)+$$

$$\Bigg(\mathbb{i}\,\Bigg((a-b)\,\text{Log}\Big[\frac{2\,\mathbb{i}\left(a-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\Big]+\sqrt{a-b}\,\Bigg(2\sqrt{a}\,\text{Log}\Big[\Big(2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\mathbb{i}\,b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Big)\Big/$$

$$\left(4\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big]-\sqrt{a+b}\,\text{Log}\Big[\frac{1}{(a+b)^{3/2}}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\Big(2\,\mathbb{i}\,b-2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$2\sqrt{a+b}\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\,\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg)\Bigg]\Bigg)\Bigg)$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg)\Bigg/$$

$$\left(4\sqrt{a-b}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^{3/2}\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\right)+$$

$$\Bigg(i\Bigg((a-b)\,\mathrm{Log}\Bigg[\frac{2i\left(a-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg]+$$

$$\sqrt{a-b}\Bigg(2\sqrt{a}\,\mathrm{Log}\Bigg[\Bigg(2ia\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)-ib\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)+2\sqrt{a}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg)\Bigg/\left(4a^{3/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\Bigg]-\sqrt{a+b}$$

$$\mathrm{Log}\Bigg[\frac{1}{(a+b)^{3/2}}\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2\Bigg(2ib-2ia\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)-2\sqrt{a+b}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg)\Bigg]\Bigg)\Bigg)\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]}{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}+\frac{\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)}{\left(1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2}\right)\Bigg)\Bigg/$$

$$\left(4\sqrt{a-b}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)+$$

$$\left(\mathbb{i}\left((a-b)\,\text{Log}\left[\frac{2\,\mathbb{i}\left(a-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.\right.\right.$$

$$\left.\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\right]+\sqrt{a-b}\left(2\sqrt{a}\,\text{Log}\left[\left(2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-\right.\right.\right.$$

$$\left.\mathbb{i}\,b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Big/$$

$$\left.\left.\left(4\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right]-\sqrt{a+b}\,\text{Log}\left[\frac{1}{(a+b)^{3/2}}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\left(2\,\mathbb{i}\,b-2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-\right.\right.$$

$$\left.\left.\left.\left.\left.2\sqrt{a+b}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\right]\right)\right)\right)$$

$$\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Big/$$

$$\left(4\sqrt{a-b}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\right)-$$

$$\left(\mathbb{i}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.$$

$$\Bigg(\Bigg((a-b)\left(\frac{2\,i\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)}{\sqrt{a-b}}+\left(\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.\right.$$

$$\left.b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg)\Big/\left(\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)+$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}{\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\right)\Big/$$

$$\left(\frac{2\,i\left(a-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.$$

$$\left.\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)+$$

$$\sqrt{a-b}\left(\left(8\,a^2\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\left(\left(2\,i\,a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-i\,b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.\right.$$

$$\left(\sqrt{a}\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Big/$$

$$\left(\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)+\left(\sqrt{a}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right.$$

$$\left.\left.\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Big/\left(\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\right)\Big/$$

$$\left(4\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(2\,i\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-\right.\right.$$

$$\left.\left.\left.\mathrm{i}\, b \left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+2 \sqrt{a} \sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+b-a\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)\right/$$

$$\left.\left(4 a^{3/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)\right) \Big/ \left(2\, \mathrm{i}\, a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-\mathrm{i}\, b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\right.$$

$$\left.2 \sqrt{a} \sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+b-a\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)-$$

$$\left((a+b)^2\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{1}{(a+b)^{3/2}} \mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2\left(-2\, \mathrm{i}\, a\, \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.\right.\right.$$

$$\left.\left(\sqrt{a+b}\left(-a\, \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+b\, \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right/$$

$$\left(\sqrt{a+b-a\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)-\left(\sqrt{a+b}\, \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left.\left.\sqrt{a+b-a\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right) \Big/ \left(\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)-\frac{1}{(a+b)^{3/2}}$$

$$\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right] \mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2\left(2\, \mathrm{i}\, b-2\, \mathrm{i}\, a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-2 \sqrt{a+b} \sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left.\left.\left.\sqrt{a+b-a\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)\right) \Big/ \left(2\, \mathrm{i}\, b-2\, \mathrm{i}\, a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-\right.$$

$$\left.\left.\left.\left.2 \sqrt{a+b} \sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+b-a\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)\right)\right) \Big/$$

$$\left(2\sqrt{a-b}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\right)\Bigg)\Bigg)\Bigg)$$

Problem 322: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Cot}[c+dx]^3\sqrt{a+b\,\mathrm{Sec}[c+dx]}\,dx$$

Optimal (type 3, 215 leaves, 13 steps):

$$-\frac{2\sqrt{a}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{\sqrt{a}}\right]}{d}+\frac{a\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{\sqrt{a-b}}\right]}{\sqrt{a-b}\,d}-\frac{3\,b\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{\sqrt{a-b}}\right]}{4\sqrt{a-b}\,d}+$$
$$\frac{a\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{\sqrt{a+b}}\right]}{\sqrt{a+b}\,d}+\frac{3\,b\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{\sqrt{a+b}}\right]}{4\sqrt{a+b}\,d}-\frac{\mathrm{Cot}[c+dx]^2\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{2\,d}$$

Result (type 3, 4909 leaves):

$$\frac{\left(\frac{1}{2}-\frac{1}{2}\mathrm{Csc}[c+dx]^2\right)\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{d}+$$

$$\Bigg(\mathrm{i}\Bigg(\sqrt{a+b}\,(-4a+3b)\,\mathrm{Log}\Bigg[\frac{2\,\mathrm{i}\left(a-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$
$$\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg]+\sqrt{a-b}\Bigg(-8\sqrt{a}\sqrt{a+b}\,\mathrm{Log}\Bigg[\Bigg(-2\,\mathrm{i}\,a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)+$$
$$\mathrm{i}\,b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)-2\sqrt{a}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\Bigg)\Big/$$
$$\left(16\,a^{3/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\Bigg]+(4a+3b)\,\mathrm{Log}\Bigg[\frac{1}{\sqrt{a+b}\,(4a+3b)}\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2$$
$$\left(-2\,\mathrm{i}\,b+2\,\mathrm{i}\,a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)+2\sqrt{a+b}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\right)\Bigg]\Bigg)\Bigg)\Bigg)$$

$$\left(-\frac{3\,b\,Csc[c+d\,x]}{4\,\sqrt{b+a\,Cos[c+d\,x]}\,\sqrt{Sec[c+d\,x]}}-\frac{a\,Csc[c+d\,x]\,\sqrt{Sec[c+d\,x]}}{2\,\sqrt{b+a\,Cos[c+d\,x]}}-\frac{a\,Cos[2\,(c+d\,x)]\,Csc[c+d\,x]\,\sqrt{Sec[c+d\,x]}}{2\,\sqrt{b+a\,Cos[c+d\,x]}}\right)$$

$$\sqrt{a+b\,Sec[c+d\,x]}$$

$$\sqrt{\frac{1}{1-Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\sqrt{\frac{-1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left.\sqrt{a+b-a\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\Big/$$

$$\left(8\,\sqrt{a-b}\,\sqrt{a+b}\,d\,\sqrt{b+a\,Cos[c+d\,x]}\,\sqrt{Sec[c+d\,x]}\,\sqrt{\frac{a+b-a\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(\left(i\,\left(\sqrt{a+b}\,(-4\,a+3\,b)\,Log\left[\frac{2\,i\,\left(a-a\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\,\sqrt{-1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right.\right.\right.$$

$$\left.\sqrt{a+b-a\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\right]+\sqrt{a-b}\,\left(-8\,\sqrt{a}\,\sqrt{a+b}\,Log\left[\left(-2\,i\,a\,\left(-1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+\right.\right.\right.$$

$$\left.i\,b\,\left(1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-2\,\sqrt{a}\,\sqrt{-1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{a+b-a\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\Big/$$

$$\left.\left.\left.\left(16\,a^{3/2}\,\left(1+Tan\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\right]+(4\,a+3\,b)\,Log\left[\frac{1}{\sqrt{a+b}\,(4\,a+3\,b)}Cot\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(-2\,i\,b+\right.\right.$$

$$2\,i\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a+b}\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg]\Bigg)\Bigg)$$

$$\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\Bigg/$$

$$\left(16\sqrt{a-b}\sqrt{a+b}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)+$$

$$\frac{1}{16\sqrt{a-b}\sqrt{a+b}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}}\,i\,\Bigg(\sqrt{a+b}\,(-4\,a+3\,b)\,\text{Log}\Bigg[$$

$$\frac{2\,i\left(a-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg]+$$

$$\sqrt{a-b}\,\Bigg(-8\sqrt{a}\sqrt{a+b}\,\text{Log}\Bigg[\Bigg(-2\,i\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+i\,b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-2\sqrt{a}\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg)\Bigg/\left(16\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Bigg]+$$

$$(4\,a+3\,b)\,\text{Log}\Bigg[\frac{1}{\sqrt{a+b}\,(4\,a+3\,b)}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(-2\,i\,b+2\,i\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a+b}$$

$$\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg)\Bigg]\Bigg)\Bigg)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\sqrt{\frac{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+$$

$$\frac{1}{16\sqrt{a-b}\sqrt{a+b}\sqrt{\frac{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}}\,\mathbb{i}\left(\sqrt{a+b}\,(-4a+3b)\,\text{Log}\Big[\right.$$

$$\frac{2\,\mathbb{i}\left(a-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Big]+$$

$$\sqrt{a-b}\left(-8\sqrt{a}\sqrt{a+b}\,\text{Log}\Big[\left(-2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\mathbb{i}\,b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-2\sqrt{a}\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.\right.$$

$$\left.\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\Big/\left(16\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Big]+$$

$$(4a+3b)\,\text{Log}\Big[\frac{1}{\sqrt{a+b}\,(4a+3b)}\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2\left(-2\,\mathbb{i}\,b+2\,\mathbb{i}\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+2\sqrt{a+b}\right.$$

$$\left.\left.\left.\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\Big]\right)\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(-\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}+\right.$$

$$\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)-$$

$$\frac{1}{16\sqrt{a-b}\sqrt{a+b}\left(\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}}\,\mathbb{i}\left(\sqrt{a+b}\,(-4a+3b)\,\text{Log}\Big[\frac{2\,\mathbb{i}\left(a-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\sqrt{a-b}}+\right.$$

$$2\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Big]+$$

$$\sqrt{a-b}\left(-8\sqrt{a}\sqrt{a+b}\,\text{Log}\left[\left(-2\,i\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+i\,b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-2\sqrt{a}\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.\right.\right.$$

$$\left.\left.\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Big/\left(16\,a^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right]+$$

$$(4\,a+3\,b)\,\text{Log}\left[\frac{1}{\sqrt{a+b}\,(4\,a+3\,b)}\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-2\,i\,b+2\,i\,a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+2\sqrt{a+b}\right.\right.$$

$$\left.\left.\left.\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\right]\right)$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)+$$

$$\frac{1}{8\sqrt{a-b}\sqrt{a+b}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}}\,i\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\sqrt{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(\left(\sqrt{a+b}\,(-4\,a+3\,b)\left(\frac{2\,i\left(-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)}{\sqrt{a-b}}+\right.\right.\right.$$

$$\left(\left(-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\Big/$$

$$\left(\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)+$$

$$\left.\left.\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}{\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)\right)\Big/$$

$$\left(\frac{2\,i\left(a-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\sqrt{a-b}}+2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)+$$

$$\sqrt{a-b}\left(-\left(\left(128\,a^2\sqrt{a+b}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(\left(-2\,i\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+i\,b\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.\right.\right.\right.\right.$$

$$\left(\sqrt{a}\left(-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\Big/$$

$$\left(\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)-\left(\sqrt{a}\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left.\left.\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\Big/\left(\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)\Big/$$

$$\left(16\,a^{3/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)-\left(\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-2\,i\,a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\right.\right.$$

$$\left.\left.i\,b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-2\sqrt{a}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)\Big/$$

$$\left(16\, a^{3/2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\Bigg)\Bigg)\Bigg/\Bigg(-2\, i\, a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+i\, b \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$2 \sqrt{a} \sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+b-a\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg)\Bigg)+$$

$$\Bigg(\sqrt{a+b}\, (4 a+3 b)^2\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \Bigg(\frac{1}{\sqrt{a+b}\, (4 a+3 b)} \text{Cot}\left[\frac{1}{2}(c+d x)\right]^2 \Bigg(2\, i\, a\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\Bigg(\sqrt{a+b} \left(-a\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg)\Bigg/$$

$$\left(\sqrt{a+b-a\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)+\Bigg(\sqrt{a+b}\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\sqrt{a+b-a\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg)\Bigg/\left(\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\Bigg)-$$

$$\frac{1}{\sqrt{a+b}\, (4 a+3 b)} \text{Cot}\left[\frac{1}{2}(c+d x)\right] \text{Csc}\left[\frac{1}{2}(c+d x)\right]^2 \Bigg(-2\, i\, b+2\, i\, a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$2 \sqrt{a+b} \sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+b-a\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg)\Bigg)\Bigg)\Bigg/\Bigg(-2\, i\, b+$$

$$2\, i\, a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+2 \sqrt{a+b} \sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+b-a\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 323: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{a+b\, \text{Sec}[c+d x]}\, \text{Tan}[c+d x]^2\, dx$$

Optimal (type 4, 344 leaves, 7 steps):

$$-\frac{1}{3 b^2 d}2 a (a-b) \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} -$$

$$\frac{1}{3 b d}2 \sqrt{a+b} (a+2 b) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} +$$

$$\frac{2 \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{d} + \frac{2 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 692 leaves) :

$$-\left(\left(2\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.\right.$$

$$\left(-i\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,(a-b)\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$6\,i\,a\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$\left.\left.\left.a\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\right)\right/$$

$$\left(3\,b\sqrt{\frac{-a+b}{a+b}}\,d\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\right)+$$

$$\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(\frac{2\,a\,\text{Sin}[c+d\,x]}{3\,b}+\frac{2}{3}\,\text{Tan}[c+d\,x]\right)}{d}$$

Problem 324: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 125 leaves, 1 step) :

$$-\frac{1}{\sqrt{a+b}\,d}2\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a}{a+b},\text{ArcSin}\left[\frac{\sqrt{a+b}}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\right],\frac{a-b}{a+b}\right]\sqrt{-\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b\,\text{Sec}[c+d\,x]}}\sqrt{\frac{b\,(1+\text{Sec}[c+d\,x])}{a+b\,\text{Sec}[c+d\,x]}}\,(a+b\,\text{Sec}[c+d\,x])$$

Result (type 8, 16 leaves) :

$$\int\sqrt{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Problem 327: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tan}[c+d\,x]^3}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 79 leaves, 5 steps) :

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{\sqrt{a}\,d}-\frac{2\,a\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b^2\,d}+\frac{2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}{3\,b^2\,d}$$

Result (type 3, 194 leaves) :

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,\left(-\frac{4\,a}{3\,b^2}+\frac{2\,\text{Sec}[c+d\,x]}{3\,b}\right)}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\left(\sqrt{a\,\text{Cos}[c+d\,x]}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\left(-\text{Log}\left[1-\frac{\sqrt{b+a\,\text{Cos}[c+d\,x]}}{\sqrt{a\,\text{Cos}[c+d\,x]}}\right]+\text{Log}\left[1+\frac{\sqrt{b+a\,\text{Cos}[c+d\,x]}}{\sqrt{a\,\text{Cos}[c+d\,x]}}\right]\right)\text{Sin}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(a\,d\,\left(1-\text{Cos}[c+d\,x]^2\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)$$

Problem 328: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tan}[c+d\,x]}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 31 leaves, 3 steps) :

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{\sqrt{a}\,d}$$

Result (type 3, 108 leaves) :

$$\frac{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(\text{Log}\left[1-\frac{\sqrt{b+a\,\text{Cos}[c+d\,x]}}{\sqrt{a\,\text{Cos}[c+d\,x]}}\right]-\text{Log}\left[1+\frac{\sqrt{b+a\,\text{Cos}[c+d\,x]}}{\sqrt{a\,\text{Cos}[c+d\,x]}}\right]\right)}{d\,\sqrt{a\,\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

- **Problem 329: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cot}[c+d\,x]}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 106 leaves, 7 steps):

$$\frac{2\,\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\Big]}{\sqrt{a}\;d}-\frac{\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a-b}}\Big]}{\sqrt{a-b}\;d}-\frac{\text{ArcTanh}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big]}{\sqrt{a+b}\;d}$$

Result (type 3, 5506 leaves):

$$-\Bigg(\Bigg(i\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]$$

$$\Bigg(\sqrt{a-b}\,\text{Log}\Bigg[\frac{2\,i\,a+\Big(-2\,i\,a-2\,i\,b+4\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\Big)\,\text{Cot}\big[\frac{1}{2}(c+d\,x)\big]^2}{\sqrt{a+b}}\Bigg]-$$

$$\sqrt{a+b}\,\text{Log}\Bigg[\frac{2\,i\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-2\,i\sqrt{a-b}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Bigg]\Bigg)$$

$$\text{Sec}[c+d\,x]^{3/2}\Bigg)\Bigg/\Bigg(4\sqrt{a-b}\,\sqrt{a+b}\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\Bigg(\Bigg(i\,a\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\Bigg(\sqrt{a-b}\,\text{Log}\Bigg[\frac{2\,i\,a+\Big(-2\,i\,a-2\,i\,b+4\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\Big)\,\text{Cot}\big[\frac{1}{2}(c+d\,x)\big]^2}{\sqrt{a+b}}\Bigg]-$$

$$\sqrt{a+b}\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a}{\sqrt{a-b}}+4\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,-2\,\mathrm{i}\,\sqrt{a-b}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Bigg)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]\Bigg)\Big/$$

$$\left(4\,\sqrt{a-b}\,\,\sqrt{a+b}\,\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right)-\Bigg(\mathrm{i}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\,\sqrt{b+a\,\text{Cos}[c+d\,x]}$$

$$\Bigg(\sqrt{a-b}\,\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a+\left(-2\,\mathrm{i}\,a-2\,\mathrm{i}\,b+4\,\sqrt{a+b}\,\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right)\text{Cot}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{\sqrt{a+b}}\Big]-$$

$$\sqrt{a+b}\,\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a}{\sqrt{a-b}}+4\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,-2\,\mathrm{i}\,\sqrt{a-b}\,\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Bigg)$$

$$\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\left(4\,\sqrt{a-b}\,\,\sqrt{a+b}\,\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right)-$$

$$\Bigg(\mathrm{i}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\,\Bigg(\sqrt{a-b}\,\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a+\left(-2\,\mathrm{i}\,a-2\,\mathrm{i}\,b+4\,\sqrt{a+b}\,\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right)\text{Cot}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{\sqrt{a+b}}\Big]-$$

$$\sqrt{a+b}\,\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a}{\sqrt{a-b}}+4\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,-2\,\mathrm{i}\,\sqrt{a-b}\,\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big]\Bigg)$$

$$\sqrt{\text{Sec}[c+d x]}\left(-\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)\Bigg)\Bigg/$$

$$\left(4\sqrt{a-b}\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\right)+\Bigg(\mathrm{i}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{b+a\,\text{Cos}[c+d x]}$$

$$\Bigg(\sqrt{a-b}\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a+\left(-2\,\mathrm{i}\,a-2\,\mathrm{i}\,b+4\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\right)\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{\sqrt{a+b}}\Big]-$$

$$\sqrt{a+b}\,\text{Log}\Big[\frac{2\,\mathrm{i}\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-2\,\mathrm{i}\,\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\Bigg)$$

$$\sqrt{\text{Sec}[c+d x]}\left(-\frac{a\,\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)\Bigg)\Bigg/\left(4\sqrt{a-b}\,\sqrt{a+b}\left(\frac{b+a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}\right)^{3/2}\right)-$$

$$\frac{1}{2\sqrt{a-b}\,\sqrt{a+b}\,\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}\,\mathrm{i}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{b+a\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}$$

$$\Bigg(\Bigg(\sqrt{a-b}\,\Bigg(-\left(-2\,\mathrm{i}\,a-2\,\mathrm{i}\,b+4\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\right)\text{Cot}\left[\frac{1}{2}(c+d x)\right]\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2+$$

$$\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\frac{2\sqrt{a+b}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.$$

$$\left.\left.\left.\frac{2\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}\right)\right)\right)\Bigg/\left(2\,i\,a+\left(-2\,i\,a-2\,i\,b+4\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right.\right.$$

$$\left.\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right)\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)-\left(\sqrt{a+b}\left(\frac{2\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{2\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}-2\,i\sqrt{a-b}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Bigg/$$

$$\left.\left.\left.\left.\left(\frac{2\,i\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-2\,i\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\right)\right)-$$

$$\left(i\sqrt{-1-\text{Cos}[c+d\,x]}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[\right.$$

$$c+$$
$$d\,x]$$

$$\left(\sqrt{a}\ \sqrt{a-b}\ \mathrm{Log}\left[\frac{2\,i\,a+\left(-2\,i\,a-2\,i\,b+4\sqrt{a+b}\ \sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right)\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{a+b}}\right]-\right.$$

$$\sqrt{a+b}\ \left(\sqrt{a}\ \mathrm{Log}\left[\frac{2\,i\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ -2\,i\,\sqrt{a-b}\ \mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.4\sqrt{a-b}\ \mathrm{Log}\left[-\frac{1}{8\sqrt{a}}\,i\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(-2\,a-b-4\,i\,\sqrt{a}\ \sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ +(2\,a-b)\ \mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right]\right)\right)$$

$$\left.\mathrm{Sec}[c+d\,x]\right)\Big/\left(4\sqrt{a}\ \sqrt{a-b}\ \sqrt{a+b}\ d\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right.$$

$$\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}$$

$$\left(-\frac{1}{4\sqrt{a-b}\ \sqrt{a+b}\ (b+a\,\mathrm{Cos}[c+d\,x])^{3/2}}\,i\,\sqrt{a}\ \sqrt{-1-\mathrm{Cos}[c+d\,x]}\ \sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right.$$

$$\left(\sqrt{a}\ \sqrt{a-b}\ \mathrm{Log}\left[\frac{2\,i\,a+\left(-2\,i\,a-2\,i\,b+4\sqrt{a+b}\ \sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right)\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{a+b}}\right]-\right.$$

$$\sqrt{a+b}\ \left(\sqrt{a}\ \mathrm{Log}\left[\frac{2\,i\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ -2\,i\,\sqrt{a-b}\ \mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+4\sqrt{a-b}\ \mathrm{Log}\left[\right.\right.$$

$$-\frac{1}{8\sqrt{a}}\,\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-2\,a-b-4\,\mathrm{i}\sqrt{a}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(2\,a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Bigg]\Bigg)\Bigg)$$

$$\mathrm{Sin}[c+d\,x]-\frac{1}{4\sqrt{a}\sqrt{a-b}\sqrt{a+b}\sqrt{-1-\mathrm{Cos}[c+d\,x]}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}\,\mathrm{i}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}$$

$$\left(\sqrt{a}\sqrt{a-b}\,\mathrm{Log}\left[\frac{2\,\mathrm{i}\,a+\left(-2\,\mathrm{i}\,a-2\,\mathrm{i}\,b+4\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right)\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{a+b}}\right]-\right.$$

$$\sqrt{a+b}\left(\sqrt{a}\,\mathrm{Log}\left[\frac{2\,\mathrm{i}\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-2\,\mathrm{i}\sqrt{a-b}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+4\sqrt{a-b}\right.$$

$$\left.\left.\mathrm{Log}\left[-\frac{1}{8\sqrt{a}}\,\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-2\,a-b-4\,\mathrm{i}\sqrt{a}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(2\,a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right]\right)\right)$$

$$\mathrm{Sin}[c+d\,x]-\frac{1}{4\sqrt{a}\sqrt{a-b}\sqrt{a+b}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}}\,\mathrm{i}\sqrt{-1-\mathrm{Cos}[c+d\,x]}$$

$$\left(\sqrt{a}\sqrt{a-b}\,\mathrm{Log}\left[\frac{2\,\mathrm{i}\,a+\left(-2\,\mathrm{i}\,a-2\,\mathrm{i}\,b+4\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right)\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{a+b}}\right]-\right.$$

$$\sqrt{a+b}\left(\sqrt{a}\,\mathrm{Log}\left[\frac{2\,\mathrm{i}\,a}{\sqrt{a-b}}+4\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-2\,\mathrm{i}\sqrt{a-b}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+4\sqrt{a-b}\right.$$

$$\text{Log}\Big[-\frac{1}{8\sqrt{a}}\, i\, \text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2 \Big(-2 a-b-4 i \sqrt{a}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(2 a-b)\, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big]\Big)\Bigg)$$

$$\left(-\frac{a \text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(b+a \text{Cos}[c+d x])\, \text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)-\frac{1}{2\sqrt{a}\sqrt{a-b}\sqrt{a+b}\sqrt{b+a \text{Cos}[c+d x]}}$$

$$i\sqrt{-1-\text{Cos}[c+d x]}\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\Bigg(\Bigg(\sqrt{a}\sqrt{a-b}\Bigg(-\Bigg(-2 i a-2 i b+4\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\Bigg)$$

$$\text{Cot}\Big[\frac{1}{2}(c+d x)\Big]\text{Csc}\Big[\frac{1}{2}(c+d x)\Big]^2+\text{Cot}\Big[\frac{1}{2}(c+d x)\Big]^2\Bigg(\frac{2\sqrt{a+b}\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\left(-\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+$$

$$\frac{2\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\left(-\frac{a \text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(b+a \text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)}{\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(2 i a+\Bigg(-2 i a-2 i b+4\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\Bigg)\text{Cot}\Big[\frac{1}{2}(c+d x)\Big]^2\Bigg)-$$

$$\sqrt{a+b}\Bigg(\Bigg(\sqrt{a}\Bigg(\frac{2\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\left(-\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+\frac{2\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\left(-\frac{a \text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(b+a \text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)}{\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}-$$

$$2 i\sqrt{a-b}\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Bigg)\Bigg)\Bigg/\Bigg(\frac{2 i a}{\sqrt{a-b}}+4\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{b+a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-$$

$$2\,i\,\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg) + \Bigg(32\,i\,\sqrt{a}\,\sqrt{a-b}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(-1\Big/\left(8\sqrt{a}\right)i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left(-\frac{2\,i\,\sqrt{a}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}} - \frac{2\,i\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}} +\right.$$

$$\left.(2\,a-b)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right) + 1\Big/\left(8\sqrt{a}\right)i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(-2\,a-b-4\,i\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(2\,a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Bigg)\Bigg)\Bigg/$$

$$\left(-2\,a-b-4\,i\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(2\,a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 330: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cot}[c+d\,x]^3}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 260 leaves, 11 steps):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{\sqrt{a}\,d}+\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a-b}}\right]}{\sqrt{a-b}\,d}-\frac{b\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a-b}}\right]}{4\,(a-b)^{3/2}\,d}+$$

$$\frac{b\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right]}{4\,(a+b)^{3/2}\,d}+\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right]}{\sqrt{a+b}\,d}+\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,(a+b)\,d\,(1-\text{Sec}[c+d\,x])}+\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,(a-b)\,d\,(1+\text{Sec}[c+d\,x])}$$

Result (type 3, 3876 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])\left(\frac{a}{2\left(a^2-b^2\right)}+\frac{(a-b\,\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]^2}{2\left(-a^2+b^2\right)}\right)\text{Sec}[c+d\,x]}{d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\Bigg((b+a\,\text{Cos}[c+d\,x])\Bigg(-\frac{8\left(a^2-b^2\right)\text{Log}\left[\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}+\frac{(a-b)\,(4\,a+5\,b)\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-$$

$$\frac{(a-b)\,(4\,a+5\,b)\,\text{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}+$$

$$\frac{\left(4\,a^2-a\,b-5\,b^2\right)\text{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a-b}}+$$

$$\frac{8\left(a^2-b^2\right)\text{Log}\left[2\,a+b+4\sqrt{a}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}\Bigg)$$

$$\Bigg(\frac{a\,b\,\text{Csc}[c+d\,x]}{4\left(-a^2+b^2\right)\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^2\,\text{Csc}[c+d\,x]\sqrt{\text{Sec}[c+d\,x]}}{2\left(-a^2+b^2\right)\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{3\,b^2\,\text{Csc}[c+d\,x]\sqrt{\text{Sec}[c+d\,x]}}{4\left(-a^2+b^2\right)\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\frac{a^2\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[c+d\,x]\sqrt{\text{Sec}[c+d\,x]}}{2\left(-a^2+b^2\right)\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{b^2\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[c+d\,x]\sqrt{\text{Sec}[c+d\,x]}}{2\left(-a^2+b^2\right)\sqrt{b+a\,\text{Cos}[c+d\,x]}}\Bigg)\text{Sec}[c+d\,x]\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\Bigg)\Bigg/$$

$$\Bigg(8\left(a^2-b^2\right)d\sqrt{-(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(\left(\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\left(-\frac{8\left(a^2-b^2\right)\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}+\frac{(a-b)(4a+5b)\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-\right.\right.\right.$$

$$\frac{(a-b)(4a+5b)\,\mathrm{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}+\frac{1}{\sqrt{a-b}}$$

$$\left(4a^2-a\,b-5b^2\right)\mathrm{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\left.\frac{8\left(a^2-b^2\right)\mathrm{Log}\left[2a+b+4\sqrt{a}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(-2a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left.\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(16\left(a^2-b^2\right)\sqrt{-(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)-$$

$$\left(a\left(-\frac{8\left(a^2-b^2\right)\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}+\frac{(a-b)(4a+5b)\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-\right.\right.$$

$$\frac{(a-b)(4a+5b)\,\mathrm{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}+\frac{1}{\sqrt{a-b}}$$

$$\left(4a^2-a\,b-5b^2\right)\mathrm{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\left.\frac{8\left(a^2-b^2\right)\text{Log}\left[2a+b+4\sqrt{a}\sqrt{-\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{-b-a\,\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}+(-2a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]}{\sqrt{a}}\right)\sqrt{\text{Sec}[c+dx]}$$

$$\left.\text{Sin}[c+dx]\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\right)\Bigg/\left(16\left(a^2-b^2\right)\sqrt{b+a\,\text{Cos}[c+dx]}\sqrt{-(b+a\,\text{Cos}[c+dx])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}\right)+$$

$$\frac{1}{16\left(a^2-b^2\right)\sqrt{-(b+a\,\text{Cos}[c+dx])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{b+a\,\text{Cos}[c+dx]}$$

$$\left(-\frac{8\left(a^2-b^2\right)\text{Log}\left[\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\right]}{\sqrt{a}}+\frac{(a-b)(4a+5b)\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]}{\sqrt{a+b}}-\right.$$

$$\frac{(a-b)(4a+5b)\,\text{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{-b-a\,\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]}{\sqrt{a+b}}+\frac{1}{\sqrt{a-b}}$$

$$\left(4a^2-ab-5b^2\right)\text{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{-b-a\,\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]+$$

$$\left.\frac{8\left(a^2-b^2\right)\text{Log}\left[2a+b+4\sqrt{a}\sqrt{-\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\frac{-b-a\,\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}+(-2a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right]}{\sqrt{a}}\right)$$

$$\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}-\frac{1}{16\left(a^2-b^2\right)\left(-(b+a\,\text{Cos}[c+dx])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\right)^{3/2}}$$

$$\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\left(-\frac{8\left(a^2-b^2\right)\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}+\frac{(a-b)\,(4\,a+5\,b)\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-\right.$$

$$\frac{(a-b)\,(4\,a+5\,b)\,\mathrm{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}+\frac{1}{\sqrt{a-b}}$$

$$\left(4\,a^2-a\,b-5\,b^2\right)\mathrm{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\left.\frac{8\left(a^2-b^2\right)\mathrm{Log}\left[2\,a+b+4\sqrt{a}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(-2\,a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a}}\right)\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\left(a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sin}[c+d\,x]-(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+$$

$$\frac{1}{8\left(a^2-b^2\right)\sqrt{-(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\sqrt{\mathrm{Sec}[c+d\,x]}\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(\frac{(a-b)\,(4\,a+5\,b)\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}-\frac{8\left(a^2-b^2\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a}}-\right.$$

$$\left((a-b)\,(4\,a+5\,b)\left(\frac{\sqrt{a+b}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\left(-\frac{\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{(1+\mathrm{Cos}[c+d\,x])^2}+\frac{\mathrm{Sin}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}}+\right.\right.$$

$$\frac{\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\left(\frac{a\,\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(-b-a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}-a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)\Big/$$

$$\left(\sqrt{a+b}\left(a+b+2\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$\Bigg((4a^2-a b-5 b^2)\Bigg(\frac{\sqrt{a-b}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\left(-\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+$$

$$\frac{\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\left(\frac{a\,\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(-b-a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+(a-b)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)\Big/$$

$$\left(\sqrt{a-b}\left(-a+2\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$\Bigg(8\,(a^2-b^2)\Bigg(\frac{2\sqrt{a}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\left(-\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+$$

$$\frac{2\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\left(\frac{a\,\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(-b-a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+(-2a+b)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)\Big/$$

$$\left(\sqrt{a}\left(2a+b+4\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(-2a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Bigg)\Bigg)\Bigg)$$

Problem 331: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]^4}{\sqrt{a+b \,\text{Sec}[c+d x]}}\, dx$$

Optimal (type 4, 404 leaves, 11 steps):

$$-\frac{2 \sqrt{a+b}\, \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\, (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\, (1+\text{Sec}[c+d x])}{a-b}}}{a\, d} - \frac{1}{15\, b^4\, d} 2\, (a-b) \sqrt{a+b}\, \left(8 a^2-21 b^2\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{-\frac{b\, (-1+\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\, (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{15\, b^3\, d} 2 \sqrt{a+b}\, \left(-8 a^2+2 a b+21 b^2\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{-\frac{b\, (-1+\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{b\, (1+\text{Sec}[c+d x])}{-a+b}} - \frac{8 a \sqrt{a+b\, \text{Sec}[c+d x]}\, \text{Tan}[c+d x]}{15\, b^2\, d} + \frac{2\, \text{Sec}[c+d x] \sqrt{a+b\, \text{Sec}[c+d x]}\, \text{Tan}[c+d x]}{5\, b\, d}$$

Result (type 4, 839 leaves):

$$-\left(\left(2\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.\right.$$

$$\left(8\,a^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+8\,a^2\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-21\,a\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-21\,b^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-16\,a^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+\right.$$

$$42\,a\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+8\,a^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-8\,a^2\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-21\,a\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+21\,b^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$30\,b^3\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$30\,b^3\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\left(8\,a^3+8\,a^2\,b-21\,a\,b^2-21\,b^3\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,b\left(4\,a^2+a\,b-18\,b^2\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(15\,b^3\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\right)+$$

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\left(-\frac{2\left(-8\,a^2+21\,b^2\right)\mathrm{Sin}[c+d\,x]}{15\,b^3}-\frac{8\,a\,\mathrm{Tan}[c+d\,x]}{15\,b^2}+\frac{2\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{5\,b}\right)}{d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

- **Problem 332: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 310 leaves, 6 steps):

$$-\frac{1}{b^2 d}2\,(a-b)\,\sqrt{a+b}\;\text{Cot}[c+d\,x]\;\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\;-$$

$$\frac{2\,\sqrt{a+b}\;\text{Cot}[c+d\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{b\,d}+$$

$$\frac{2\,\sqrt{a+b}\;\text{Cot}[c+d\,x]\;\text{EllipticPi}\Big[\frac{a+b}{a},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}$$

Result (type 4, 2752 leaves):

$$\frac{2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}[c+d\,x]}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\Bigg(4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]}$$

$$\Bigg(-i\,(a-b)\,\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}\;-$$

$$2\,i\,b\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}\;+$$

$$\sqrt{2}\,\sqrt{\frac{-a+b}{a+b}}\;\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)\Bigg(-1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Bigg)\Bigg)\Bigg/$$

$$\Bigg(b^2\,\sqrt{\frac{-a+b}{a+b}}\;d\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(\frac{1}{b\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4}}2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right.$$

$$\left(-i\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-\right.$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$\left.\sqrt{2}\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{b\sqrt{\frac{-a+b}{a+b}}\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4}}a\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]$$

$$\left(-i\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-\right.$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$\left.\sqrt{2}\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\frac{1}{b\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\right)^{3/2}}\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}$$

$$\Bigg(-i\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$\sqrt{2}\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)$$

$$\left(-\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Sin}[c+d\,x]+2\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\frac{1}{b\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4}}\,2\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\Bigg(\frac{\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{2}}-\sqrt{2}\,a\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{\sqrt{\frac{-a+b}{a+b}}\,(b+a\,\text{Cos}[c+d\,x])\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{2}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}-\Bigg(i\,(a-b)\,\text{EllipticE}\Bigg[i\,\text{ArcSinh}\Bigg[\sqrt{\frac{-a+b}{a+b}}$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg],\frac{a+b}{a-b}\Bigg]\left(-\frac{a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]}{a+b}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{a+b}\right)\Bigg)\Big/$$

$$\left(2\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)-\Bigg(i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(-\frac{a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sin}[c+d\,x]}{a+b}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{a+b}\right)\bigg/$$

$$\left(\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)+\frac{b\sqrt{\frac{-a+b}{a+b}}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}{\left(1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right)\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+$$

$$\left.\frac{(a-b)\sqrt{\frac{-a+b}{a+b}}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}}}{2\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}\right)+$$

$$\left(\left(-i\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-\right.\right.$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$\left.\sqrt{2}\sqrt{\frac{-a+b}{a+b}}\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\bigg/$$

$$\left.\left.\left(b\sqrt{\frac{-a+b}{a+b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4}\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\right)\right)\right)$$

- **Problem 333: Unable to integrate problem.**

$$\int \frac{1}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 106 leaves, 1 step):

$$-\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}$$

Result (type 8, 16 leaves):

$$\int \frac{1}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 334: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 361 leaves, 9 steps):

$$\frac{\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{\sqrt{a+b}\,d}-$$

$$\frac{\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{\sqrt{a+b}\,d}+$$

$$\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}-$$

$$\frac{\text{Cot}[c+d\,x]}{d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{b^2\,\text{Tan}[c+d\,x]}{\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1198 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\left(\frac{(-b+a\,\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]}{-a^2+b^2}+\frac{b\,\text{Sin}[c+d\,x]}{-a^2+b^2}\right)}{d\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\Bigg(\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\Bigg(a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-b^2\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+4\,i\,a^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,i\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$4\,i\,a^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,i\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$i\,(a-b)\,b\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i\left(2\,a^2-a\,b-b^2\right)\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,\left(a^2-b^2\right)d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right)$$

Problem 337: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]}{(a+b \,\text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 54 leaves, 4 steps):

$$-\frac{2 \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a}}\right]}{a^{3/2} d}+\frac{2}{a d \sqrt{a+b \,\text{Sec}[c+d x]}}$$

Result (type 3, 128 leaves):

$$\frac{1}{a^2 d \sqrt{a+b \,\text{Sec}[c+d x]}} \left(2 a \,\text{Cos}[c+d x]+\sqrt{a \,\text{Cos}[c+d x]} \sqrt{b+a \,\text{Cos}[c+d x]} \left(\text{Log}\left[1-\frac{\sqrt{b+a \,\text{Cos}[c+d x]}}{\sqrt{a \,\text{Cos}[c+d x]}}\right]-\text{Log}\left[1+\frac{\sqrt{b+a \,\text{Cos}[c+d x]}}{\sqrt{a \,\text{Cos}[c+d x]}}\right]\right)\right) \text{Sec}[c+d x]$$

Problem 338: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d x]}{(a+b \,\text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 142 leaves, 7 steps):

$$\frac{2 \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a}}\right]}{a^{3/2} d}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a-b}}\right]}{(a-b)^{3/2} d}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right]}{(a+b)^{3/2} d}+\frac{2 b^2}{a \left(a^2-b^2\right) d \sqrt{a+b \,\text{Sec}[c+d x]}}$$

Result (type 3, 6484 leaves):

$$\frac{(b+a \,\text{Cos}[c+d x])^2 \left(-\frac{2 b^2}{a^2 \left(-a^2+b^2\right)}-\frac{2 b^3}{a^2 \left(a^2-b^2\right) (b+a \,\text{Cos}[c+d x])}\right) \text{Sec}[c+d x]^2}{d (a+b \,\text{Sec}[c+d x])^{3/2}}-$$

$$\left(\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} (b+a \,\text{Cos}[c+d x])^2 \left(-2 \sqrt{a-b} \sqrt{a+b} \left(a^2-b^2\right) \text{Log}\left[\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2\right]+a^{3/2} (a-b)^{3/2} \text{Log}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]-\right.\right.$$

$$a^{5/2} \sqrt{a-b} \,\text{Log}\left[a+b+2 \sqrt{a+b} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-a \,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+$$

$$a^{3/2} \sqrt{a-b} \, b \,\text{Log}\left[a+b+2 \sqrt{a+b} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-a \,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]+$$

$$a^{5/2}\sqrt{a+b}\ \mathrm{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$a^{3/2}\,b\sqrt{a+b}\ \mathrm{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$2\,a^2\sqrt{a-b}\sqrt{a+b}\ \mathrm{Log}\left[2\,a+b+4\sqrt{a}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(-2\,a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-$$

$$\left.2\sqrt{a-b}\,b^2\sqrt{a+b}\ \mathrm{Log}\left[2\,a+b+4\sqrt{a}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(-2\,a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)$$

$$\left(-\frac{b\,\mathrm{Csc}[c+d\,x]}{(a^2-b^2)\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{a\,\mathrm{Csc}[c+d\,x]\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,(a^2-b^2)\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{b^2\,\mathrm{Csc}[c+d\,x]\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,a\,(a^2-b^2)\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left.\left.\frac{a\,\mathrm{Cos}[2\,(c+d\,x)]\,\mathrm{Csc}[c+d\,x]\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,(a^2-b^2)\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}-\frac{b^2\,\mathrm{Cos}[2\,(c+d\,x)]\,\mathrm{Csc}[c+d\,x]\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,a\,(a^2-b^2)\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}\right)\mathrm{Sec}[c+d\,x]^2\right)\Big/$$

$$\left(2\,a^{3/2}\sqrt{a-b}\sqrt{a+b}\,(a^2-b^2)\,d\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(\frac{1}{4\sqrt{a}\sqrt{a-b}\sqrt{a+b}\,(a^2-b^2)\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}\right.\right.$$

$$\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\left(-2\sqrt{a-b}\sqrt{a+b}\,(a^2-b^2)\,\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+a^{3/2}\,(a-b)^{3/2}\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.$$

$$a^{5/2}\sqrt{a-b}\ \mathrm{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$a^{3/2}\sqrt{a-b}\ b\ \mathrm{Log}\left[a+b+2\sqrt{a+b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$a^{5/2}\sqrt{a+b}\ \mathrm{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$a^{3/2}\, b\, \sqrt{a+b}\, \text{Log}\Big[-a+2\sqrt{a-b}\, \sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\, \sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (a-b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$2\,a^2\sqrt{a-b}\,\sqrt{a+b}\,\text{Log}\Big[2\,a+b+4\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (-2\,a+b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] -$$

$$2\sqrt{a-b}\,b^2\sqrt{a+b}\,\text{Log}\Big[2\,a+b+4\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (-2\,a+b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Bigg)$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x] - \frac{1}{4\,a^{3/2}\sqrt{a-b}\,\sqrt{a+b}\,(a^2-b^2)\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}$$

$$\Bigg(-2\sqrt{a-b}\,\sqrt{a+b}\,(a^2-b^2)\,\text{Log}\Big[\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] + a^{3/2}\,(a-b)^{3/2}\,\text{Log}\Big[\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] -$$

$$a^{5/2}\sqrt{a-b}\,\text{Log}\Big[a+b+2\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} - a\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$a^{3/2}\sqrt{a-b}\,b\,\text{Log}\Big[a+b+2\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} - a\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$a^{5/2}\sqrt{a+b}\,\text{Log}\Big[-a+2\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (a-b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$a^{3/2}\, b\, \sqrt{a+b}\, \text{Log}\Big[-a+2\sqrt{a-b}\, \sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\, \sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (a-b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] +$$

$$2\,a^2\sqrt{a-b}\,\sqrt{a+b}\,\text{Log}\Big[2\,a+b+4\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (-2\,a+b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big] -$$

$$2\sqrt{a-b}\,b^2\sqrt{a+b}\,\text{Log}\Big[2\,a+b+4\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} + (-2\,a+b)\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big]\Bigg)$$

$$\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]-\frac{1}{4\,a^{3/2}\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}$$

$$\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(-2\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+a^{3/2}\,(a-b)^{3/2}\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.$$

$$a^{5/2}\,\sqrt{a-b}\,\text{Log}\left[a+b+2\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$a^{3/2}\,\sqrt{a-b}\,b\,\text{Log}\left[a+b+2\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$a^{5/2}\,\sqrt{a+b}\,\text{Log}\left[-a+2\,\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$a^{3/2}\,b\,\sqrt{a+b}\,\text{Log}\left[-a+2\,\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$2\,a^2\,\sqrt{a-b}\,\sqrt{a+b}\,\text{Log}\left[2\,a+b+4\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-$$

$$\left.2\,\sqrt{a-b}\,b^2\,\sqrt{a+b}\,\text{Log}\left[2\,a+b+4\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)+\frac{1}{4\,a^{3/2}\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)\left(\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)^{3/2}}$$

$$\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(-2\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+a^{3/2}\,(a-b)^{3/2}\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]-\right.$$

$$a^{5/2}\,\sqrt{a-b}\,\text{Log}\left[a+b+2\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$a^{3/2}\,\sqrt{a-b}\,b\,\text{Log}\left[a+b+2\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$a^{5/2}\sqrt{a+b}\,\text{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$a^{3/2}\,b\sqrt{a+b}\,\text{Log}\left[-a+2\sqrt{a-b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$2\,a^2\sqrt{a-b}\sqrt{a+b}\,\text{Log}\left[2\,a+b+4\sqrt{a}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-$$

$$2\sqrt{a-b}\,b^2\sqrt{a+b}\,\text{Log}\left[2\,a+b+4\sqrt{a}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Bigg)$$

$$\sqrt{\text{Sec}[c+d x]}\left(\frac{a\,\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(-b-a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)-\frac{1}{2\,a^{3/2}\sqrt{a-b}\sqrt{a+b}\,(a^2-b^2)\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}$$

$$\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}\Bigg(a^{3/2}(a-b)^{3/2}\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]-$$

$$2\sqrt{a-b}\sqrt{a+b}\,(a^2-b^2)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\Bigg(a^{5/2}\sqrt{a-b}\Bigg(\frac{\sqrt{a+b}\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\left(-\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}+\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+$$

$$\frac{\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\left(\frac{a\,\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}+\frac{(-b-a\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}-a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)\Bigg/$$

$$\left(a+b+2\sqrt{a+b}\sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+\Bigg(a^{3/2}\sqrt{a-b}\,b$$

$$\left(\frac{\sqrt{a+b}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\frac{\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}-a\right.$$

$$\left.\left.\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(a+b+2\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(a^{5/2}\,\sqrt{a+b}\,\left(\frac{\sqrt{a-b}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\frac{\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.(a-b)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(-a+2\,\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+\right.$$

$$\left.(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+\left(a^{3/2}\,b\,\sqrt{a+b}\,\left(\frac{\sqrt{a-b}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+(a-b)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(-a+2\,\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(2\,a^2\,\sqrt{a-b}\,\sqrt{a+b}\,\left(\frac{2\,\sqrt{a}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{2\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+(-2\,a+b)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(2\,a+b+4\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-$$

$$\left(2\,\sqrt{a-b}\,b^2\,\sqrt{a+b}\,\left(\frac{2\,\sqrt{a}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{2\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+(-2\,a+b)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left.\left.\left.\left(2\,a+b+4\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\right)$$

- **Problem 339: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cot}[c+d\,x]^3}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 236 leaves, 11 steps):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a}}\right]}{a^{3/2}\,d}+\frac{(4\,a-7\,b)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a-b}}\right]}{4\,(a-b)^{5/2}\,d}+\frac{(4\,a+7\,b)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right]}{4\,(a+b)^{5/2}\,d}+$$
$$\frac{2\,b^4}{a\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,(a+b)^2\,d\,(1-\text{Sec}[c+d\,x])}+\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,(a-b)^2\,d\,(1+\text{Sec}[c+d\,x])}$$

Result (type 3, 4191 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\left(\frac{a^4+a^2\,b^2+4\,b^4}{2\,a^2\,\left(-a^2+b^2\right)^2}-\frac{2\,b^5}{a^2\,\left(a^2-b^2\right)^2\,(b+a\,\text{Cos}[c+d\,x])}+\frac{\left(-a^2-b^2+2\,a\,b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}[c+d\,x]^2}{2\,\left(-a^2+b^2\right)^2}\right)\text{Sec}[c+d\,x]^2}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\Bigg((b+a\,\text{Cos}[c+d\,x])^2\Bigg(-8\,\left(a^2-b^2\right)^2\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\frac{a^{3/2}\,(a-b)^2\,(4\,a+7\,b)\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-$$
$$\frac{a^{3/2}\,(a-b)^2\,(4\,a+7\,b)\,\text{Log}\left[a+b+2\,\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]}{\sqrt{a+b}}+\frac{1}{\sqrt{a-b}}$$
$$a^{3/2}\,(4\,a-7\,b)\,(a+b)^2\,\text{Log}\left[-a+2\,\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$
$$8\,\left(a^2-b^2\right)^2\,\text{Log}\left[2\,a+b+4\,\sqrt{a}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)$$
$$\Bigg(\frac{a^2\,b\,\text{Csc}[c+d\,x]}{4\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{7\,b^3\,\text{Csc}[c+d\,x]}{4\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{a^3\,\text{Csc}[c+d\,x]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{3\,a\,b^2\,\text{Csc}[c+d\,x]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{b^4\,\text{Csc}[c+d\,x]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{a^3\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[c+d\,x]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,b^2\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[c+d\,x]\,\sqrt{\text{Sec}[c+d\,x]}}{\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{b^4\,\text{Cos}[2\,(c+d\,x)]\,\text{Csc}[c+d\,x]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}\Bigg)\,\text{Sec}[c+d\,x]^2\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\Bigg)\Bigg/$$

$$\left(8\,a^{3/2}\left(a^2-b^2\right)^2 d\,\sqrt{-\left(b+a\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}\right.$$

$$\left(\left(\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\left(-8\left(a^2-b^2\right)^2\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{a^{3/2}(a-b)^2(4a+7b)\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-\frac{1}{\sqrt{a+b}}\right.\right.\right.$$

$$a^{3/2}(a-b)^2(4a+7b)\,\mathrm{Log}\left[a+b+2\sqrt{a+b}\,\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{1}{\sqrt{a-b}}$$

$$a^{3/2}(4a-7b)(a+b)^2\,\mathrm{Log}\left[-a+2\sqrt{a-b}\,\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\left.8\left(a^2-b^2\right)^2\mathrm{Log}\left[2a+b+4\sqrt{a}\,\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(-2a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left.\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(16\,a^{3/2}\left(a^2-b^2\right)^2\sqrt{-\left(b+a\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)-$$

$$\left(\left(-8\left(a^2-b^2\right)^2\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{a^{3/2}(a-b)^2(4a+7b)\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]}{\sqrt{a+b}}-\frac{1}{\sqrt{a+b}}\right.\right.$$

$$a^{3/2}(a-b)^2(4a+7b)\,\mathrm{Log}\left[a+b+2\sqrt{a+b}\,\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\frac{1}{\sqrt{a-b}}$$

$$a^{3/2}(4a-7b)(a+b)^2\,\mathrm{Log}\left[-a+2\sqrt{a-b}\,\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$\left.8\left(a^2-b^2\right)^2\mathrm{Log}\left[2a+b+4\sqrt{a}\,\sqrt{-\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}+(-2a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\text{Sin}[c+d x] \sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg) \Bigg/ \left(16 \sqrt{a} \left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{-(b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}\right)+$$

$$\frac{1}{16 a^{3/2} \left(a^2-b^2\right)^2 \sqrt{-(b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{b+a \text{Cos}[c+d x]}$$

$$\Bigg(-8 \left(a^2-b^2\right)^2 \text{Log}\left[\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{a^{3/2} (a-b)^2 (4 a+7 b) \text{Log}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]}{\sqrt{a+b}}-\frac{1}{\sqrt{a+b}}$$

$$a^{3/2} (a-b)^2 (4 a+7 b) \text{Log}\left[a+b+2 \sqrt{a+b} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{1}{\sqrt{a-b}}$$

$$a^{3/2} (4 a-7 b) (a+b)^2 \text{Log}\left[-a+2 \sqrt{a-b} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(a-b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$8 \left(a^2-b^2\right)^2 \text{Log}\left[2 a+b+4 \sqrt{a} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(-2 a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Bigg)$$

$$\text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x] \sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\frac{1}{16 a^{3/2} \left(a^2-b^2\right)^2 \left(-(b+a \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}}$$

$$\sqrt{b+a \text{Cos}[c+d x]} \Bigg(-8 \left(a^2-b^2\right)^2 \text{Log}\left[\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{a^{3/2} (a-b)^2 (4 a+7 b) \text{Log}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]}{\sqrt{a+b}}-\frac{1}{\sqrt{a+b}}$$

$$a^{3/2} (a-b)^2 (4 a+7 b) \text{Log}\left[a+b+2 \sqrt{a+b} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\frac{1}{\sqrt{a-b}}$$

$$a^{3/2} (4 a-7 b) (a+b)^2 \text{Log}\left[-a+2 \sqrt{a-b} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(a-b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$8 \left(a^2-b^2\right)^2 \text{Log}\left[2 a+b+4 \sqrt{a} \sqrt{-\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \sqrt{\frac{-b-a \text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}+(-2 a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Bigg) \sqrt{\text{Sec}[c+d x]}$$

$$\left(a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]-(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+$$

$$\frac{1}{8\,a^{3/2}\left(a^2-b^2\right)^2\sqrt{-(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(\frac{a^{3/2}(a-b)^2(4\,a+7\,b)\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}-8\left(a^2-b^2\right)^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\left(a^{3/2}(a-b)^2(4\,a+7\,b)\left(\frac{\sqrt{a+b}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$

$$\left(\sqrt{a+b}\left(a+b+2\sqrt{a+b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)+$$

$$\left(a^{3/2}(4\,a-7\,b)(a+b)^2\left(\frac{\sqrt{a-b}\,\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{\sqrt{a-b}\,\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+(a-b)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$

$$\left(\sqrt{a-b}\left(-a+2\sqrt{a-b}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)+$$

$$\left(8\left(a^2-b^2\right)^2\left(\frac{2\sqrt{a}\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(-\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}+\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)}{\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+\right.\right.$$

$$\left.\left.\frac{2\sqrt{a}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\left(\frac{a\,\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}+\frac{(-b-a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}\right)}{\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+(-2\,a+b)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\bigg/$$

$$\left.\left.\left.\left(2\,a+b+4\sqrt{a}\sqrt{-\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{-b-a\,\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}+(-2\,a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\right)$$

- **Problem 341: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 344 leaves, 7 steps):

$$\frac{2\,(a-b)\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b^2\,d}+$$

$$\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,d}+$$

$$\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{2\,\text{Tan}[c+d\,x]}{a\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 876 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\left(-\frac{2\,\text{Sin}[c+d\,x]}{a\,b}+\frac{2\,\text{Sin}[c+d\,x]}{a\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\left(2\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right.$$

$$\left(a\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-\right.$$

$$a\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-i\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-2\,i\,b$$

$$\left.\left.\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

- **Problem 342: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 347 leaves, 6 steps):

$$\frac{2\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\sqrt{a+b}\,d}-\frac{2\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\sqrt{a+b}\,d}-\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{2\,b^2\,\text{Tan}[c+d\,x]}{a\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1249 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\left(\frac{2\,b\,\text{Sin}[c+d\,x]}{a\left(-a^2+b^2\right)}+\frac{2\,b^2\,\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\left(2\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-\right.$$

$$b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-2\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$i\,(a-b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+i\left(a^2+a\,b-2\,b^2\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\,\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 343: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cot}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 449 leaves, 14 steps):

$$\frac{2\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+$$

$$\frac{2\left(a^2+b^2\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{-\frac{b\,(-1+\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,(a-b)\,(a+b)^{3/2}\,d}-\frac{1}{a\,(a-b)\,(a+b)^{3/2}\,d}$$

$$\left(a^2-a\,b+2\,b^2\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{-\frac{b\,(-1+\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{\text{Cot}[c+d\,x]}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{b^2\,\text{Tan}[c+d\,x]}{\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,b^2\left(a^2+b^2\right)\text{Tan}[c+d\,x]}{a\left(a^2-b^2\right)^2d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 4307 leaves):

$$\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2$$

$$\left(\frac{\left(2\,a\,b-a^2\,\text{Cos}[c+d\,x]-b^2\,\text{Cos}[c+d\,x]\right)\text{Csc}[c+d\,x]}{\left(-a^2+b^2\right)^2}-\frac{2\,b\left(a^2+b^2\right)\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)^2}+\frac{2\,b^4\,\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+d\,x])}\right)-$$

$$\Bigg(2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2(b+a\,\text{Cos}[c+d\,x])$$

$$\left(-\frac{a^3}{\left(-a^2+b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Sec}[c+d\,x]}}+\frac{3\,a\,b^2}{\left(-a^2+b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^2\,b\sqrt{\text{Sec}[c+d\,x]}}{2\left(-a^2+b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\right.$$

$$\left.\frac{b^3\sqrt{\text{Sec}[c+d\,x]}}{2\left(-a^2+b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,b\,\text{Cos}[2\,(c+d\,x)]\sqrt{\text{Sec}[c+d\,x]}}{\left(-a^2+b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{b^3\,\text{Cos}[2\,(c+d\,x)]\sqrt{\text{Sec}[c+d\,x]}}{\left(-a^2+b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}\right)\text{Sec}[c+d\,x]^2$$

$$\Bigg(-2\,i\,b\left(-a^3+a^2\,b-a\,b^2+b^3\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]+$$

$$i\left(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-$$

$$4\,i\,\left(a^2-b^2\right)^2 \sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}} \sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right] -$$

$$b\sqrt{\frac{-a+b}{a+b}}\ \left(a^2+b^2\right)\text{Cos}[c+d\,x]\ (b+a\,\text{Cos}[c+d\,x])\ \text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2 \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)\Bigg)\Bigg/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\ \left(a^2-b^2\right)^2 d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)\left(\frac{1}{a\sqrt{\frac{-a+b}{a+b}}\ \left(a^2-b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}\,2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right.$$

$$\left(-2\,i\,b\left(-a^3+a^2\,b-a\,b^2+b^3\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]+\right.$$

$$i\left(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{a+b}{a-b}\right]-4\,i\left(a^2-b^2\right)^2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\left.\frac{a+b}{a-b}\right]-b\sqrt{\frac{-a+b}{a+b}}\ \left(a^2+b^2\right)\text{Cos}[c+d\,x]\ (b+a\,\text{Cos}[c+d\,x])\ \text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-$$

$$\frac{1}{\sqrt{\frac{-a+b}{a+b}}\ \left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+d\,x])^{3/2}}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]\left(-2\,i\,b\left(-a^3+a^2\,b-a\,b^2+b^3\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right.$$

$$\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]+i\left(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4\right)$$

$$\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a+b}{a-b}\right]-$$

$$4\,\text{i}\,\left(a^2-b^2\right)^2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]-$$

$$b\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2+b^2\right)\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)-$$

$$\frac{1}{a\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2-b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]\,\Bigg(-2\,\text{i}\,b\,\left(-a^3+a^2\,b-a\,b^2+b^3\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}$$

$$\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticE}\Big[\text{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]+\text{i}\,\left(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4\right)$$

$$\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\Big[\text{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]-$$

$$4\,\text{i}\,\left(a^2-b^2\right)^2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]-$$

$$b\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2+b^2\right)\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)-\frac{1}{a\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2-b^2\right)^2\sqrt{b+a\,\text{Cos}[c+d\,x]}}$$

$$2\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\sqrt{\text{Sec}[c+d\,x]}\,\Bigg(-\frac{1}{2}\,b\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2+b^2\right)\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4-\frac{1}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}$$

$$\text{i}\,b\,\left(-a^3+a^2\,b-a\,b^2+b^3\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticE}\Big[\text{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)+\frac{1}{2\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}\,\text{i}\,\left(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)-\frac{1}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}$$

$$2\,i\,(a^2-b^2)^2\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)-\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}}\,i\,b\,(-a^3+a^2\,b-a\,b^2+b^3)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])^2}\right)+$$

$$\frac{1}{2\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}}\,i\,(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])^2}\right)-\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}}\,2\,i\,(a^2-b^2)^2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}$$

$$\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])^2}\right)+$$

$$a\,b\sqrt{\frac{-a+b}{a+b}}\,(a^2+b^2)\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\sqrt{\frac{-a+b}{a+b}}\,(a^2+b^2)\,(b+a\,\text{Cos}[c+d\,x])$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-b\sqrt{\frac{-a+b}{a+b}}\,(a^2+b^2)\,\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-\frac{\sqrt{\frac{-a+b}{a+b}}\,(2\,a^4-a^3\,b-2\,a^2\,b^2-3\,a\,b^3+4\,b^4)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+$$

$$\frac{2\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\left(1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}\right)\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}}\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+\left(b\sqrt{\frac{-a+b}{a+b}}\left(-a^3+a^2\,b-a\,b^2+b^3\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right.$$

$$\left.\left.\left.\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a-b}}\right)\middle/\left(\sqrt{1+\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\right)\right)$$

■ **Problem 344: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+b\,\text{Sec}[e+f\,x])^3\,(d\,\text{Tan}[e+f\,x])^n\,dx$$

Optimal (type 5, 245 leaves, 8 steps):

$$\frac{3\,a\,b^2\,(d\,\text{Tan}[e+f\,x])^{1+n}}{d\,f\,(1+n)}+\frac{a^3\,\text{Hypergeometric2F1}\left[1,\frac{1+n}{2},\frac{3+n}{2},-\text{Tan}[e+f\,x]^2\right]\,(d\,\text{Tan}[e+f\,x])^{1+n}}{d\,f\,(1+n)}+\frac{1}{d\,f\,(1+n)}$$

$$3\,a^2\,b\left(\text{Cos}[e+f\,x]^2\right)^{\frac{2+n}{2}}\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{2+n}{2},\frac{3+n}{2},\text{Sin}[e+f\,x]^2\right]\,\text{Sec}[e+f\,x]\,(d\,\text{Tan}[e+f\,x])^{1+n}+$$

$$\frac{b^3\left(\text{Cos}[e+f\,x]^2\right)^{\frac{4+n}{2}}\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{4+n}{2},\frac{3+n}{2},\text{Sin}[e+f\,x]^2\right]\,\text{Sec}[e+f\,x]^3\,(d\,\text{Tan}[e+f\,x])^{1+n}}{d\,f\,(1+n)}$$

Result (type 6, 3217 leaves):

$$-\left(\left(2\,\text{Cos}[e+f\,x]^3\,(a+b\,\text{Sec}[e+f\,x])^3\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right.\right.$$

$$\left(-b\left(\left(3\,a^2-3\,a\,b+b^2\right)\text{Hypergeometric2F1}\left[\frac{1+n}{2},1+n,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\,b\left((3\,a-2\,b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},2+n,\frac{3+n}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},3+n,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\right)\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^n-$$

$$\left(a^3\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\Big/$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)$$

$$(d\,\text{Tan}[e+f\,x])^n\,\left(a^3\,\text{Tan}[e+f\,x]^n+3\,a^2\,b\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]^n+3\,a\,b^2\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]^n+b^3\,\text{Sec}[e+f\,x]^3\,\text{Tan}[e+f\,x]^n\right)\Big/$$

$$\Bigg(f\,(1+n)\,(b+a\,\text{Cos}[e+f\,x])^3\,\Bigg(-\frac{1}{1+n}2\,n\,\text{Sec}[e+f\,x]^2\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\,\Bigg(-b\,\Bigg(\left(3\,a^2-3\,a\,b+b^2\right)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\right.$$

$$\left.1+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\,b\,\left((3\,a-2\,b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,2+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.$$

$$\left.\left.2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,3+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\right)\,\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^n-$$

$$\left(a^3\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\Big/\,\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\right.\right.$$

$$1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Big]-2\,\left(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-\right.$$

$$\left.\left.n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)\,\text{Tan}[e+f\,x]^{-1+n}-$$

$$\frac{1}{1+n}\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\,\left(-b\,\left(\left(3\,a^2-3\,a\,b+b^2\right)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,1+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.\right.$$

$$2\,b\,\left((3\,a-2\,b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,2+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.$$

$$\left.\left.2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,3+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\right)\,\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^n-$$

$$\left(a^3\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\Big/\,\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\right.\right.$$

$$n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Big]-2\,\left(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-\right.$$

$$\left.\left.n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)\,\text{Tan}[e+f\,x]^n-$$

$$\frac{1}{1+n}2\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\,\left(-b\,n\,\left(\left(3\,a^2-3\,a\,b+b^2\right)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,1+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.\right.$$

$$2\,b\,\left((3\,a-2\,b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,2+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.$$

$$\left.\left.2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,3+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\right)$$

$$\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{-1+n}\,\left(-\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\,\text{Sin}[e+f\,x]+\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)+$$

$$\left(a^3\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\Big/$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$
$$\left(a^3(3+n)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\left(-1/(3+n)(1+n)\,\text{AppellF1}\left[1+\frac{1+n}{2},n,2,1+\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+1/(3+n)n(1+n)\,\text{AppellF1}\left[1+\frac{1+n}{2},1+n,1,\right.$$
$$\left.\left.\left.1+\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$
$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$
$$\left(a^3(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right.$$
$$\left(-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\right.\right.\right.$$
$$\left.\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+(3+n)\left(-\frac{1}{3+n}(1+n)\,\text{AppellF1}\left[\right.\right.$$
$$1+\frac{1+n}{2},n,2,1+\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left.\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3+n}n(1+n)$$
$$\left.\text{AppellF1}\left[1+\frac{1+n}{2},1+n,1,1+\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)-$$
$$2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-\frac{1}{5+n}2(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},n,3,1+\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5+n}n(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},1+n,2,1+\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]-n\left(-\frac{1}{5+n}(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},1+n,2,1+\frac{5+n}{2},\right.\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5+n}(1+n)(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},\right.$$
$$\left.\left.\left.\left.\left.2+n,1,1+\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right)\Big/$$
$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] - n\,\text{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)^2 -$$

$$b\left(\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(\frac{1}{2}\left(3 a^2-3 a b+b^2\right)(1+n)\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1+n}{2}, 1+n, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1-n}\right) +$$

$$2 b\left(b(1+n)\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]\left(-\text{Hypergeometric2F1}\left[\frac{1+n}{2}, 3+n, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.\right.$$

$$\left.\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-3-n}\right) + \frac{1}{2}(3 a-2 b)(1+n)\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]$$

$$\left.\left.\left.\left(-\text{Hypergeometric2F1}\left[\frac{1+n}{2}, 2+n, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-2-n}\right)\right)\right)\text{Tan}[e+f x]^n\right)\Big)\Big)$$

- **Problem 345: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[e+f x])^2\,(d\,\text{Tan}[e+f x])^n\,dx$$

Optimal (type 5, 160 leaves, 7 steps):

$$\frac{b^2\,(d\,\text{Tan}[e+f x])^{1+n}}{d f (1+n)} + \frac{a^2\,\text{Hypergeometric2F1}\left[1, \frac{1+n}{2}, \frac{3+n}{2}, -\text{Tan}[e+f x]^2\right](d\,\text{Tan}[e+f x])^{1+n}}{d f (1+n)} + \frac{1}{d f (1+n)}$$

$$2 a b\left(\text{Cos}[e+f x]^2\right)^{\frac{2+n}{2}}\text{Hypergeometric2F1}\left[\frac{1+n}{2}, \frac{2+n}{2}, \frac{3+n}{2}, \text{Sin}[e+f x]^2\right]\text{Sec}[e+f x]\,(d\,\text{Tan}[e+f x])^{1+n}$$

Result (type 6, 2894 leaves):

$$\left(2\,\text{Cos}[e+f x]^2\,(a+b\,\text{Sec}[e+f x])^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left(b\left((2 a-b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2}, 1+n, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2 b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2}, 2+n, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\right.$$

$$\left(\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n + \left(a^2(3+n)\,\text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big/$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] - 2\left(\text{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] - n\,\text{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)$$

$$\left.(d\,\text{Tan}[e+f x])^n\left(a^2\,\text{Tan}[e+f x]^n + 2 a b\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]^n + b^2\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]^n\right)\right)\Big/$$

$$\left(f(1+n)(b+a\,\text{Cos}[e+f x])^2\left(\frac{1}{1+n}2 n\,\text{Sec}[e+f x]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(b\left((2 a-b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2}, 1+n, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.\right.\right.\right.$$

$$2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,2+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\Bigg)\,\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^n+$$

$$\Bigg(a^2\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Bigg)\Big/$$

$$\Bigg((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-2\,\Bigg(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Bigg)\Bigg)$$

$$\text{Tan}[e+f\,x]^{-1+n}+\frac{1}{1+n}\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\Bigg(b\,\Bigg((2\,a-b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,1+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,2+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\Bigg)\,\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^n+$$

$$\Bigg(a^2\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Bigg)\Big/$$

$$\Bigg((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-2\,\Bigg(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Bigg)\Bigg)$$

$$\text{Tan}[e+f\,x]^n+\frac{1}{1+n}\,2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\,\Bigg(b\,n\,\Bigg((2\,a-b)\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,1+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$2\,b\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\,2+n,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)$$

$$\left(\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^{-1+n}\,\left(-\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sin}[e+f\,x]+\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)-$$

$$\Bigg(a^2\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)\Big/$$

$$\Bigg((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-2\,\Bigg(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Bigg)+$$

$$\Bigg(a^2\,(3+n)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\Bigg(-1\,/\,(3+n)\,(1+n)\,\text{AppellF1}\left[1+\frac{1+n}{2},\,n,\,2,\,1+\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+1\,/\,(3+n)\,n\,(1+n)\,\text{AppellF1}\left[1+\frac{1+n}{2},\,1+n,\,1,\right.$$

$$\left.1+\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)\Bigg)\Big/$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(a^2(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right.$$

$$\left(-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\right.\right.\right.$$

$$\left.\left.\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+(3+n)\left(-\frac{1}{3+n}\right.$$

$$(1+n)\,\text{AppellF1}\left[1+\frac{1+n}{2},n,2,1+\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3+n}$$

$$\left.n(1+n)\,\text{AppellF1}\left[1+\frac{1+n}{2},1+n,1,1+\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)-$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-\frac{1}{5+n}2(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},n,3,1+\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5+n}n(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},1+n,2,1+\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]-n\left(-\frac{1}{5+n}(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},1+n,2,1+\frac{5+n}{2},\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5+n}(1+n)(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},\right.$$

$$\left.\left.\left.\left.\left.2+n,1,1+\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2+$$

$$b\left(\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^n\left(b(1+n)\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]\left(-\text{Hypergeometric2F1}\left[\frac{1+n}{2},2+n,\right.\right.\right.$$

$$\left.\left.\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-2-n}\right)+\frac{1}{2}(2a-b)(1+n)\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]$$

$$\left.\left.\left(-\text{Hypergeometric2F1}\left[\frac{1+n}{2},1+n,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1-n}\right)\right)\text{Tan}[e+f x]^n\right)\right)$$

- **Problem 346: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a + b \operatorname{Sec}[e + f x]) (d \operatorname{Tan}[e + f x])^n \, dx$$

Optimal (type 5, 129 leaves, 4 steps):

$$\frac{a \operatorname{Hypergeometric2F1}\left[1, \frac{1+n}{2}, \frac{3+n}{2}, -\operatorname{Tan}[e + f x]^2\right] (d \operatorname{Tan}[e + f x])^{1+n}}{d f (1 + n)} + \frac{b \left(\operatorname{Cos}[e + f x]^2\right)^{\frac{2+n}{2}} \operatorname{Hypergeometric2F1}\left[\frac{1+n}{2}, \frac{2+n}{2}, \frac{3+n}{2}, \operatorname{Sin}[e + f x]^2\right] \operatorname{Sec}[e + f x] (d \operatorname{Tan}[e + f x])^{1+n}}{d f (1 + n)}$$

Result (type 6, 2597 leaves):

$$\left(2 \operatorname{Cos}[e + f x] (a + b \operatorname{Sec}[e + f x]) \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]\right.$$
$$\left(b \operatorname{Hypergeometric2F1}\left[\frac{1+n}{2}, 1 + n, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] \left(\operatorname{Cos}[e + f x] \operatorname{Sec}\left[\frac{1}{2} (e + f x)\right]^2\right)^n + \right.$$
$$\left(a (3 + n) \operatorname{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2} (e + f x)\right]^2\right) \Big/$$
$$\left((3 + n) \operatorname{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] - 2 \left(\operatorname{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2,\right.\right.$$
$$\left.\left.\left.\left. -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] - n \operatorname{AppellF1}\left[\frac{3+n}{2}, 1 + n, 1, \frac{5+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right)\right)$$
$$\left.(d \operatorname{Tan}[e + f x])^n \left(a \operatorname{Tan}[e + f x]^n + b \operatorname{Sec}[e + f x] \operatorname{Tan}[e + f x]^n\right)\right) \Big/ \left(f (1 + n) (b + a \operatorname{Cos}[e + f x])\right.$$
$$\left(\frac{1}{1+n} 2 n \operatorname{Sec}[e + f x]^2 \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right] \left(b \operatorname{Hypergeometric2F1}\left[\frac{1+n}{2}, 1 + n, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] \left(\operatorname{Cos}[e + f x] \operatorname{Sec}\left[\frac{1}{2} (e + f x)\right]^2\right)^n + \right.\right.$$
$$\left(a (3 + n) \operatorname{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2} (e + f x)\right]^2\right) \Big/$$
$$\left((3 + n) \operatorname{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] - 2 \left(\operatorname{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2,\right.\right.$$
$$\left.\left.\left.\left. -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] - n \operatorname{AppellF1}\left[\frac{3+n}{2}, 1 + n, 1, \frac{5+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right)\right)$$
$$\operatorname{Tan}[e + f x]^{-1+n} + \frac{1}{1+n} \operatorname{Sec}\left[\frac{1}{2} (e + f x)\right]^2 \left(b \operatorname{Hypergeometric2F1}\left[\frac{1+n}{2}, 1 + n, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] \left(\operatorname{Cos}[e + f x] \operatorname{Sec}\left[\frac{1}{2} (e + f x)\right]^2\right)^n + \right.$$
$$\left(a (3 + n) \operatorname{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2} (e + f x)\right]^2\right) \Big/$$
$$\left((3 + n) \operatorname{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2\right] - 2 \left(\operatorname{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]^2,\right.\right.\right.$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big] - n\,\mathrm{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)\Big)$$

$$\mathrm{Tan}[e+fx]^n + \frac{1}{1+n}\,2\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\Big(b\,n\,\mathrm{Hypergeometric2F1}\left[\frac{1+n}{2}, 1+n, \frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\left(\mathrm{Cos}[e+fx]\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1+n}\left(-\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Sin}[e+fx] + \mathrm{Cos}[e+fx]\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\right) -$$

$$\left(a\,(3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]\mathrm{Sin}\left[\frac{1}{2}(e+fx)\right]\right)\Big/$$

$$\Big((3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] - 2\Big(\mathrm{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] - n\,\mathrm{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big) +$$

$$\Big(a\,(3+n)\,\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2\Big(-1/(3+n)(1+n)\,\mathrm{AppellF1}\left[1+\frac{1+n}{2}, n, 2, 1+\frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right] + 1/(3+n)\,n\,(1+n)\,\mathrm{AppellF1}\Big[1+\frac{1+n}{2}, 1+n, 1,$$

$$1+\frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\Big)\Big)\Big/$$

$$\Big((3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] - 2\Big(\mathrm{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] - n\,\mathrm{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big) +$$

$$\frac{1}{2}\,b\,(1+n)\,\mathrm{Csc}\left[\frac{1}{2}(e+fx)\right]\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]\left(\mathrm{Cos}[e+fx]\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^n$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1+n}{2}, 1+n, \frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + \left(1-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1-n}\right) -$$

$$\Big(a\,(3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\Big(-2\Big(\mathrm{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] - n\,\mathrm{AppellF1}\Big[\frac{3+n}{2}, 1+n, 1,$$

$$\frac{5+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\Big)\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right] + (3+n)\Big(-\frac{1}{3+n}$$

$$(1+n)\,\mathrm{AppellF1}\left[1+\frac{1+n}{2}, n, 2, 1+\frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right] + \frac{1}{3+n}$$

$$n\,(1+n)\,\mathrm{AppellF1}\left[1+\frac{1+n}{2}, 1+n, 1, 1+\frac{3+n}{2}, \mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\Big) -$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\left(-\frac{1}{5+n}2\,(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},\,n,\,3,\,1+\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]+\frac{1}{5+n}n\,(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},\,1+n,\,2,\,1+\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]-n\left(-\frac{1}{5+n}(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},\,1+n,\,2,\,1+\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]+\frac{1}{5+n}(1+n)\,(3+n)\,\text{AppellF1}\left[1+\frac{3+n}{2},\,2+n,\,1,\,1+\frac{5+n}{2},\right.$$

$$\left.\left.\left.\left.\left.\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right)\right)\right)\right)\right)\Big/\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-\right.$$

$$\left.\left.\left.\left.n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\right)\text{Tan}[e+f\,x]^n\right)\right)$$

- **Problem 347: Result more than twice size of optimal antiderivative.**

$$\int\frac{(d\,\text{Tan}[e+f\,x])^n}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 6, 266 leaves, ? steps):

$$\frac{1}{a\,f\,(1-n)}d\,\text{AppellF1}\left[1-n,\,\frac{1-n}{2},\,\frac{1-n}{2},\,2-n,\,\frac{a+b}{a+b\,\text{Sec}[e+f\,x]},\,\frac{a-b}{a+b\,\text{Sec}[e+f\,x]}\right]\left(-\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b\,\text{Sec}[e+f\,x]}\right)^{\frac{1-n}{2}}\left(\frac{b\,(1+\text{Sec}[e+f\,x])}{a+b\,\text{Sec}[e+f\,x]}\right)^{\frac{1-n}{2}}$$

$$(d\,\text{Tan}[e+f\,x])^{-1+n}\left(-\text{Tan}[e+f\,x]^2\right)^{\frac{1-n}{2}+\frac{1}{2}(-1+n)}-\frac{d\,\text{Hypergeometric2F1}\left[1,\,\frac{1+n}{2},\,\frac{3+n}{2},\,-\text{Tan}[e+f\,x]^2\right](d\,\text{Tan}[e+f\,x])^{-1+n}\left(-\text{Tan}[e+f\,x]^2\right)^{\frac{1-n}{2}+\frac{1+n}{2}}}{a\,f\,(1+n)}$$

Result (type 6, 4911 leaves) :

$$\left(2\,(3+n)\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\left(\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\Big/\right.\right.$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},\,n,\,2,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},\,1+n,\,1,\,\frac{5+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)-$$

$$\left(b\,(a+b)\,\text{AppellF1}\left[\frac{1+n}{2},\,n,\,1,\,\frac{3+n}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]\right)\Big/$$

$$\left((b+a\,\text{Cos}[e+f\,x])\left((a+b)\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((a-b)\,\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)\right)$$

$$\left.\text{Tan}[e+f\,x]^n\,(d\,\text{Tan}[e+f\,x])^n\right)\Big/\left(a\,f\,(1+n)\,(a+b\,\text{Sec}[e+f\,x])\left(\frac{1}{a\,(1+n)}2\,n\,(3+n)\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}[e+f\,x]^2\right.\right.$$

$$\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\left(\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\Big/\right.$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-n\,\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)-$$

$$\left(b\,(a+b)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]\right)\Big/$$

$$\left((b+a\,\text{Cos}[e+f\,x])\left((a+b)\,(3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((a-b)\,\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]+(a+b)\,n\right.$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)\right)\text{Tan}[e+f\,x]^{-1+n}+$$

$$\frac{1}{a\,(1+n)}(3+n)\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\left(\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\Big/\right.$$

$$\left((3+n)\,\text{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\mathrm{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(b(a+b)\,\mathrm{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\Big/$$

$$\left((b+a\,\mathrm{Cos}[e+f x])\left((a+b)(3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((a-b)\,\mathrm{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,n\,\mathrm{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)\mathrm{Tan}[e+f x]^n-$$

$$\frac{1}{a(1+n)}(3+n)\,\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]^2\left(\mathrm{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\right.$$

$$\left((3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-2\left(\mathrm{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-n\,\mathrm{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(b(a+b)\,\mathrm{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\Big/$$

$$\left((b+a\,\mathrm{Cos}[e+f x])\left((a+b)(3+n)\,\mathrm{AppellF1}\left[\frac{1+n}{2},n,1,\frac{3+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.\right.$$

$$2\left((a-b)\,\mathrm{AppellF1}\left[\frac{3+n}{2},n,2,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+\right.$$

$$\left.\left.\left.(a+b)\,n\,\mathrm{AppellF1}\left[\frac{3+n}{2},1+n,1,\frac{5+n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)\mathrm{Tan}[e+f x]^n+$$

$$\frac{1}{a(1+n)}2(3+n)\,\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\left(\left(-1/(3+n)(1+n)\,\mathrm{AppellF1}\left[1+\frac{1+n}{2},n,2,1+\frac{3+n}{2},\right.\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + 1/(3+n) n (1+n)$$

$$\text{AppellF1}\left[1+\frac{1+n}{2}, 1+n, 1, 1+\frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg) \Bigg/$$

$$\Bigg((3+n) \text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] - 2 \Bigg(\text{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] - n\, \text{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) -$$

$$\Bigg(a\, b\, (a+b) \text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \text{Sin}[e+f x]\Bigg) \Bigg/$$

$$\Bigg((b+a \text{Cos}[e+f x])^2 \Bigg((a+b)(3+n) \text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] +$$

$$2 \Bigg((a-b) \text{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] +$$

$$(a+b)\, n\, \text{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg) -$$

$$\Bigg(b\, (a+b) \Bigg(1/((a+b)(3+n)) (a-b)(1+n) \text{AppellF1}\left[1+\frac{1+n}{2}, n, 2, 1+\frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + 1/(3+n) n (1+n) \text{AppellF1}\left[1+\frac{1+n}{2},\right.$$

$$\left.1+n, 1, 1+\frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg) \Bigg/$$

$$\Bigg((b+a \text{Cos}[e+f x]) \Bigg((a+b)(3+n) \text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] +$$

$$2 \Bigg((a-b) \text{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] +$$

$$(a+b)\, n\, \text{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg) -$$

$$\Big(\text{AppellF1}\Big[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] \Big(-2\Big(\text{AppellF1}\Big[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] - n\,\text{AppellF1}\Big[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big) \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[$$

$$\frac{1}{2}(e+f x)\Big] + (3+n)\Big(-\frac{1}{3+n}(1+n)\,\text{AppellF1}\Big[1+\frac{1+n}{2}, n, 2, 1+\frac{3+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + \frac{1}{3+n} n (1+n)\,\text{AppellF1}\Big[1+\frac{1+n}{2}, 1+n, 1, 1+\frac{3+n}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big) - 2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big(-\frac{1}{5+n} 2 (3+n)\,\text{AppellF1}\Big[1+\frac{3+n}{2}, n, 3, 1+\frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(e+f x)\Big] +$$

$$\frac{1}{5+n} n (3+n)\,\text{AppellF1}\Big[1+\frac{3+n}{2}, 1+n, 2, 1+\frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] - n\Big(-\frac{1}{5+n}(3+n)\,\text{AppellF1}\Big[1+\frac{3+n}{2}, 1+n, 2, 1+\frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + \frac{1}{5+n}(1+n)(3+n)\,\text{AppellF1}\Big[1+\frac{3+n}{2}, 2+n, 1,$$

$$1+\frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big) \Big/$$

$$\Big((3+n)\,\text{AppellF1}\Big[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] - 2\Big(\text{AppellF1}\Big[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] - n\,\text{AppellF1}\Big[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big) \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2 +$$

$$\Big(b (a+b)\,\text{AppellF1}\Big[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(e+f x)\big]^2}{a+b}\Big]$$

$$\Big(2\Big((a-b)\,\text{AppellF1}\Big[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(e+f x)\big]^2}{a+b}\Big] +$$

$$(a+b) n\,\text{AppellF1}\Big[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(e+f x)\big]^2}{a+b}\Big]\Big) \text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(e+f x)\Big] +$$

$$(a+b)(3+n)\Big(\frac{1}{(a+b)(3+n)}(a-b)(1+n)\,\text{AppellF1}\Big[1+\frac{1+n}{2}, n, 2, 1+\frac{3+n}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, \frac{(a-b)\,\text{Tan}\big[\frac{1}{2}(e+f x)\big]^2}{a+b}\Big]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3+n} n (1+n) \text{AppellF1}\left[1+\frac{1+n}{2}, 1+n, 1, 1+\frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2 \Bigg((a-b) \Bigg(\frac{1}{(a+b)(5+n)}$$

$$2 (a-b)(3+n) \text{AppellF1}\left[1+\frac{3+n}{2}, n, 3, 1+\frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5+n} n (3+n) \text{AppellF1}\left[1+\frac{3+n}{2}, 1+n, 2, 1+\frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+(a+b) n \Bigg(\frac{1}{(a+b)(5+n)}(a-b)(3+n) \text{AppellF1}\left[1+\frac{3+n}{2}, 1+n, 2, 1+\frac{5+n}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5+n}(1+n)(3+n) \text{AppellF1}\Bigg[$$

$$1+\frac{3+n}{2}, 2+n, 1, 1+\frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\Bigg] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg) \Bigg/$$

$$\Bigg((b+a \text{Cos}[e+f x]) \Bigg((a+b)(3+n) \text{AppellF1}\left[\frac{1+n}{2}, n, 1, \frac{3+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+$$

$$2 \Bigg((a-b) \text{AppellF1}\left[\frac{3+n}{2}, n, 2, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]+(a+b) n$$

$$\text{AppellF1}\left[\frac{3+n}{2}, 1+n, 1, \frac{5+n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, \frac{(a-b) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2\Bigg)\Bigg) \text{Tan}[e+f x]^n\Bigg)\Bigg)$$

- **Problem 353: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b \text{Sec}[c+d x])^n \text{Tan}[c+d x]^5 \, dx$$

Optimal (type 5, 177 leaves, 5 steps):

$$-\frac{a\left(a^2-2 b^2\right)(a+b \text{Sec}[c+d x])^{1+n}}{b^4 d (1+n)}-\frac{\text{Hypergeometric2F1}\left[1, 1+n, 2+n, 1+\frac{b \text{Sec}[c+d x]}{a}\right](a+b \text{Sec}[c+d x])^{1+n}}{a d (1+n)}+$$

$$\frac{\left(3 a^2-2 b^2\right)(a+b \text{Sec}[c+d x])^{2+n}}{b^4 d (2+n)}-\frac{3 a (a+b \text{Sec}[c+d x])^{3+n}}{b^4 d (3+n)}+\frac{(a+b \text{Sec}[c+d x])^{4+n}}{b^4 d (4+n)}$$

Result (type 6, 30 540 leaves) : Display of huge result suppressed!

- **Problem 354: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]^3\,dx$$

Optimal (type 5, 102 leaves, 4 steps) :

$$-\frac{a\,(a+b\,\text{Sec}[c+d\,x])^{1+n}}{b^2\,d\,(1+n)}+\frac{\text{Hypergeometric2F1}\left[1,\,1+n,\,2+n,\,1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\,(a+b\,\text{Sec}[c+d\,x])^{1+n}}{a\,d\,(1+n)}+\frac{(a+b\,\text{Sec}[c+d\,x])^{2+n}}{b^2\,d\,(2+n)}$$

Result (type 6, 7524 leaves) : Display of huge result suppressed!

- **Problem 355: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]\,dx$$

Optimal (type 5, 48 leaves, 2 steps) :

$$-\frac{\text{Hypergeometric2F1}\left[1,\,1+n,\,2+n,\,1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\,(a+b\,\text{Sec}[c+d\,x])^{1+n}}{a\,d\,(1+n)}$$

Result (type 6, 5900 leaves) : Display of huge result suppressed!

- **Problem 356: Unable to integrate problem.**

$$\int \text{Cot}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

Optimal (type 5, 162 leaves, 8 steps) :

$$-\frac{\text{Hypergeometric2F1}\left[1,\,1+n,\,2+n,\,\frac{a+b\,\text{Sec}[c+d\,x]}{a-b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{1+n}}{2\,(a-b)\,d\,(1+n)}-\frac{\text{Hypergeometric2F1}\left[1,\,1+n,\,2+n,\,\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{1+n}}{2\,(a+b)\,d\,(1+n)}+\frac{\text{Hypergeometric2F1}\left[1,\,1+n,\,2+n,\,1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right]\,(a+b\,\text{Sec}[c+d\,x])^{1+n}}{a\,d\,(1+n)}$$

Result (type 8, 21 leaves) :

$$\int \text{Cot}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

- **Problem 357: Unable to integrate problem.**

$$\int \text{Cot}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

Optimal (type 5, 279 leaves, 10 steps) :

$$\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a-b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{2\,(a-b)\,d\,(1+n)}+\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{2\,(a+b)\,d\,(1+n)}-$$
$$\frac{\text{Hypergeometric2F1}\left[1,1+n,2+n,1+\frac{b\,\text{Sec}[c+d\,x]}{a}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{a\,d\,(1+n)}-$$
$$\frac{b\,\text{Hypergeometric2F1}\left[2,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a-b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{4\,(a-b)^2\,d\,(1+n)}+$$
$$\frac{b\,\text{Hypergeometric2F1}\left[2,1+n,2+n,\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1+n}}{4\,(a+b)^2\,d\,(1+n)}$$

Result (type 8, 23 leaves) :

$$\int \text{Cot}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^n\,dx$$

Test results for the 241 problems in "4.5.2.1 (a+b sec)^m (c+d sec)^n.m"

- **Problem 5: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[e+f\,x])^2\,(c-c\,\text{Sec}[e+f\,x])\,dx$$

Optimal (type 3, 55 leaves, 4 steps) :

$$a^2\,c\,x+\frac{a^2\,c\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,f}-\frac{c\,\left(2\,a^2+a^2\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{2\,f}$$

Result (type 3, 141 leaves) :

$$-\frac{1}{16\,f}a^2\,c\,(-1+\text{Cos}[e+f\,x])\,(1+\text{Cos}[e+f\,x])^2\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\,\text{Sec}[e+f\,x]$$
$$\left(\text{Cos}[e+f\,x]\,\left(2\,e+2\,f\,x-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\right)-(1+2\,\text{Cos}[e+f\,x])\,\text{Tan}[e+f\,x]\right)$$

- **Problem 6: Result more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[e+f\,x])^2}{c-c\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 56 leaves, 8 steps) :

$$\frac{a^2\,x}{c}-\frac{a^2\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{c\,f}-\frac{4\,a^2\,\text{Tan}[e+f\,x]}{c\,f\,(1-\text{Sec}[e+f\,x])}$$

Result (type 3, 169 leaves) :

$$\frac{1}{c f (-1+\text{Cos}[e+f x])} a^2 \text{Csc}\left[\frac{e}{2}\right] \left(-\text{Cos}\left[\frac{f x}{2}\right] \left(f x+\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right)+\right.$$
$$\left.\text{Cos}\left[e+\frac{f x}{2}\right] \left(f x+\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right)+8 \text{Sin}\left[\frac{f x}{2}\right]\right) \text{Sin}\left[\frac{1}{2} (e+f x)\right]$$

Problem 16: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+a \text{Sec}[e+f x])^3}{c-c \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 78 leaves, 15 steps):

$$\frac{a^3 x}{c}-\frac{4 a^3 \text{ArcTanh}[\text{Sin}[e+f x]]}{c f}+\frac{8 a^3 \text{Cot}[e+f x]}{c f}+\frac{8 a^3 \text{Csc}[e+f x]}{c f}-\frac{a^3 \text{Tan}[e+f x]}{c f}$$

Result (type 3, 240 leaves):

$$\frac{1}{4 f (c-c \text{Sec}[e+f x])} a^3 \text{Cos}[e+f x]^2 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^4 (1+\text{Sec}[e+f x])^3 \text{Tan}\left[\frac{1}{2} (e+f x)\right] \left(8 \text{Csc}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{1}{2} (e+f x)\right] \text{Sin}\left[\frac{f x}{2}\right]+\right.$$
$$\left(-f x-4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]+4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]+\text{Sin}[f x]\right/$$
$$\left.\left(\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right) \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)\right)\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)$$

Problem 17: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+a \text{Sec}[e+f x])^3}{(c-c \text{Sec}[e+f x])^2} \, dx$$

Optimal (type 3, 88 leaves, 13 steps):

$$\frac{a^3 x}{c^2}+\frac{a^3 \text{ArcTanh}[\text{Sin}[e+f x]]}{c^2 f}-\frac{8 a^3 \text{Tan}[e+f x]}{3 c^2 f (1-\text{Sec}[e+f x])^2}+\frac{4 a^3 \text{Tan}[e+f x]}{3 c^2 f (1-\text{Sec}[e+f x])}$$

Result (type 3, 177 leaves):

$$\frac{1}{6 c^2 f (-1+\text{Cos}[e+f x])^2}$$
$$a^3 (1+\text{Cos}[e+f x])^3 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \text{Tan}\left[\frac{1}{2} (e+f x)\right] \left(4 \text{Csc}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{1}{2} (e+f x)\right] \text{Sin}\left[\frac{f x}{2}\right]-4 \text{Cot}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \text{Tan}\left[\frac{1}{2} (e+f x)\right]+\right.$$
$$\left.3 \left(f x-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]^3\right)$$

Problem 21: Result more than twice size of optimal antiderivative.

$$\int \frac{(c-c \text{Sec}[e+f x])^5}{(a+a \text{Sec}[e+f x])^2} \, dx$$

Optimal (type 3, 136 leaves, 26 steps):

$$\frac{c^5 x}{a^2}-\frac{47 c^5 \text{ArcTanh}[\text{Sin}[e+f x]]}{2 a^2 f}+\frac{13 c^5 \text{Tan}[e+f x]}{2 a^2 f}+\frac{112 c^5 \text{Tan}[e+f x]}{3 a^2 f (1+\text{Sec}[e+f x])}-\frac{32 c^5 \text{Tan}[e+f x]}{3 f (a+a \text{Sec}[e+f x])^2}+\frac{\left(c^5-c^5 \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{2 a^2 f}$$

Result (type 3, 384 leaves):

$$\frac{1}{96 a^2 (1+\text{Sec}[e+f x])^2}\text{Cos}[e+f x]^3 \text{Cot}\left[\frac{1}{2}(e+f x)\right] \text{Csc}\left[\frac{1}{2}(e+f x)\right]^6 (c-c \text{Sec}[e+f x])^5 \left(-\frac{320 \text{Cot}\left[\frac{1}{2}(e+f x)\right]^2 \text{Csc}\left[\frac{1}{2}(e+f x)\right] \text{Sec}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{f}-\right.$$
$$\frac{64 \text{Csc}\left[\frac{1}{2}(e+f x)\right]^3 \text{Sec}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{f}+3 \text{Cot}\left[\frac{1}{2}(e+f x)\right]^3 \left(-4 x-\frac{94 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{f}+\right.$$
$$\frac{94 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{f}+\frac{1}{f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-\frac{1}{f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-$$
$$\left.(28 \text{Sin}[f x])\Big/\left(f\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)-$$
$$\left.\frac{64 \text{Cot}\left[\frac{1}{2}(e+f x)\right] \text{Csc}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{e}{2}\right]}{f}\right)$$

- **Problem 22: Result more than twice size of optimal antiderivative.**

$$\int \frac{(c-c \text{Sec}[e+f x])^4}{(a+a \text{Sec}[e+f x])^2} \, dx$$

Optimal (type 3, 102 leaves, 21 steps):

$$\frac{c^4 x}{a^2}-\frac{6 c^4 \text{ArcTanh}[\text{Sin}[e+f x]]}{a^2 f}-\frac{16 c^4 \text{Cot}[e+f x]}{a^2 f}-\frac{32 c^4 \text{Cot}[e+f x]^3}{3 a^2 f}+\frac{32 c^4 \text{Csc}[e+f x]^3}{3 a^2 f}+\frac{c^4 \text{Tan}[e+f x]}{a^2 f}$$

Result (type 3, 753 leaves):

$$\frac{x \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \operatorname{Sec}[e+f x])^4}{4 (a+a \operatorname{Sec}[e+f x])^2}+$$

$$\frac{3 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c-c \operatorname{Sec}[e+f x])^4}{2 f (a+a \operatorname{Sec}[e+f x])^2}-$$

$$\frac{3 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c-c \operatorname{Sec}[e+f x])^4}{2 f (a+a \operatorname{Sec}[e+f x])^2}+$$

$$\frac{4 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \operatorname{Sec}\left[\frac{e}{2}\right] (c-c \operatorname{Sec}[e+f x])^4 \operatorname{Sin}\left[\frac{f x}{2}\right]}{3 f (a+a \operatorname{Sec}[e+f x])^2}+$$

$$\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^7 \operatorname{Sec}\left[\frac{e}{2}\right] (c-c \operatorname{Sec}[e+f x])^4 \operatorname{Sin}\left[\frac{f x}{2}\right]}{3 f (a+a \operatorname{Sec}[e+f x])^2}+$$

$$\frac{\operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \operatorname{Sec}[e+f x])^4 \operatorname{Sin}\left[\frac{f x}{2}\right]}{4 f (a+a \operatorname{Sec}[e+f x])^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$

$$\frac{\operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \operatorname{Sec}[e+f x])^4 \operatorname{Sin}\left[\frac{f x}{2}\right]}{4 f (a+a \operatorname{Sec}[e+f x])^2 \left(\operatorname{Cos}\left[\frac{e}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (c-c \operatorname{Sec}[e+f x])^4 \operatorname{Tan}\left[\frac{e}{2}\right]}{3 f (a+a \operatorname{Sec}[e+f x])^2}$$

- **Problem 23: Result more than twice size of optimal antiderivative.**

$$\int \frac{(c-c \operatorname{Sec}[e+f x])^3}{(a+a \operatorname{Sec}[e+f x])^2} \, dx$$

Optimal (type 3, 85 leaves, 13 steps):

$$\frac{c^3 x}{a^2}-\frac{c^3 \operatorname{ArcTanh}[\operatorname{Sin}[e+f x]]}{a^2 f}-\frac{8 c^3 \operatorname{Tan}[e+f x]}{3 a^2 f (1+\operatorname{Sec}[e+f x])^2}+\frac{4 c^3 \operatorname{Tan}[e+f x]}{3 a^2 f (1+\operatorname{Sec}[e+f x])}$$

Result (type 3, 216 leaves):

$$-\frac{1}{6 a^2 f (1+\operatorname{Cos}[e+f x])^2} c^3 (-1+\operatorname{Cos}[e+f x])^3 \operatorname{Cot}\left[\frac{1}{2} (e+f x)\right] \operatorname{Csc}\left[\frac{1}{2} (e+f x)\right]^2$$
$$\left(3 \operatorname{Cot}\left[\frac{1}{2} (e+f x)\right]^3 \left(f x+\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right)-\right.$$
$$\left.4 \operatorname{Cot}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Csc}\left[\frac{1}{2} (e+f x)\right] \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]+4 \operatorname{Csc}\left[\frac{1}{2} (e+f x)\right]^3 \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]+4 \operatorname{Cot}\left[\frac{1}{2} (e+f x)\right] \operatorname{Csc}\left[\frac{1}{2} (e+f x)\right]^2 \operatorname{Tan}\left[\frac{e}{2}\right]\right)$$

- **Problem 28: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a \operatorname{Sec}[e+f x])^2 (c-c \operatorname{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 98 leaves, 5 steps):

$$\frac{x}{a^2 c^3}+\frac{\text{Cot}[e+f x]^5 (1+\text{Sec}[e+f x])}{5 a^2 c^3 f}-\frac{\text{Cot}[e+f x]^3 (5+4 \text{Sec}[e+f x])}{15 a^2 c^3 f}+\frac{\text{Cot}[e+f x] (15+8 \text{Sec}[e+f x])}{15 a^2 c^3 f}$$

Result (type 3, 257 leaves):

$$\frac{1}{30720 a^2 c^3 f}\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{1}{2} (e+f x)\right]^5 \text{Sec}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{1}{2} (e+f x)\right]^3 (360 f x \text{Cos}[f x]-360 f x \text{Cos}[2 e+f x]-120 f x \text{Cos}[e+2 f x]+120 f x \text{Cos}[3 e+2 f x]-120 f x \text{Cos}[2 e+3 f x]+120 f x \text{Cos}[4 e+3 f x]+60 f x \text{Cos}[3 e+4 f x]-60 f x \text{Cos}[5 e+4 f x]+200 \text{Sin}[e]-584 \text{Sin}[f x]-534 \text{Sin}[e+f x]+178 \text{Sin}[2 (e+f x)]+178 \text{Sin}[3 (e+f x)]-89 \text{Sin}[4 (e+f x)]-520 \text{Sin}[2 e+f x]+248 \text{Sin}[e+2 f x]+120 \text{Sin}[3 e+2 f x]+248 \text{Sin}[2 e+3 f x]+120 \text{Sin}[4 e+3 f x]-184 \text{Sin}[3 e+4 f x])$$

■ Problem 31: Result more than twice size of optimal antiderivative.

$$\int \frac{(c-c \text{Sec}[e+f x])^5}{(a+a \text{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 162 leaves, 29 steps):

$$\frac{c^5 x}{a^3}+\frac{8 c^5 \text{ArcTanh}[\text{Sin}[e+f x]]}{a^3 f}+\frac{32 c^5 \text{Cot}[e+f x]}{a^3 f}+\frac{128 c^5 \text{Cot}[e+f x]^3}{3 a^3 f}+\frac{128 c^5 \text{Cot}[e+f x]^5}{5 a^3 f}-\frac{16 c^5 \text{Csc}[e+f x]}{a^3 f}+\frac{64 c^5 \text{Csc}[e+f x]^3}{3 a^3 f}-\frac{128 c^5 \text{Csc}[e+f x]^5}{5 a^3 f}-\frac{c^5 \text{Tan}[e+f x]}{a^3 f}$$

Result (type 3, 908 leaves):

$$-\frac{x \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \operatorname{Sec}[e+f x])^5}{4 (a+a \operatorname{Sec}[e+f x])^3}+$$

$$\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c-c \operatorname{Sec}[e+f x])^5}{f (a+a \operatorname{Sec}[e+f x])^3}-$$

$$\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c-c \operatorname{Sec}[e+f x])^5}{f (a+a \operatorname{Sec}[e+f x])^3}+$$

$$\frac{56 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \operatorname{Sec}\left[\frac{e}{2}\right] (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Sin}\left[\frac{f x}{2}\right]}{15 f (a+a \operatorname{Sec}[e+f x])^3}-$$

$$\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^7 \operatorname{Sec}\left[\frac{e}{2}\right] (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Sin}\left[\frac{f x}{2}\right]}{15 f (a+a \operatorname{Sec}[e+f x])^3}+$$

$$\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^9 \operatorname{Sec}\left[\frac{e}{2}\right] (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Sin}\left[\frac{f x}{2}\right]}{5 f (a+a \operatorname{Sec}[e+f x])^3}+$$

$$\frac{\operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Sin}\left[\frac{f x}{2}\right]}{4 f (a+a \operatorname{Sec}[e+f x])^3 \left(\operatorname{Cos}\left[\frac{e}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$

$$\frac{\operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Sin}\left[\frac{f x}{2}\right]}{4 f (a+a \operatorname{Sec}[e+f x])^3 \left(\operatorname{Cos}\left[\frac{e}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}-$$

$$\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Tan}\left[\frac{e}{2}\right]}{15 f (a+a \operatorname{Sec}[e+f x])^3}+\frac{2 \operatorname{Cos}[e+f x]^2 \operatorname{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^8 (c-c \operatorname{Sec}[e+f x])^5 \operatorname{Tan}\left[\frac{e}{2}\right]}{5 f (a+a \operatorname{Sec}[e+f x])^3}$$

- **Problem 37: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a \operatorname{Sec}[e+f x])^3 (c-c \operatorname{Sec}[e+f x])^2} \, dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$\frac{x}{a^3 c^2}+\frac{\operatorname{Cot}[e+f x] (15-8 \operatorname{Sec}[e+f x])}{15 a^3 c^2 f}-\frac{\operatorname{Cot}[e+f x]^3 (5-4 \operatorname{Sec}[e+f x])}{15 a^3 c^2 f}+\frac{\operatorname{Cot}[e+f x]^5 (1-\operatorname{Sec}[e+f x])}{5 a^3 c^2 f}$$

Result (type 3, 257 leaves):

$$\frac{1}{30720\, a^3\, c^2\, f}\, \text{Csc}\left[\frac{e}{2}\right]\, \text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3\, \text{Sec}\left[\frac{e}{2}\right]\, \text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5\, (360\, f\, x\, \text{Cos}[f\, x] - 360\, f\, x\, \text{Cos}[2\, e+f\, x] + 120\, f\, x\, \text{Cos}[e+2\, f\, x] - 120\, f\, x\, \text{Cos}[3\, e+2\, f\, x] - 120\, f\, x\, \text{Cos}[2\, e+3\, f\, x] + 120\, f\, x\, \text{Cos}[4\, e+3\, f\, x] - 60\, f\, x\, \text{Cos}[3\, e+4\, f\, x] + 60\, f\, x\, \text{Cos}[5\, e+4\, f\, x] - 200\, \text{Sin}[e] - 584\, \text{Sin}[f\, x] + 534\, \text{Sin}[e+f\, x] + 178\, \text{Sin}[2\,(e+f\, x)] - 178\, \text{Sin}[3\,(e+f\, x)] - 89\, \text{Sin}[4\,(e+f\, x)] - 520\, \text{Sin}[2\, e+f\, x] - 248\, \text{Sin}[e+2\, f\, x] - 120\, \text{Sin}[3\, e+2\, f\, x] + 248\, \text{Sin}[2\, e+3\, f\, x] + 120\, \text{Sin}[4\, e+3\, f\, x] + 184\, \text{Sin}[3\, e+4\, f\, x])$$

- **Problem 39: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a\,\text{Sec}[e+f\,x])^3\,(c-c\,\text{Sec}[e+f\,x])^4}\,dx$$

Optimal (type 3, 129 leaves, 6 steps):

$$\frac{x}{a^3\,c^4} - \frac{\text{Cot}[e+f\,x]^7\,(1+\text{Sec}[e+f\,x])}{7\,a^3\,c^4\,f} + \frac{\text{Cot}[e+f\,x]^5\,(7+6\,\text{Sec}[e+f\,x])}{35\,a^3\,c^4\,f} + \frac{\text{Cot}[e+f\,x]\,(35+16\,\text{Sec}[e+f\,x])}{35\,a^3\,c^4\,f} - \frac{\text{Cot}[e+f\,x]^3\,(35+24\,\text{Sec}[e+f\,x])}{105\,a^3\,c^4\,f}$$

Result (type 3, 362 leaves):

$$\frac{1}{6881280\, a^3\, c^4\, f}\, \text{Csc}\left[\frac{e}{2}\right]\, \text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^7\, \text{Sec}\left[\frac{e}{2}\right]\, \text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5\, (16800\, f\, x\, \text{Cos}[f\, x] - 16800\, f\, x\, \text{Cos}[2\, e+f\, x] - 4200\, f\, x\, \text{Cos}[e+2\, f\, x] + 4200\, f\, x\, \text{Cos}[3\, e+2\, f\, x] - 8400\, f\, x\, \text{Cos}[2\, e+3\, f\, x] + 8400\, f\, x\, \text{Cos}[4\, e+3\, f\, x] + 3360\, f\, x\, \text{Cos}[3\, e+4\, f\, x] - 3360\, f\, x\, \text{Cos}[5\, e+4\, f\, x] + 1680\, f\, x\, \text{Cos}[4\, e+5\, f\, x] - 1680\, f\, x\, \text{Cos}[6\, e+5\, f\, x] - 840\, f\, x\, \text{Cos}[5\, e+6\, f\, x] + 840\, f\, x\, \text{Cos}[7\, e+6\, f\, x] + 3136\, \text{Sin}[e] - 30112\, \text{Sin}[f\, x] - 22860\, \text{Sin}[e+f\, x] + 5715\, \text{Sin}[2\,(e+f\, x)] + 11430\, \text{Sin}[3\,(e+f\, x)] - 4572\, \text{Sin}[4\,(e+f\, x)] - 2286\, \text{Sin}[5\,(e+f\, x)] + 1143\, \text{Sin}[6\,(e+f\, x)] - 26208\, \text{Sin}[2\, e+f\, x] + 14080\, \text{Sin}[e+2\, f\, x] + 16400\, \text{Sin}[2\, e+3\, f\, x] + 11760\, \text{Sin}[4\, e+3\, f\, x] - 7904\, \text{Sin}[3\, e+4\, f\, x] - 3360\, \text{Sin}[5\, e+4\, f\, x] - 3952\, \text{Sin}[4\, e+5\, f\, x] - 1680\, \text{Sin}[6\, e+5\, f\, x] + 2816\, \text{Sin}[5\, e+6\, f\, x])$$

- **Problem 40: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a\,\text{Sec}[e+f\,x])^3\,(c-c\,\text{Sec}[e+f\,x])^5}\,dx$$

Optimal (type 3, 210 leaves, 14 steps):

$$\frac{x}{a^3\,c^5} + \frac{\text{Cot}[e+f\,x]}{a^3\,c^5\,f} - \frac{\text{Cot}[e+f\,x]^3}{3\,a^3\,c^5\,f} + \frac{\text{Cot}[e+f\,x]^5}{5\,a^3\,c^5\,f} - \frac{\text{Cot}[e+f\,x]^7}{7\,a^3\,c^5\,f} + \frac{2\,\text{Cot}[e+f\,x]^9}{9\,a^3\,c^5\,f} + \frac{2\,\text{Csc}[e+f\,x]}{a^3\,c^5\,f} - \frac{8\,\text{Csc}[e+f\,x]^3}{3\,a^3\,c^5\,f} + \frac{12\,\text{Csc}[e+f\,x]^5}{5\,a^3\,c^5\,f} - \frac{8\,\text{Csc}[e+f\,x]^7}{7\,a^3\,c^5\,f} + \frac{2\,\text{Csc}[e+f\,x]^9}{9\,a^3\,c^5\,f}$$

Result (type 3, 441 leaves):

$$\frac{1}{2580480\, a^3 c^5 f\, (-1+\text{Sec}[e+f x])^5\, (1+\text{Sec}[e+f x])^3}$$

$$\text{Csc}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{e}{2}\right] \text{Sec}[e+f x]^7\, (453600\, f x\, \text{Cos}[f x] - 453600\, f x\, \text{Cos}[2 e+f x] - 201600\, f x\, \text{Cos}[e+2 f x] + 201600\, f x\, \text{Cos}[3 e+2 f x] - 191520\, f x\, \text{Cos}[2 e+3 f x] + 191520\, f x\, \text{Cos}[4 e+3 f x] + 161280\, f x\, \text{Cos}[3 e+4 f x] - 161280\, f x\, \text{Cos}[5 e+4 f x] + 10080\, f x\, \text{Cos}[4 e+5 f x] - 10080\, f x\, \text{Cos}[6 e+5 f x] - 40320\, f x\, \text{Cos}[5 e+6 f x] + 40320\, f x\, \text{Cos}[7 e+6 f x] + 10080\, f x\, \text{Cos}[6 e+7 f x] - 10080\, f x\, \text{Cos}[8 e+7 f x] + 259584\, \text{Sin}[e] - 897024\, \text{Sin}[f x] - 1152405\, \text{Sin}[e+f x] + 512180\, \text{Sin}[2 (e+f x)] + 486571\, \text{Sin}[3 (e+f x)] - 409744\, \text{Sin}[4 (e+f x)] - 25609\, \text{Sin}[5 (e+f x)] + 102436\, \text{Sin}[6 (e+f x)] - 25609\, \text{Sin}[7 (e+f x)] - 825216\, \text{Sin}[2 e+f x] + 622976\, \text{Sin}[e+2 f x] + 142464\, \text{Sin}[3 e+2 f x] + 297088\, \text{Sin}[2 e+3 f x] + 430080\, \text{Sin}[4 e+3 f x] - 424192\, \text{Sin}[3 e+4 f x] - 188160\, \text{Sin}[5 e+4 f x] + 2048\, \text{Sin}[4 e+5 f x] - 40320\, \text{Sin}[6 e+5 f x] + 112768\, \text{Sin}[5 e+6 f x] + 40320\, \text{Sin}[7 e+6 f x] - 38272\, \text{Sin}[6 e+7 f x])\, \text{Tan}[e+f x]$$

- **Problem 47: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{a+a\,\text{Sec}[e+f x]}}{(c-c\,\text{Sec}[e+f x])^2}\, dx$$

Optimal (type 3, 104 leaves, 5 steps):

$$\frac{2\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+a\,\text{Sec}[e+f x]}}\right]}{c^2 f} + \frac{2\,\text{Cot}[e+f x]\sqrt{a+a\,\text{Sec}[e+f x]}}{c^2 f} - \frac{2\,\text{Cot}[e+f x]^3\,(a+a\,\text{Sec}[e+f x])^{3/2}}{3\, a\, c^2 f}$$

Result (type 4, 471 leaves):

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^2}\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}[e+f\,x]^2\sqrt{a\,(1+\text{Sec}[e+f\,x])}\;\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\left(\frac{20}{3}\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]-\frac{2}{3}\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^3-\frac{32}{3}\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)-$$

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^2}32\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]$$

$$\text{Sec}[e+f\,x]^3\sqrt{a\,(1+\text{Sec}[e+f\,x])}\;\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]^2}$$

- **Problem 48: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[e+f\,x]}}{(c-c\,\text{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 139 leaves, 6 steps):

$$\frac{2\sqrt{a}\;\text{ArcTan}\left[\frac{\sqrt{a}\;\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{c^3\,f}+\frac{2\,\text{Cot}[e+f\,x]\sqrt{a+a\,\text{Sec}[e+f\,x]}}{c^3\,f}-\frac{2\,\text{Cot}[e+f\,x]^3\,(a+a\,\text{Sec}[e+f\,x])^{3/2}}{3\,a\,c^3\,f}+\frac{2\,\text{Cot}[e+f\,x]^5\,(a+a\,\text{Sec}[e+f\,x])^{5/2}}{5\,a^2\,c^3\,f}$$

Result (type 4, 487 leaves):

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^3}\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,\mathrm{Sec}[e+f\,x]^3\,\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}$$
$$\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\left(-\frac{272}{15}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{56}{15}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3-\frac{2}{5}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^5+\frac{368}{15}\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)+$$
$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^3}\,64\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]$$
$$\mathrm{Sec}[e+f\,x]^4\,\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\;\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 49: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}{(c-c\,\mathrm{Sec}[e+f\,x])^4}\,dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$\frac{2\sqrt{a}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}\right]}{c^4\,f}+\frac{2\,\mathrm{Cot}[e+f\,x]\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}{c^4\,f}-$$
$$\frac{2\,\mathrm{Cot}[e+f\,x]^3\,(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{3\,a\,c^4\,f}+\frac{2\,\mathrm{Cot}[e+f\,x]^5\,(a+a\,\mathrm{Sec}[e+f\,x])^{5/2}}{5\,a^2\,c^4\,f}-\frac{2\,\mathrm{Cot}[e+f\,x]^7\,(a+a\,\mathrm{Sec}[e+f\,x])^{7/2}}{7\,a^3\,c^4\,f}$$

Result (type 4, 503 leaves):

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^4}\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,\mathrm{Sec}[e+f\,x]^4\,\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,\,\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^8$$

$$\left(\frac{4768}{105}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]-\frac{1504}{105}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3+\frac{108}{35}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^5-\frac{2}{7}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^7-\frac{5632}{105}\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)-$$

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^4}\,128\,\left(-3-2\,\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\,\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\mathrm{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\,\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]$$

$$\mathrm{Sec}[e+f\,x]^5\,\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,\,\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^8\,\sqrt{3-2\,\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 54: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 102 leaves, 5 steps) :

$$\frac{2\,a^{3/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}\right]}{c^2\,f}+\frac{2\,a\,\mathrm{Cot}[e+f\,x]\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}{c^2\,f}-\frac{4\,\mathrm{Cot}[e+f\,x]^3\,(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{3\,c^2\,f}$$

Result (type 4, 473 leaves) :

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^2}\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^3\text{Sec}[e+f\,x]\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\left(\frac{14}{3}\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]-\frac{2}{3}\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^3-\frac{20}{3}\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)-$$

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^2}16\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^3$$

$$\text{Sec}[e+f\,x]^2\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]^2}$$

- **Problem 55: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[e+f\,x])^{3/2}}{(c-c\,\text{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 137 leaves, 6 steps):

$$\frac{2\,a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{c^3\,f}+\frac{2\,a\,\text{Cot}[e+f\,x]\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}{c^3\,f}-\frac{2\,\text{Cot}[e+f\,x]^3\,(a+a\,\text{Sec}[e+f\,x])^{3/2}}{3\,c^3\,f}+\frac{4\,\text{Cot}[e+f\,x]^5\,(a+a\,\text{Sec}[e+f\,x])^{5/2}}{5\,a\,c^3\,f}$$

Result (type 4, 491 leaves):

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^3}\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,\mathrm{Sec}[e+f\,x]^2\,(a\,(1+\mathrm{Sec}[e+f\,x]))^{3/2}$$

$$\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\left(-\frac{172}{15}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{46}{15}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3-\frac{2}{5}\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^5+\frac{208}{15}\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)+$$

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^3}\,32\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3$$

$$\mathrm{Sec}[e+f\,x]^3\,(a\,(1+\mathrm{Sec}[e+f\,x]))^{3/2}\,\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 56: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^4}\,dx$$

Optimal (type 3, 172 leaves, 7 steps):

$$\frac{2\,a^{3/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}\right]}{c^4\,f}+\frac{2\,a\,\mathrm{Cot}[e+f\,x]\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}{c^4\,f}-$$

$$\frac{2\,\mathrm{Cot}[e+f\,x]^3\,(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{3\,c^4\,f}+\frac{2\,\mathrm{Cot}[e+f\,x]^5\,(a+a\,\mathrm{Sec}[e+f\,x])^{5/2}}{5\,a\,c^4\,f}-\frac{4\,\mathrm{Cot}[e+f\,x]^7\,(a+a\,\mathrm{Sec}[e+f\,x])^{7/2}}{7\,a^2\,c^4\,f}$$

Result (type 4, 507 leaves):

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^4}\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,\text{Sec}[e+f\,x]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^8$$
$$\left(\frac{2864}{105}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]-\frac{1112}{105}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3+\frac{94}{35}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^5-\frac{2}{7}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^7-\frac{3056}{105}\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)-$$
$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^4}\,64\,\left(-3-2\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3$$
$$\text{Sec}[e+f\,x]^4\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^8\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 61: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[e+f\,x])^{5/2}}{(c-c\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 74 leaves, 5 steps):

$$\frac{2\,a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{c^2\,f}-\frac{8\,a\,\text{Cot}[e+f\,x]^3\,(a+a\,\text{Sec}[e+f\,x])^{3/2}}{3\,c^2\,f}$$

Result (type 4, 465 leaves):

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^2}\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\left(\frac{8}{3}\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]-\frac{2}{3}\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3-\frac{8}{3}\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)-$$

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^2}\,8\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5$$

$$\text{Sec}[e+f\,x]\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 62: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[e+f\,x])^{5/2}}{(c-c\,\text{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 104 leaves, 5 steps):

$$\frac{2\,a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{c^3\,f}+\frac{2\,a^2\,\text{Cot}[e+f\,x]\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}{c^3\,f}+\frac{8\,\text{Cot}[e+f\,x]^5\,(a+a\,\text{Sec}[e+f\,x])^{5/2}}{5\,c^3\,f}$$

Result (type 4, 489 leaves):

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^3}\mathrm{Sec}\left[\frac{1}{2}(e+f\,x)\right]^5\mathrm{Sec}[e+f\,x]\,(a\,(1+\mathrm{Sec}[e+f\,x]))^{5/2}$$
$$\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\left(-\frac{34}{5}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]+\frac{12}{5}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^3-\frac{2}{5}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^5+\frac{36}{5}\mathrm{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)+$$
$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^3}16\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(e+f\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}(e+f\,x)\right]^5$$
$$\mathrm{Sec}[e+f\,x]^2\,(a\,(1+\mathrm{Sec}[e+f\,x]))^{5/2}\,\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(e+f\,x)\right]^2}$$

- **Problem 63: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\mathrm{Sec}[e+f\,x])^{5/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^4}\,dx$$

Optimal (type 3, 140 leaves, 5 steps):

$$\frac{2\,a^{5/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}\right]}{c^4\,f}+\frac{2\,a^2\,\mathrm{Cot}[e+f\,x]\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}{c^4\,f}-\frac{2\,a\,\mathrm{Cot}[e+f\,x]^3\,(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{3\,c^4\,f}-\frac{8\,\mathrm{Cot}[e+f\,x]^7\,(a+a\,\mathrm{Sec}[e+f\,x])^{7/2}}{7\,a\,c^4\,f}$$

Result (type 4, 507 leaves):

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^4}\mathrm{Sec}\left[\frac{1}{2}(e+f\,x)\right]^5\mathrm{Sec}[e+f\,x]^2\,(a\,(1+\mathrm{Sec}[e+f\,x]))^{5/2}\,\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^8$$
$$\left(\frac{332}{21}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]-\frac{158}{21}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^3+\frac{16}{7}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^5-\frac{2}{7}\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^7-\frac{320}{21}\mathrm{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)-$$
$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f\,x])^4}\,32\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(e+f\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}(e+f\,x)\right]^5$$
$$\mathrm{Sec}[e+f\,x]^3\,(a\,(1+\mathrm{Sec}[e+f\,x]))^{5/2}\,\mathrm{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^8\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(e+f\,x)\right]^2}$$

- **Problem 64: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\mathrm{Sec}[e+f\,x])^{5/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^5}\,dx$$

Optimal (type 3, 172 leaves, 5 steps) :

$$\frac{2\,a^{5/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}\right]}{c^5\,f}+\frac{2\,a^2\,\mathrm{Cot}[e+f\,x]\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}{c^5\,f}-$$
$$\frac{2\,a\,\mathrm{Cot}[e+f\,x]^3\,(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{3\,c^5\,f}+\frac{2\,\mathrm{Cot}[e+f\,x]^5\,(a+a\,\mathrm{Sec}[e+f\,x])^{5/2}}{5\,c^5\,f}+\frac{8\,\mathrm{Cot}[e+f\,x]^9\,(a+a\,\mathrm{Sec}[e+f\,x])^{9/2}}{9\,a^2\,c^5\,f}$$

Result (type 4, 523 leaves) :

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^5}\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5\,\text{Sec}[e+f\,x]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^{10}$$

$$\left(-\frac{1616}{45}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{968}{45}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^3-\frac{418}{45}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^5+\frac{20}{9}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^7-\frac{2}{9}\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^9+\frac{1424}{45}\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)+$$

$$\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])^5}\,64\,\left(-3-2\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5$$

$$\text{Sec}[e+f\,x]^4\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^{10}\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 73: Result more than twice size of optimal antiderivative.**

$$\int\frac{(c-c\,\text{Sec}[e+f\,x])^3}{(a+a\,\text{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 3, 169 leaves, 7 steps) :

$$\frac{2\,c^3\,\text{ArcTan}\left[\frac{\sqrt{a}\,\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{3/2}\,f}+\frac{2\,\sqrt{2}\,\,c^3\,\text{ArcTan}\left[\frac{\sqrt{a}\,\,\text{Tan}[e+f\,x]}{\sqrt{2}\,\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{3/2}\,f}-\frac{4\,c^3\,\text{Tan}[e+f\,x]}{a\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{c^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sin}[e+f\,x]\,\text{Tan}[e+f\,x]^2}{f\,(a+a\,\text{Sec}[e+f\,x])^{3/2}}$$

Result (type 3, 564 leaves) :

$$\frac{1}{8\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}}\text{Cos}[e+f\,x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(1+\text{Sec}[e+f\,x])^{3/2}\,(c-c\,\text{Sec}[e+f\,x])^3$$

$$\left(\frac{3\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[e+f\,x]}}\right]\text{Cos}[e+f\,x]^2\sqrt{-1+\text{Sec}[e+f\,x]}\,(1+\text{Sec}[e+f\,x])^{3/2}\,\text{Sin}[e+f\,x]}{f\,(1+\text{Cos}[e+f\,x])\sqrt{1-\text{Cos}[e+f\,x]^2}\,\sqrt{\text{Cos}[e+f\,x]^2\,(-1+\text{Sec}[e+f\,x])\,(1+\text{Sec}[e+f\,x])}}-\right.$$

$$\left(\left(\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[e+f\,x]}}\right]+\text{ArcTan}\left[\frac{-2+\sqrt{1+\text{Sec}[e+f\,x]}}{\sqrt{-1+\text{Sec}[e+f\,x]}}\right]-\text{ArcTan}\left[\frac{2+\sqrt{1+\text{Sec}[e+f\,x]}}{\sqrt{-1+\text{Sec}[e+f\,x]}}\right]\right)\text{Cos}[e+f\,x]^2\sqrt{-1+\text{Sec}[e+f\,x]}\right.$$

$$\left.\left.(1+\text{Sec}[e+f\,x])^{3/2}\,\text{Sin}[e+f\,x]\right)\Big/\left(f\,(1+\text{Cos}[e+f\,x])\sqrt{1-\text{Cos}[e+f\,x]^2}\,\sqrt{\text{Cos}[e+f\,x]^2\,(-1+\text{Sec}[e+f\,x])\,(1+\text{Sec}[e+f\,x])}\right)\right)+$$

$$\frac{1}{(a\,(1+\text{Sec}[e+f\,x]))^{3/2}}\text{Cos}[e+f\,x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\sqrt{(1+\text{Cos}[e+f\,x])\,\text{Sec}[e+f\,x]}\,(1+\text{Sec}[e+f\,x])^{3/2}\,(c-c\,\text{Sec}[e+f\,x])^3$$

$$\left(\frac{3\,\text{Sec}\left[\frac{e}{2}\right]\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\text{Sin}\left[\frac{f\,x}{2}\right]}{4\,f}-\frac{\text{Sec}\left[\frac{e}{2}\right]\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^3\text{Sin}\left[\frac{f\,x}{2}\right]}{4\,f}+\frac{3\,\text{Tan}\left[\frac{e}{2}\right]}{4\,f}-\frac{\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\text{Tan}\left[\frac{e}{2}\right]}{4\,f}\right)$$

- **Problem 79: Result more than twice size of optimal antiderivative.**

$$\int\frac{(c-c\,\text{Sec}[e+f\,x])^5}{(a+a\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 260 leaves, 9 steps):

$$\frac{2\,c^5\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{5/2}\,f}-\frac{23\sqrt{2}\,c^5\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{5/2}\,f}+\frac{21\,c^5\,\text{Tan}[e+f\,x]}{a^2\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}}-$$

$$\frac{19\,c^5\,\text{Tan}[e+f\,x]^3}{6\,a\,f\,(a+a\,\text{Sec}[e+f\,x])^{3/2}}+\frac{3\,c^5\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sin}[e+f\,x]\,\text{Tan}[e+f\,x]^4}{4\,f\,(a+a\,\text{Sec}[e+f\,x])^{5/2}}+\frac{a\,c^5\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^4\text{Sin}[e+f\,x]^2\,\text{Tan}[e+f\,x]^5}{4\,f\,(a+a\,\text{Sec}[e+f\,x])^{7/2}}$$

Result (type 3, 667 leaves):

$$\left(\text{Cos}[e+f x]^5 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^{10} (1+\text{Sec}[e+f x])^{5/2} (c-c \text{Sec}[e+f x])^5\right.$$

$$\left(-\frac{22 \sqrt{2} \text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[e+f x]}}\right] \text{Cos}[e+f x]^2 \sqrt{-1+\text{Sec}[e+f x]} (1+\text{Sec}[e+f x])^{3/2} \text{Sin}[e+f x]}{f (1+\text{Cos}[e+f x]) \sqrt{1-\text{Cos}[e+f x]^2} \sqrt{\text{Cos}[e+f x]^2 (-1+\text{Sec}[e+f x]) (1+\text{Sec}[e+f x])}}-\right.$$

$$\left(\left(\sqrt{2} \text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]+\text{ArcTan}\left[\frac{-2+\sqrt{1+\text{Sec}[e+f x]}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]-\text{ArcTan}\left[\frac{2+\sqrt{1+\text{Sec}[e+f x]}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]\right) \text{Cos}[e+f x]^2 \sqrt{-1+\text{Sec}[e+f x]}\right.$$

$$\left.\left.\left.(1+\text{Sec}[e+f x])^{3/2} \text{Sin}[e+f x]\right) \Big/ \left(f (1+\text{Cos}[e+f x]) \sqrt{1-\text{Cos}[e+f x]^2} \sqrt{\text{Cos}[e+f x]^2 (-1+\text{Sec}[e+f x]) (1+\text{Sec}[e+f x])}\right)\right)\right) \Big/$$

$$\left(32 (a (1+\text{Sec}[e+f x]))^{5/2}\right)+\frac{1}{(a (1+\text{Sec}[e+f x]))^{5/2}} \text{Cos}[e+f x]^5 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^{10} \sqrt{(1+\text{Cos}[e+f x]) \text{Sec}[e+f x]}$$

$$(1+\text{Sec}[e+f x])^{5/2}$$

$$(c-c \text{Sec}[e+f x])^5$$

$$\left(-\frac{(-1+37 \text{Cos}[e]) \text{Sin}\left[\frac{e}{2}\right]}{24 f \left(\text{Cos}\left[\frac{e}{2}\right]+\text{Cos}\left[\frac{3 e}{2}\right]\right)}-\frac{19 \text{Sec}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{24 f}+\frac{\text{Sec}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \text{Sin}\left[\frac{f x}{2}\right]}{32 f}+\right.$$

$$\left.\frac{\text{Sec}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \text{Sin}\left[\frac{f x}{2}\right]}{16 f}+\frac{\text{Sec}[e] \text{Sec}[e+f x] \text{Sin}[f x]}{48 f}+\frac{\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Tan}\left[\frac{e}{2}\right]}{32 f}+\frac{\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Tan}\left[\frac{e}{2}\right]}{16 f}\right)$$

- **Problem 80: Result more than twice size of optimal antiderivative.**

$$\int \frac{(c-c \text{Sec}[e+f x])^4}{(a+a \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 229 leaves, 8 steps):

$$\frac{2 c^4 \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{a+a \text{Sec}[e+f x]}}\right]}{a^{5/2} f}-\frac{11 c^4 \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{2} \sqrt{a+a \text{Sec}[e+f x]}}\right]}{\sqrt{2} a^{5/2} f}+\frac{7 c^4 \text{Tan}[e+f x]}{2 a^2 f \sqrt{a+a \text{Sec}[e+f x]}}-$$

$$\frac{c^4 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sin}[e+f x] \text{Tan}[e+f x]^2}{4 a f (a+a \text{Sec}[e+f x])^{3/2}}-\frac{c^4 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^4 \text{Sin}[e+f x]^2 \text{Tan}[e+f x]^3}{4 f (a+a \text{Sec}[e+f x])^{5/2}}$$

Result (type 3, 627 leaves):

$$\Bigg(\text{Cos}[e+f x]^4\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^8 (1+\text{Sec}[e+f x])^{5/2} (c-c\,\text{Sec}[e+f x])^4$$

$$\Bigg(\frac{9\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]\text{Cos}[e+f x]^2\sqrt{-1+\text{Sec}[e+f x]}\,(1+\text{Sec}[e+f x])^{3/2}\,\text{Sin}[e+f x]}{f\,(1+\text{Cos}[e+f x])\sqrt{1-\text{Cos}[e+f x]^2}\,\sqrt{\text{Cos}[e+f x]^2(-1+\text{Sec}[e+f x])(1+\text{Sec}[e+f x])}}+$$

$$\Bigg(2\left(\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]+\text{ArcTan}\left[\frac{-2+\sqrt{1+\text{Sec}[e+f x]}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]-\text{ArcTan}\left[\frac{2+\sqrt{1+\text{Sec}[e+f x]}}{\sqrt{-1+\text{Sec}[e+f x]}}\right]\right)\text{Cos}[e+f x]^2\sqrt{-1+\text{Sec}[e+f x]}$$

$$(1+\text{Sec}[e+f x])^{3/2}\,\text{Sin}[e+f x]\Bigg)\Big/\left(f\,(1+\text{Cos}[e+f x])\sqrt{1-\text{Cos}[e+f x]^2}\,\sqrt{\text{Cos}[e+f x]^2(-1+\text{Sec}[e+f x])(1+\text{Sec}[e+f x])}\right)\Bigg)\Bigg)\Big/$$

$$\left(32\,(a\,(1+\text{Sec}[e+f x]))^{5/2}\right)+\frac{1}{(a\,(1+\text{Sec}[e+f x]))^{5/2}}\text{Cos}[e+f x]^4\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^8\sqrt{(1+\text{Cos}[e+f x])\,\text{Sec}[e+f x]}$$

$$(1+\text{Sec}[e+f x])^{5/2}$$

$$(c-c\,\text{Sec}[e+f x])^4$$

$$\Bigg(\frac{3\,\text{Sec}\left[\frac{e}{2}\right]\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]\text{Sin}\left[\frac{f x}{2}\right]}{16 f}+\frac{3\,\text{Sec}\left[\frac{e}{2}\right]\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\text{Sin}\left[\frac{f x}{2}\right]}{32 f}-$$

$$\frac{\text{Sec}\left[\frac{e}{2}\right]\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\text{Sin}\left[\frac{f x}{2}\right]}{16 f}+\frac{3\,\text{Tan}\left[\frac{e}{2}\right]}{16 f}+\frac{3\,\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Tan}\left[\frac{e}{2}\right]}{32 f}-\frac{\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Tan}\left[\frac{e}{2}\right]}{16 f}\Bigg)$$

- **Problem 86: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{a+a\,\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{7/2}\,dx$$

Optimal (type 3, 185 leaves, 5 steps):

$$\frac{a\,c^4\,\text{Log}[\text{Cos}[e+f x]]\,\text{Tan}[e+f x]}{f\sqrt{a+a\,\text{Sec}[e+f x]}\,\sqrt{c-c\,\text{Sec}[e+f x]}}-\frac{a\,c^3\sqrt{c-c\,\text{Sec}[e+f x]}\,\text{Tan}[e+f x]}{f\sqrt{a+a\,\text{Sec}[e+f x]}}-$$

$$\frac{a\,c^2\,(c-c\,\text{Sec}[e+f x])^{3/2}\,\text{Tan}[e+f x]}{2 f\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{a\,c\,(c-c\,\text{Sec}[e+f x])^{5/2}\,\text{Tan}[e+f x]}{3 f\sqrt{a+a\,\text{Sec}[e+f x]}}$$

Result (type 3, 149 leaves):

$$\frac{1}{24 f} c^3 \text{Csc}\left[\frac{1}{2}(e+f x)\right] \left(-22-18 \text{Cos}[2(e+f x)]+3 i f x \text{Cos}[3(e+f x)]+9 \text{Cos}[e+f x]\left(2+i f x-\text{Log}\left[1+e^{2 i(e+f x)}\right]\right)-3 \text{Cos}[3(e+f x)] \text{Log}\left[1+e^{2 i(e+f x)}\right]\right) \text{Sec}\left[\frac{1}{2}(e+f x)\right] \text{Sec}[e+f x]^2 \sqrt{a(1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 87: Result unnecessarily involves imaginary or complex numbers.**

$$\int \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{5/2} \, dx$$

Optimal (type 3, 139 leaves, 4 steps):

$$\frac{a c^3 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{a c^2 \sqrt{c-c \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]}}-\frac{a c (c-c \text{Sec}[e+f x])^{3/2} \text{Tan}[e+f x]}{2 f \sqrt{a+a \text{Sec}[e+f x]}}$$

Result (type 3, 162 leaves):

$$-\frac{1}{16\left(1+e^{i(e+f x)}\right) f} c^2 e^{-3 i(e+f x)}\left(1+e^{2 i(e+f x)}\right)^3\left(i+\text{Cot}\left[\frac{1}{2}(e+f x)\right]\right)\left(-1-i f x+4 \text{Cos}[e+f x]+\text{Log}\left[1+e^{2 i(e+f x)}\right]+\text{Cos}[2(e+f x)]\left(-i f x+\text{Log}\left[1+e^{2 i(e+f x)}\right]\right)\right) \text{Sec}[e+f x]^4 \sqrt{a(1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 88: Result unnecessarily involves imaginary or complex numbers.**

$$\int \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{3/2} \, dx$$

Optimal (type 3, 93 leaves, 3 steps):

$$\frac{a c^2 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{a c \sqrt{c-c \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]}}$$

Result (type 3, 99 leaves):

$$\frac{1}{\left(1+e^{i(e+f x)}\right) f} i c\left(i+\text{Cot}\left[\frac{1}{2}(e+f x)\right]\right)\left(i+\text{Cos}[e+f x]\left(f x+i \text{Log}\left[1+e^{2 i(e+f x)}\right]\right)\right) \sqrt{a(1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 89: Result unnecessarily involves imaginary or complex numbers.**

$$\int \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 48 leaves, 2 steps):

$$\frac{a c \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 84 leaves):

$$-\frac{\left(1+e^{2 i (e+f x)}\right) \left(f x+i \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}}{\left(-1+e^{2 i (e+f x)}\right) f}$$

- **Problem 90: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\sqrt{a+a \text{Sec}[e+f x]}}{\sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 51 leaves, 2 steps):

$$\frac{a \text{Log}[1-\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 86 leaves):

$$-\frac{\left(-1+e^{i (e+f x)}\right) \left(f x+2 i \text{Log}\left[1-e^{i (e+f x)}\right]\right) \sqrt{a (1+\text{Sec}[e+f x])}}{\left(1+e^{i (e+f x)}\right) f \sqrt{c-c \text{Sec}[e+f x]}}$$

- **Problem 91: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\sqrt{a+a \text{Sec}[e+f x]}}{(c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 96 leaves, 3 steps):

$$-\frac{a \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{3/2}}+\frac{a \text{Log}[1-\text{Cos}[e+f x]] \text{Tan}[e+f x]}{c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 107 leaves):

$$\frac{1}{f (c-c \text{Sec}[e+f x])^{3/2}}$$

$$\left(-1+i f x-2 \text{Log}\left[1-e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(-i f x+2 \text{Log}\left[1-e^{i (e+f x)}\right]\right)\right) \text{Sec}[e+f x] \sqrt{a (1+\text{Sec}[e+f x])} \text{Tan}\left[\frac{1}{2} (e+f x)\right]$$

- **Problem 92: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\sqrt{a+a \text{Sec}[e+f x]}}{(c-c \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 142 leaves, 4 steps):

$$-\frac{a \text{Tan}[e+f x]}{2 f \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{5/2}}-\frac{a \text{Tan}[e+f x]}{c f \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{3/2}}+\frac{a \text{Log}[1-\text{Cos}[e+f x]] \text{Tan}[e+f x]}{c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 152 leaves):

$$\left(\left(3-3\,i\,f\,x+\text{Cos}[e+f\,x]\,\left(-4+4\,i\,f\,x-8\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)+6\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+\text{Cos}[2\,(e+f\,x)]\,\left(-i\,f\,x+2\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)\right)\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/\left(2\,c^2\,f\,(-1+\text{Cos}[e+f\,x])^2\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

- **Problem 93: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[e+f\,x]}}{(c-c\,\text{Sec}[e+f\,x])^{7/2}}\,dx$$

Optimal (type 3, 188 leaves, 5 steps):

$$-\frac{a\,\text{Tan}[e+f\,x]}{3\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c-c\,\text{Sec}[e+f\,x])^{7/2}}-\frac{a\,\text{Tan}[e+f\,x]}{2\,c\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c-c\,\text{Sec}[e+f\,x])^{5/2}}-\frac{a\,\text{Tan}[e+f\,x]}{c^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}+\frac{a\,\text{Log}[1-\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{c^3\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 198 leaves):

$$\left(\left(-40+30\,i\,f\,x-3\,i\,f\,x\,\text{Cos}[3\,(e+f\,x)]+18\,i\,\text{Cos}[2\,(e+f\,x)]\,\left(i+f\,x+2\,i\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)-60\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+6\,\text{Cos}[3\,(e+f\,x)]\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+9\,\text{Cos}[e+f\,x]\,\left(6-5\,i\,f\,x+10\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)\right)\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/\left(12\,c^3\,f\,(-1+\text{Cos}[e+f\,x])^3\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

- **Problem 94: Result unnecessarily involves imaginary or complex numbers.**

$$\int(a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c-c\,\text{Sec}[e+f\,x])^{5/2}\,dx$$

Optimal (type 3, 190 leaves, 5 steps):

$$\frac{a^2\,c^3\,\text{Log}[\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{a^2\,c^2\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\,\text{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{a^2\,c\,(c-c\,\text{Sec}[e+f\,x])^{3/2}\,\text{Tan}[e+f\,x]}{2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{a^2\,(c-c\,\text{Sec}[e+f\,x])^{5/2}\,\text{Tan}[e+f\,x]}{3\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 157 leaves):

$$\frac{1}{24\,f}\,i\,a\,c^2\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]\left(2\,i+6\,i\,\text{Cos}[2\,(e+f\,x)]+3\,f\,x\,\text{Cos}[3\,(e+f\,x)]+\text{Cos}[e+f\,x]\,\left(6\,i+9\,f\,x+9\,i\,\text{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)+3\,i\,\text{Cos}[3\,(e+f\,x)]\,\text{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Sec}[e+f\,x]^2\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}$$

Problem 95: Result unnecessarily involves imaginary or complex numbers.

$$\int (a + a \operatorname{Sec}[e + f x])^{3/2} (c - c \operatorname{Sec}[e + f x])^{3/2} \, dx$$

Optimal (type 3, 103 leaves, 3 steps):

$$\frac{a^2 c^2 \operatorname{Log}[\operatorname{Cos}[e + f x]] \operatorname{Tan}[e + f x]}{f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}} + \frac{a^2 c^2 \operatorname{Tan}[e + f x]^3}{2 f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Result (type 3, 159 leaves):

$$\frac{1}{8 \left(1 + e^{i (e+f x)}\right) f} i a c e^{-2 i (e+f x)} \left(1 + e^{2 i (e+f x)}\right)^2 \left(i + \operatorname{Cot}\left[\frac{1}{2} (e + f x)\right]\right)$$
$$\left(i + f x + \operatorname{Cos}[2 (e + f x)] \left(f x + i \operatorname{Log}\left[1 + e^{2 i (e+f x)}\right]\right) + i \operatorname{Log}\left[1 + e^{2 i (e+f x)}\right]\right) \operatorname{Sec}[e + f x]^3 \sqrt{a (1 + \operatorname{Sec}[e + f x])} \sqrt{c - c \operatorname{Sec}[e + f x]}$$

Problem 96: Result unnecessarily involves imaginary or complex numbers.

$$\int (a + a \operatorname{Sec}[e + f x])^{3/2} \sqrt{c - c \operatorname{Sec}[e + f x]} \, dx$$

Optimal (type 3, 93 leaves, 3 steps):

$$\frac{a^2 c \operatorname{Log}[\operatorname{Cos}[e + f x]] \operatorname{Tan}[e + f x]}{f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}} - \frac{a c \sqrt{a + a \operatorname{Sec}[e + f x]} \operatorname{Tan}[e + f x]}{f \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Result (type 3, 128 leaves):

$$\frac{1}{2 \left(1 + e^{i (e+f x)}\right) f} a e^{-i (e+f x)} \left(1 + e^{2 i (e+f x)}\right) \left(i + \operatorname{Cot}\left[\frac{1}{2} (e + f x)\right]\right)$$
$$\left(1 + \operatorname{Cos}[e + f x] \left(i f x - \operatorname{Log}\left[1 + e^{2 i (e+f x)}\right]\right)\right) \operatorname{Sec}[e + f x] \sqrt{a (1 + \operatorname{Sec}[e + f x])} \sqrt{c - c \operatorname{Sec}[e + f x]}$$

Problem 97: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a + a \operatorname{Sec}[e + f x])^{3/2}}{\sqrt{c - c \operatorname{Sec}[e + f x]}} \, dx$$

Optimal (type 3, 104 leaves, 3 steps):

$$\frac{a^2 \operatorname{Log}[\operatorname{Cos}[e + f x]] \operatorname{Tan}[e + f x]}{f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}} + \frac{2 a^2 \operatorname{Log}[1 - \operatorname{Sec}[e + f x]] \operatorname{Tan}[e + f x]}{f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Result (type 3, 105 leaves):

$$-\frac{a \left(-1 + e^{i (e+f x)}\right) \left(f x + 4 i \operatorname{Log}\left[1 - e^{i (e+f x)}\right] - i \operatorname{Log}\left[1 + e^{2 i (e+f x)}\right]\right) \sqrt{a (1 + \operatorname{Sec}[e + f x])}}{\left(1 + e^{i (e+f x)}\right) f \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Problem 98: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 3, 100 leaves, 3 steps):

$$-\frac{2\,a^2\,\mathrm{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\left(c-c\,\mathrm{Sec}[e+f\,x]\right)^{3/2}}+\frac{a^2\,\mathrm{Log}[1-\mathrm{Cos}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{c\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 3, 115 leaves):

$$\left(a\,\left(-2+i\,f\,x-2\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]+\mathrm{Cos}[e+f\,x]\,\left(-i\,f\,x+2\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)\right)\,\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/$$
$$\left(c\,f\,(-1+\mathrm{Cos}[e+f\,x])\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}\right)$$

Problem 99: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 146 leaves, 4 steps):

$$-\frac{a^2\,\mathrm{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\left(c-c\,\mathrm{Sec}[e+f\,x]\right)^{5/2}}-\frac{a^2\,\mathrm{Tan}[e+f\,x]}{c\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\left(c-c\,\mathrm{Sec}[e+f\,x]\right)^{3/2}}+\frac{a^2\,\mathrm{Log}[1-\mathrm{Cos}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{c^2\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 3, 153 leaves):

$$\left(a\,\left(4-3\,i\,f\,x+\mathrm{Cos}[e+f\,x]\,\left(-6+4\,i\,f\,x-8\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)+6\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]+\mathrm{Cos}[2\,(e+f\,x)]\,\left(-i\,f\,x+2\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]\right)\right)\right.$$
$$\left.\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\Big/\left(2\,c^2\,f\,(-1+\mathrm{Cos}[e+f\,x])^2\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}\right)$$

Problem 100: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}{(c-c\,\mathrm{Sec}[e+f\,x])^{7/2}}\,dx$$

Optimal (type 3, 196 leaves, 5 steps):

$$-\frac{2\,a^2\,\mathrm{Tan}[e+f\,x]}{3\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\left(c-c\,\mathrm{Sec}[e+f\,x]\right)^{7/2}}-\frac{a^2\,\mathrm{Tan}[e+f\,x]}{2\,c\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\left(c-c\,\mathrm{Sec}[e+f\,x]\right)^{5/2}}-$$
$$\frac{a^2\,\mathrm{Tan}[e+f\,x]}{c^2\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\left(c-c\,\mathrm{Sec}[e+f\,x]\right)^{3/2}}+\frac{a^2\,\mathrm{Log}[1-\mathrm{Cos}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{c^3\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 3, 489 leaves):

$$\left(8\,i\,\sqrt{2}\,e^{\frac{1}{2}i(e+fx)}\sqrt{\frac{\left(1+e^{i(e+fx)}\right)^2}{1+e^{2i(e+fx)}}}\,\left(fx+2\,i\,\text{Log}\left[1-e^{i(e+fx)}\right]\right)\text{Sec}[e+fx]^{7/2}\,(a\,(1+\text{Sec}[e+fx]))^{3/2}\,\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]^7\right)\Big/$$

$$\left(\left(1+e^{i(e+fx)}\right)\sqrt{\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}}}\,f\,(1+\text{Sec}[e+fx])^{3/2}\,(c-c\,\text{Sec}[e+fx])^{7/2}\right)+$$

$$\Bigg(\text{Sec}[e+fx]^4\sqrt{(1+\text{Cos}[e+fx])\,\text{Sec}[e+fx]}\,(a\,(1+\text{Sec}[e+fx]))^{3/2}$$

$$\left(-\frac{61\,\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]}{3f}+\frac{17\,\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]^3}{3f}-\frac{2\,\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]^5}{3f}+\frac{35\,\text{Sec}\left[\frac{e}{2}+\frac{fx}{2}\right]}{3f}+\frac{61\,\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]^2\text{Sin}\left[\frac{fx}{2}\right]}{3f}-\right.$$

$$\left.\frac{17\,\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]^4\text{Sin}\left[\frac{fx}{2}\right]}{3f}+\frac{2\,\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]^6\text{Sin}\left[\frac{fx}{2}\right]}{3f}\right)\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]^7\Bigg)\Big/\left((1+\text{Sec}[e+fx])^{3/2}\,(c-c\,\text{Sec}[e+fx])^{7/2}\right)$$

- **Problem 101: Result unnecessarily involves imaginary or complex numbers.**

$$\int(a+a\,\text{Sec}[e+fx])^{5/2}\,(c-c\,\text{Sec}[e+fx])^{5/2}\,dx$$

Optimal (type 3, 153 leaves, 4 steps):

$$\frac{a^3\,c^3\,\text{Log}[\text{Cos}[e+fx]]\,\text{Tan}[e+fx]}{f\sqrt{a+a\,\text{Sec}[e+fx]}\,\sqrt{c-c\,\text{Sec}[e+fx]}}+\frac{a^3\,c^3\,\text{Tan}[e+fx]^3}{2f\sqrt{a+a\,\text{Sec}[e+fx]}\,\sqrt{c-c\,\text{Sec}[e+fx]}}-\frac{a^3\,c^3\,\text{Tan}[e+fx]^5}{4f\sqrt{a+a\,\text{Sec}[e+fx]}\,\sqrt{c-c\,\text{Sec}[e+fx]}}$$

Result (type 3, 164 leaves):

$$\frac{1}{16f}i\,a^2\,c^2\,\text{Csc}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(2\,i+3fx+\text{Cos}[4\,(e+fx)]\left(fx+i\,\text{Log}\left[1+e^{2i(e+fx)}\right]\right)+4\,\text{Cos}[2\,(e+fx)]\left(i+fx+i\,\text{Log}\left[1+e^{2i(e+fx)}\right]\right)+3\,i\,\text{Log}\left[1+e^{2i(e+fx)}\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]^3\sqrt{a\,(1+\text{Sec}[e+fx])}\,\sqrt{c-c\,\text{Sec}[e+fx]}$$

- **Problem 102: Result unnecessarily involves imaginary or complex numbers.**

$$\int(a+a\,\text{Sec}[e+fx])^{5/2}\,(c-c\,\text{Sec}[e+fx])^{3/2}\,dx$$

Optimal (type 3, 190 leaves, 5 steps):

$$\frac{a^3 c^2 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{a^2 c^2 \sqrt{a+a \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f \sqrt{c-c \text{Sec}[e+f x]}}-\frac{a c^2 (a+a \text{Sec}[e+f x])^{3/2} \text{Tan}[e+f x]}{2 f \sqrt{c-c \text{Sec}[e+f x]}}+\frac{c^2 (a+a \text{Sec}[e+f x])^{5/2} \text{Tan}[e+f x]}{3 f \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 149 leaves):

$$\frac{1}{24 f} a^2 c \text{Csc}\left[\frac{1}{2} (e+f x)\right] \left(2+6 \text{Cos}[2 (e+f x)]+3 i f x \text{Cos}[3 (e+f x)]+\text{Cos}[e+f x] \left(-6+9 i f x-9 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)-3 \text{Cos}[3 (e+f x)] \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \text{Sec}\left[\frac{1}{2} (e+f x)\right] \text{Sec}[e+f x]^2 \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 103: Result unnecessarily involves imaginary or complex numbers.**

$$\int (a+a \text{Sec}[e+f x])^{5/2} \sqrt{c-c \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 139 leaves, 4 steps):

$$\frac{a^3 c \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{a^2 c \sqrt{a+a \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f \sqrt{c-c \text{Sec}[e+f x]}}-\frac{a c (a+a \text{Sec}[e+f x])^{3/2} \text{Tan}[e+f x]}{2 f \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 164 leaves):

$$\frac{1}{4 \left(1+e^{i (e+f x)}\right) f} a^2 e^{-i (e+f x)} \left(1+e^{2 i (e+f x)}\right) \left(i+\text{Cot}\left[\frac{1}{2} (e+f x)\right]\right) \left(1+i f x+4 \text{Cos}[e+f x]+\text{Cos}[2 (e+f x)] \left(i f x-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right)-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \text{Sec}[e+f x]^2 \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 104: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(a+a \text{Sec}[e+f x])^{5/2}}{\sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 152 leaves, 3 steps):

$$\frac{a^3 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{4 a^3 \text{Log}[1-\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{a^3 \text{Sec}[e+f x] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 198 leaves):

$$\left(\left(1+\text{Cos}[e+f x]\left(-\text{i} f x+8 \text{Log}\left[1-e^{\text{i}(e+f x)}\right]-3 \text{Log}\left[1+e^{2 \text{i}(e+f x)}\right]\right)\right) \sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2} \text{Sec}[e+f x](a(1+\text{Sec}[e+f x]))^{5/2}\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{i} \text{Sin}\left[\frac{1}{2}(e+f x)\right]\right) \text{Sin}\left[\frac{1}{2}(e+f x)\right]\right) \Big/ \left(\left(1+e^{\text{i}(e+f x)}\right) \sqrt{\frac{e^{\text{i}(e+f x)}}{1+e^{2 \text{i}(e+f x)}}} f(1+\text{Sec}[e+f x])^{3/2} \sqrt{c-c \text{Sec}[e+f x]}\right)$$

- **Problem 105: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(a+a \text{Sec}[e+f x])^{5/2}}{(c-c \text{Sec}[e+f x])^{3/2}} dx$$

Optimal (type 3, 96 leaves, 3 steps):

$$-\frac{4 a^3 \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{3/2}}+\frac{a^3 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 111 leaves):

$$\left(a^2\left(-4+\text{i} f x-\text{Log}\left[1+e^{2 \text{i}(e+f x)}\right]+\text{Cos}[e+f x]\left(-\text{i} f x+\text{Log}\left[1+e^{2 \text{i}(e+f x)}\right]\right)\right) \sqrt{a(1+\text{Sec}[e+f x])} \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) \Big/$$
$$\left(c f(-1+\text{Cos}[e+f x]) \sqrt{c-c \text{Sec}[e+f x]}\right)$$

- **Problem 106: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(a+a \text{Sec}[e+f x])^{5/2}}{(c-c \text{Sec}[e+f x])^{5/2}} dx$$

Optimal (type 3, 100 leaves, 3 steps):

$$-\frac{2 a^3 \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{5/2}}+\frac{a^3 \text{Log}[1-\text{Cos}[e+f x]] \text{Tan}[e+f x]}{c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 155 leaves):

$$\left(a^2\left(4-3 \text{i} f x+\text{Cos}[e+f x]\left(-8+4 \text{i} f x-8 \text{Log}\left[1-e^{\text{i}(e+f x)}\right]\right)+6 \text{Log}\left[1-e^{\text{i}(e+f x)}\right]+\text{Cos}[2(e+f x)]\left(-\text{i} f x+2 \text{Log}\left[1-e^{\text{i}(e+f x)}\right]\right)\right)\right.$$
$$\left.\sqrt{a(1+\text{Sec}[e+f x])} \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) \Big/ \left(2 c^2 f(-1+\text{Cos}[e+f x])^2 \sqrt{c-c \text{Sec}[e+f x]}\right)$$

- **Problem 107: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a \text{Sec}[e+f x])^{5/2}}{(c-c \text{Sec}[e+f x])^{7/2}} dx$$

Optimal (type 3, 148 leaves, 4 steps):

$$-\frac{4 a^3 \operatorname{Tan}[e+f x]}{3 f \sqrt{a+a \operatorname{Sec}[e+f x]}\,(c-c \operatorname{Sec}[e+f x])^{7/2}}-\frac{a^3 \operatorname{Tan}[e+f x]}{c^2 f \sqrt{a+a \operatorname{Sec}[e+f x]}\,(c-c \operatorname{Sec}[e+f x])^{3/2}}+\frac{a^3 \operatorname{Log}[1-\operatorname{Cos}[e+f x]] \operatorname{Tan}[e+f x]}{c^3 f \sqrt{a+a \operatorname{Sec}[e+f x]}\,\sqrt{c-c \operatorname{Sec}[e+f x]}}$$

Result (type 3, 489 leaves) :

$$\left(8\, i \sqrt{2}\, e^{\frac{1}{2} i (e+f x)} \sqrt{\frac{\left(1+e^{i (e+f x)}\right)^2}{1+e^{2 i (e+f x)}}}\left(f x+2 i \operatorname{Log}\left[1-e^{i (e+f x)}\right]\right) \operatorname{Sec}[e+f x]^{7/2} (a (1+\operatorname{Sec}[e+f x]))^{5/2} \operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^7\right) \Big/$$

$$\left(\left(1+e^{i (e+f x)}\right) \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}}\, f\, (1+\operatorname{Sec}[e+f x])^{5/2} (c-c \operatorname{Sec}[e+f x])^{7/2}\right)+$$

$$\left(\operatorname{Sec}[e+f x]^4 \sqrt{(1+\operatorname{Cos}[e+f x]) \operatorname{Sec}[e+f x]}\, (a (1+\operatorname{Sec}[e+f x]))^{5/2}\right.$$

$$\left(-\frac{80 \operatorname{Cot}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 f}+\frac{28 \operatorname{Cot}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{3 f}-\frac{4 \operatorname{Cot}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5}{3 f}+\frac{40 \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 f}+\frac{80 \operatorname{Csc}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \operatorname{Sin}\left[\frac{f x}{2}\right]}{3 f}-\right.$$

$$\left.\left.\frac{28 \operatorname{Csc}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Sin}\left[\frac{f x}{2}\right]}{3 f}+\frac{4 \operatorname{Csc}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \operatorname{Sin}\left[\frac{f x}{2}\right]}{3 f}\right) \operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^7\right) \Big/ \left((1+\operatorname{Sec}[e+f x])^{5/2} (c-c \operatorname{Sec}[e+f x])^{7/2}\right)$$

■ Problem 108: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a \operatorname{Sec}[e+f x])^{5/2}}{(c-c \operatorname{Sec}[e+f x])^{9/2}}\, dx$$

Optimal (type 3, 194 leaves, 5 steps) :

$$-\frac{a^3 \operatorname{Tan}[e+f x]}{f \sqrt{a+a \operatorname{Sec}[e+f x]}\,(c-c \operatorname{Sec}[e+f x])^{9/2}}-\frac{a^3 \operatorname{Tan}[e+f x]}{2 c^2 f \sqrt{a+a \operatorname{Sec}[e+f x]}\,(c-c \operatorname{Sec}[e+f x])^{5/2}}-$$

$$\frac{a^3 \operatorname{Tan}[e+f x]}{c^3 f \sqrt{a+a \operatorname{Sec}[e+f x]}\,(c-c \operatorname{Sec}[e+f x])^{3/2}}+\frac{a^3 \operatorname{Log}[1-\operatorname{Cos}[e+f x]] \operatorname{Tan}[e+f x]}{c^4 f \sqrt{a+a \operatorname{Sec}[e+f x]}\,\sqrt{c-c \operatorname{Sec}[e+f x]}}$$

Result (type 3, 285 leaves) :

$$\left(\text{Sec}[e+fx]^{9/2}\,(a\,(1+\text{Sec}[e+fx]))^{5/2}\left(\frac{16\sqrt{2}\,e^{\frac{1}{2}i\,(e+fx)}\sqrt{\frac{\left(1+e^{i\,(e+fx)}\right)^2}{1+e^{2i\,(e+fx)}}}\left(-i\,fx+2\,\text{Log}\left[1-e^{i\,(e+fx)}\right]\right)}{\left(1+e^{i\,(e+fx)}\right)\sqrt{\frac{e^{i\,(e+fx)}}{1+e^{2i\,(e+fx)}}}\,f}+\right.\right.$$

$$1/(8f)\,(-54+89\,\text{Cos}[e+fx]-60\,\text{Cos}[2\,(e+fx)]+23\,\text{Cos}[3\,(e+fx)]-6\,\text{Cos}[4\,(e+fx)])\,\text{Csc}\left[\frac{1}{2}(e+fx)\right]^8$$

$$\left.\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}\,\sqrt{1+\text{Sec}[e+fx]}\right)\text{Sin}\left[\frac{1}{2}(e+fx)\right]^9\right)\Big/\left((1+\text{Sec}[e+fx])^{5/2}\,(c-c\,\text{Sec}[e+fx])^{9/2}\right)$$

Problem 109: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(a+a\,\text{Sec}[e+fx])^{5/2}}{(c-c\,\text{Sec}[e+fx])^{11/2}}\,dx$$

Optimal (type 3, 244 leaves, 6 steps):

$$-\frac{4\,a^3\,\text{Tan}[e+fx]}{5\,f\,\sqrt{a+a\,\text{Sec}[e+fx]}\,(c-c\,\text{Sec}[e+fx])^{11/2}}-\frac{a^3\,\text{Tan}[e+fx]}{3\,c^2\,f\,\sqrt{a+a\,\text{Sec}[e+fx]}\,(c-c\,\text{Sec}[e+fx])^{7/2}}-$$

$$\frac{a^3\,\text{Tan}[e+fx]}{2\,c^3\,f\,\sqrt{a+a\,\text{Sec}[e+fx]}\,(c-c\,\text{Sec}[e+fx])^{5/2}}-\frac{a^3\,\text{Tan}[e+fx]}{c^4\,f\,\sqrt{a+a\,\text{Sec}[e+fx]}\,(c-c\,\text{Sec}[e+fx])^{3/2}}+\frac{a^3\,\text{Log}[1-\text{Cos}[e+fx]]\,\text{Tan}[e+fx]}{c^5\,f\,\sqrt{a+a\,\text{Sec}[e+fx]}\,\sqrt{c-c\,\text{Sec}[e+fx]}}$$

Result (type 3, 299 leaves):

$$\left(\text{Sec}[e+fx]^{11/2}\,(a\,(1+\text{Sec}[e+fx]))^{5/2}\left(\frac{32\,i\sqrt{2}\,e^{\frac{1}{2}i\,(e+fx)}\sqrt{\frac{\left(1+e^{i\,(e+fx)}\right)^2}{1+e^{2i\,(e+fx)}}}\left(fx+2\,i\,\text{Log}\left[1-e^{i\,(e+fx)}\right]\right)}{\left(1+e^{i\,(e+fx)}\right)\sqrt{\frac{e^{i\,(e+fx)}}{1+e^{2i\,(e+fx)}}}\,f}-\right.\right.$$

$$1/(240f)\,(5612\,\text{Cos}[e+fx]-5\,(625+736\,\text{Cos}[2\,(e+fx)]-367\,\text{Cos}[3\,(e+fx)]+111\,\text{Cos}[4\,(e+fx)]-21\,\text{Cos}[5\,(e+fx)]))$$

$$\left.\left.\text{Csc}\left[\frac{1}{2}(e+fx)\right]^{10}\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}\,\sqrt{1+\text{Sec}[e+fx]}\right)\text{Sin}\left[\frac{1}{2}(e+fx)\right]^{11}\right)\Big/\left((1+\text{Sec}[e+fx])^{5/2}\,(c-c\,\text{Sec}[e+fx])^{11/2}\right)$$

Problem 110: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(c-c\,\text{Sec}[e+fx])^{7/2}}{\sqrt{a+a\,\text{Sec}[e+fx]}}\,dx$$

Optimal (type 3, 204 leaves, 3 steps):

$$\frac{c^4 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{8 c^4 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{4 c^4 \text{Sec}[e+f x] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{c^4 \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 153 leaves):

$$\frac{1}{2 f \sqrt{a (1+\text{Sec}[e+f x])}} c^3 \text{Cot}\left[\frac{1}{2} (e+f x)\right] \left(-1+i f x+8 \text{Cos}[e+f x]-16 \text{Log}\left[1+e^{i (e+f x)}\right]+7 \text{Log}\left[1+e^{2 i (e+f x)}\right]+\text{Cos}[2 (e+f x)] \left(i f x-16 \text{Log}\left[1+e^{i (e+f x)}\right]+7 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)\right) \text{Sec}[e+f x]^2 \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 111: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(c-c \text{Sec}[e+f x])^{5/2}}{\sqrt{a+a \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 151 leaves, 3 steps):

$$\frac{c^3 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{4 c^3 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{c^3 \text{Sec}[e+f x] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 315 leaves):

$$\left(e^{\frac{1}{2} i (e+f x)} \sqrt{\frac{\left(1+e^{i (e+f x)}\right)^2}{1+e^{2 i (e+f x)}}} \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \left(i f x-8 \text{Log}\left[1+e^{i (e+f x)}\right]+3 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \sqrt{1+\text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{5/2}\right) \Big/ \left(4 \sqrt{2} \left(1+e^{i (e+f x)}\right) \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} f \text{Sec}[e+f x]^{5/2} \sqrt{a (1+\text{Sec}[e+f x])}\right)+\frac{1}{8 f \sqrt{a (1+\text{Sec}[e+f x])}} \text{Cos}[e+f x]^2 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right] \sqrt{(1+\text{Cos}[e+f x]) \text{Sec}[e+f x]} \sqrt{1+\text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{5/2}$$

- **Problem 112: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(c-c \text{Sec}[e+f x])^{3/2}}{\sqrt{a+a \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 102 leaves, 3 steps):

$$\frac{c^2 \text{Log}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{2 c^2 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 103 leaves):

$$-\frac{c\left(1+e^{i(e+fx)}\right)\left(fx+4 i \operatorname{Log}\left[1+e^{i(e+fx)}\right]-i \operatorname{Log}\left[1+e^{2 i(e+fx)}\right]\right)\sqrt{c-c\operatorname{Sec}[e+fx]}}{\left(-1+e^{i(e+fx)}\right) f\sqrt{a\,(1+\operatorname{Sec}[e+fx])}}$$

- **Problem 113: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{c-c\operatorname{Sec}[e+fx]}}{\sqrt{a+a\operatorname{Sec}[e+fx]}}\,dx$$

Optimal (type 3, 49 leaves, 2 steps):

$$\frac{c\operatorname{Log}[1+\operatorname{Cos}[e+fx]]\operatorname{Tan}[e+fx]}{f\sqrt{a+a\operatorname{Sec}[e+fx]}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}$$

Result (type 3, 105 leaves):

$$-\frac{\left(1+e^{i(e+fx)}\right)\sqrt{\frac{c\left(-1+e^{i(e+fx)}\right)^2}{1+e^{2i(e+fx)}}}\left(fx+2 i \operatorname{Log}\left[1+e^{i(e+fx)}\right]\right)}{\left(-1+e^{i(e+fx)}\right) f\sqrt{a\,(1+\operatorname{Sec}[e+fx])}}$$

- **Problem 114: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{a+a\operatorname{Sec}[e+fx]}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}\,dx$$

Optimal (type 3, 46 leaves, 2 steps):

$$\frac{\operatorname{Log}[\operatorname{Sin}[e+fx]]\operatorname{Tan}[e+fx]}{f\sqrt{a+a\operatorname{Sec}[e+fx]}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}$$

Result (type 3, 122 leaves):

$$-\frac{2\left(-1+e^{i(e+fx)}\right)\operatorname{Cos}\left[\frac{1}{2}(e+fx)\right]^2\left(fx+i\operatorname{Log}\left[1-e^{i(e+fx)}\right]+i\operatorname{Log}\left[1+e^{i(e+fx)}\right]\right)\operatorname{Sec}[e+fx]}{\left(1+e^{i(e+fx)}\right) f\sqrt{a\,(1+\operatorname{Sec}[e+fx])}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}$$

- **Problem 115: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{\sqrt{a+a\operatorname{Sec}[e+fx]}\,(c-c\operatorname{Sec}[e+fx])^{3/2}}\,dx$$

Optimal (type 3, 168 leaves, 3 steps):

$$\frac{\operatorname{Tan}[e+fx]}{2cf\,(1-\operatorname{Cos}[e+fx])\sqrt{a+a\operatorname{Sec}[e+fx]}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}+\frac{3\operatorname{Log}[1-\operatorname{Cos}[e+fx]]\operatorname{Tan}[e+fx]}{4cf\sqrt{a+a\operatorname{Sec}[e+fx]}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}+\frac{\operatorname{Log}[1+\operatorname{Cos}[e+fx]]\operatorname{Tan}[e+fx]}{4cf\sqrt{a+a\operatorname{Sec}[e+fx]}\,\sqrt{c-c\operatorname{Sec}[e+fx]}}$$

Result (type 3, 143 leaves):

$$\left(\left(-1+2\,i\,f\,x-3\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]-\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]+\mathrm{Cos}[e+f\,x]\left(-2\,i\,f\,x+3\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]+\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\right)\mathrm{Tan}[e+f\,x]\right)\Big/\left(2\,c\,f\,(-1+\mathrm{Cos}[e+f\,x])\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}\right)$$

- **Problem 116: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{1}{\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,(c-c\,\mathrm{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 274 leaves, 3 steps):

$$\frac{\mathrm{Log}[\mathrm{Cos}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{c^2\,f\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}+\frac{7\,\mathrm{Log}[1-\mathrm{Sec}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{8\,c^2\,f\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}+\frac{\mathrm{Log}[1+\mathrm{Sec}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{8\,c^2\,f\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}-\frac{\mathrm{Tan}[e+f\,x]}{4\,c^2\,f\,(1-\mathrm{Sec}[e+f\,x])^2\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}-\frac{3\,\mathrm{Tan}[e+f\,x]}{4\,c^2\,f\,(1-\mathrm{Sec}[e+f\,x])\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 3, 194 leaves):

$$\left(\left(8-12\,i\,f\,x+21\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]+\mathrm{Cos}[e+f\,x]\left(-10+16\,i\,f\,x-28\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]-4\,\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+3\,\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]+\mathrm{Cos}[2\,(e+f\,x)]\left(-4\,i\,f\,x+7\,\mathrm{Log}\left[1-e^{i\,(e+f\,x)}\right]+\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\right)\mathrm{Tan}[e+f\,x]\right)\Big/\left(8\,c^2\,f\,(-1+\mathrm{Cos}[e+f\,x])^2\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}\right)$$

- **Problem 117: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(c-c\,\mathrm{Sec}[e+f\,x])^{7/2}}{(a+a\,\mathrm{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 3, 215 leaves, 3 steps):

$$\frac{c^4\,\mathrm{Log}[\mathrm{Cos}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{a\,f\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}-\frac{4\,c^4\,\mathrm{Log}[1+\mathrm{Sec}[e+f\,x]]\,\mathrm{Tan}[e+f\,x]}{a\,f\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}+\frac{c^4\,\mathrm{Sec}[e+f\,x]\,\mathrm{Tan}[e+f\,x]}{a\,f\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}-\frac{8\,c^4\,\mathrm{Tan}[e+f\,x]}{a\,f\,(1+\mathrm{Sec}[e+f\,x])\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 3, 204 leaves):

$$\left(c^3\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]\left(-2+i\,f\,x+8\,\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]+2\,\mathrm{Cos}[e+f\,x]\left(-9+i\,f\,x+8\,\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]-5\,\mathrm{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)+\mathrm{Cos}[2\,(e+f\,x)]\left(i\,f\,x+8\,\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]-5\,\mathrm{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)-5\,\mathrm{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)\mathrm{Sec}[e+f\,x]\sqrt{c-c\,\mathrm{Sec}[e+f\,x]}\right)\Big/\left(2\,a\,f\,(1+\mathrm{Cos}[e+f\,x])\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\right)$$

Problem 118: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^{5/2}}{(a + a \operatorname{Sec}[e + f x])^{3/2}} \, dx$$

Optimal (type 3, 96 leaves, 3 steps):

$$-\frac{4 c^3 \operatorname{Tan}[e + f x]}{f (a + a \operatorname{Sec}[e + f x])^{3/2} \sqrt{c - c \operatorname{Sec}[e + f x]}} + \frac{c^3 \operatorname{Log}[\operatorname{Cos}[e + f x]] \operatorname{Tan}[e + f x]}{a f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Result (type 3, 116 leaves):

$$\left(i c^2 \operatorname{Cot}\left[\frac{1}{2} (e + f x)\right] \left(4 i + f x + \operatorname{Cos}[e + f x] \left(f x + i \operatorname{Log}\left[1 + e^{2 i (e+f x)}\right]\right) + i \operatorname{Log}\left[1 + e^{2 i (e+f x)}\right]\right) \sqrt{c - c \operatorname{Sec}[e + f x]}\right) \Big/ \left(a f (1 + \operatorname{Cos}[e + f x]) \sqrt{a (1 + \operatorname{Sec}[e + f x])}\right)$$

Problem 119: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^{3/2}}{(a + a \operatorname{Sec}[e + f x])^{3/2}} \, dx$$

Optimal (type 3, 98 leaves, 3 steps):

$$-\frac{2 c^2 \operatorname{Tan}[e + f x]}{f (a + a \operatorname{Sec}[e + f x])^{3/2} \sqrt{c - c \operatorname{Sec}[e + f x]}} + \frac{c^2 \operatorname{Log}[1 + \operatorname{Cos}[e + f x]] \operatorname{Tan}[e + f x]}{a f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Result (type 3, 114 leaves):

$$\left(i c \operatorname{Cot}\left[\frac{1}{2} (e + f x)\right] \left(2 i + f x + \operatorname{Cos}[e + f x] \left(f x + 2 i \operatorname{Log}\left[1 + e^{i (e+f x)}\right]\right) + 2 i \operatorname{Log}\left[1 + e^{i (e+f x)}\right]\right) \sqrt{c - c \operatorname{Sec}[e + f x]}\right) \Big/ \left(a f (1 + \operatorname{Cos}[e + f x]) \sqrt{a (1 + \operatorname{Sec}[e + f x])}\right)$$

Problem 120: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{c - c \operatorname{Sec}[e + f x]}}{(a + a \operatorname{Sec}[e + f x])^{3/2}} \, dx$$

Optimal (type 3, 94 leaves, 3 steps):

$$-\frac{c \operatorname{Tan}[e + f x]}{f (a + a \operatorname{Sec}[e + f x])^{3/2} \sqrt{c - c \operatorname{Sec}[e + f x]}} + \frac{c \operatorname{Log}[1 + \operatorname{Cos}[e + f x]] \operatorname{Tan}[e + f x]}{a f \sqrt{a + a \operatorname{Sec}[e + f x]} \sqrt{c - c \operatorname{Sec}[e + f x]}}$$

Result (type 3, 106 leaves):

$$\frac{1}{f (a (1 + \operatorname{Sec}[e + f x]))^{3/2}} i \operatorname{Cot}\left[\frac{1}{2} (e + f x)\right] \left(i + f x + \operatorname{Cos}[e + f x] \left(f x + 2 i \operatorname{Log}\left[1 + e^{i (e+f x)}\right]\right) + 2 i \operatorname{Log}\left[1 + e^{i (e+f x)}\right]\right) \operatorname{Sec}[e + f x] \sqrt{c - c \operatorname{Sec}[e + f x]}$$

Problem 121: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(a+a\,\text{Sec}[e+f\,x])^{3/2}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 3, 215 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{\text{Log}[1-\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{4\,a\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{3\,\text{Log}[1+\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{4\,a\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{2\,a\,f\,(1+\text{Sec}[e+f\,x])\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 141 leaves):

$$\left(\left(1-2\,i\,f\,x+\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+3\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+\text{Cos}[e+f\,x]\,\left(-2\,i\,f\,x+\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+3\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\right)\,\text{Tan}[e+f\,x]\right)\Big/\left(2\,a\,f\,(1+\text{Cos}[e+f\,x])\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

Problem 122: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 3, 101 leaves, 3 steps):

$$\frac{\text{Cot}[e+f\,x]}{2\,a\,c\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{\text{Log}[\text{Sin}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a\,c\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 151 leaves):

$$\left(\left(1-i\,f\,x+\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+\text{Cos}[2\,(e+f\,x)]\,\left(i\,f\,x-\text{Log}\left[1-e^{i\,(e+f\,x)}\right]-\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\Big/\left(2\,c\,f\,(-1+\text{Sec}[e+f\,x])\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

Problem 123: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c-c\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 347 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a\,c^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{11\,\text{Log}[1-\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{16\,a\,c^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{5\,\text{Log}[1+\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{16\,a\,c^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{8\,a\,c^2\,f\,(1-\text{Sec}[e+f\,x])^2\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{2\,a\,c^2\,f\,(1-\text{Sec}[e+f\,x])\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{8\,a\,c^2\,f\,(1+\text{Sec}[e+f\,x])\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 275 leaves):

$$\left(\left(14-16\,i\,f\,x-8\,i\,f\,x\,\text{Cos}[3\,(e+f\,x)]+22\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+11\,\text{Cos}[3\,(e+f\,x)]\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+\text{Cos}[e+f\,x]\,\left(-12+8\,i\,f\,x-11\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]-5\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+2\,\text{Cos}[2\,(e+f\,x)]\,\left(-5+8\,i\,f\,x-11\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]-5\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+10\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+5\,\text{Cos}[3\,(e+f\,x)]\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\,\text{Tan}[e+f\,x]\right)\Big/\left(32\,a\,c^2\,f\,(-1+\text{Cos}[e+f\,x])^2\,(1+\text{Cos}[e+f\,x])\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

Problem 124: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(c-c\,\text{Sec}[e+f\,x])^{7/2}}{(a+a\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 220 leaves, 3 steps):

$$\frac{c^4\,\text{Log}[\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{2\,c^4\,\text{Log}[1+\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{4\,c^4\,\text{Tan}[e+f\,x]}{a^2\,f\,(1+\text{Sec}[e+f\,x])^2\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{4\,c^4\,\text{Tan}[e+f\,x]}{a^2\,f\,(1+\text{Sec}[e+f\,x])\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 157 leaves):

$$\left(c^3\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]\,\left(4\,\text{Cos}[e+f\,x]\,\left(-2+i\,f\,x-4\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+\text{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)+(3+\text{Cos}[2\,(e+f\,x)])\,\left(i\,f\,x-4\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+\text{Log}\left[1+e^{2\,i\,(e+f\,x)}\right]\right)\right)\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)\Big/\left(2\,a^2\,f\,(1+\text{Cos}[e+f\,x])^2\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\right)$$

Problem 125: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(c-c\,\text{Sec}[e+f\,x])^{5/2}}{(a+a\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 98 leaves, 3 steps):

$$-\frac{2\,c^3\,\text{Tan}[e+f\,x]}{f\,(a+a\,\text{Sec}[e+f\,x])^{5/2}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{c^3\,\text{Log}[1+\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 154 leaves):

$$\left(i\,c^2\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]\,\left(4\,i+3\,f\,x+\text{Cos}[2\,(e+f\,x)]\,\left(f\,x+2\,i\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+4\,\text{Cos}[e+f\,x]\,\left(2\,i+f\,x+2\,i\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+6\,i\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)\Big/\left(2\,a^2\,f\,(1+\text{Cos}[e+f\,x])^2\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\right)$$

Problem 126: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(c - c\,\text{Sec}[e + f\,x])^{3/2}}{(a + a\,\text{Sec}[e + f\,x])^{5/2}}\,dx$$

Optimal (type 3, 144 leaves, 4 steps):

$$-\frac{c^2\,\text{Tan}[e + f\,x]}{f\,(a + a\,\text{Sec}[e + f\,x])^{5/2}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} - \frac{c^2\,\text{Tan}[e + f\,x]}{a\,f\,(a + a\,\text{Sec}[e + f\,x])^{3/2}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} + \frac{c^2\,\text{Log}[1 + \text{Cos}[e + f\,x]]\,\text{Tan}[e + f\,x]}{a^2\,f\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}}$$

Result (type 3, 152 leaves):

$$\left(i\,c\,\text{Cot}\left[\frac{1}{2}\,(e + f\,x)\right]\left(4\,i + 3\,f\,x + \text{Cos}[2\,(e + f\,x)]\,\left(f\,x + 2\,i\,\text{Log}\left[1 + e^{i\,(e+f\,x)}\right]\right) + \text{Cos}[e + f\,x]\,\left(6\,i + 4\,f\,x + 8\,i\,\text{Log}\left[1 + e^{i\,(e+f\,x)}\right]\right) + 6\,i\,\text{Log}\left[1 + e^{i\,(e+f\,x)}\right]\right)\sqrt{c - c\,\text{Sec}[e + f\,x]}\right) \Big/ \left(2\,a^2\,f\,(1 + \text{Cos}[e + f\,x])^2\,\sqrt{a\,(1 + \text{Sec}[e + f\,x])}\right)$$

Problem 127: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{c - c\,\text{Sec}[e + f\,x]}}{(a + a\,\text{Sec}[e + f\,x])^{5/2}}\,dx$$

Optimal (type 3, 140 leaves, 4 steps):

$$-\frac{c\,\text{Tan}[e + f\,x]}{2\,f\,(a + a\,\text{Sec}[e + f\,x])^{5/2}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} - \frac{c\,\text{Tan}[e + f\,x]}{a\,f\,(a + a\,\text{Sec}[e + f\,x])^{3/2}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} + \frac{c\,\text{Log}[1 + \text{Cos}[e + f\,x]]\,\text{Tan}[e + f\,x]}{a^2\,f\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}}$$

Result (type 3, 151 leaves):

$$\left(i\,\text{Cot}\left[\frac{1}{2}\,(e + f\,x)\right]\left(3\,i + 3\,f\,x + \text{Cos}[2\,(e + f\,x)]\,\left(f\,x + 2\,i\,\text{Log}\left[1 + e^{i\,(e+f\,x)}\right]\right) + 4\,\text{Cos}[e + f\,x]\,\left(i + f\,x + 2\,i\,\text{Log}\left[1 + e^{i\,(e+f\,x)}\right]\right) + 6\,i\,\text{Log}\left[1 + e^{i\,(e+f\,x)}\right]\right)\sqrt{c - c\,\text{Sec}[e + f\,x]}\right) \Big/ \left(2\,a^2\,f\,(1 + \text{Cos}[e + f\,x])^2\,\sqrt{a\,(1 + \text{Sec}[e + f\,x])}\right)$$

Problem 128: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(a + a\,\text{Sec}[e + f\,x])^{5/2}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}}\,dx$$

Optimal (type 3, 270 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[e + f\,x]]\,\text{Tan}[e + f\,x]}{a^2\,f\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} + \frac{\text{Log}[1 - \text{Sec}[e + f\,x]]\,\text{Tan}[e + f\,x]}{8\,a^2\,f\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} + \frac{7\,\text{Log}[1 + \text{Sec}[e + f\,x]]\,\text{Tan}[e + f\,x]}{8\,a^2\,f\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} - \frac{\text{Tan}[e + f\,x]}{4\,a^2\,f\,(1 + \text{Sec}[e + f\,x])^2\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}} - \frac{3\,\text{Tan}[e + f\,x]}{4\,a^2\,f\,(1 + \text{Sec}[e + f\,x])\,\sqrt{a + a\,\text{Sec}[e + f\,x]}\,\sqrt{c - c\,\text{Sec}[e + f\,x]}}$$

Result (type 3, 195 leaves):

$$\left(\left(8-12\,i\,f\,x+3\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+21\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+\text{Cos}[2\,(e+f\,x)]\left(-4\,i\,f\,x+\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+7\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+2\,\text{Cos}[e+f\,x]\left(5-8\,i\,f\,x+2\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+14\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\right)\text{Tan}[e+f\,x]\right)\Big/\left(8\,a^2\,f\,(1+\text{Cos}[e+f\,x])^2\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

- **Problem 129: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{(a+a\,\text{Sec}[e+f\,x])^{5/2}\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 3, 345 leaves, 3 steps):

$$\frac{\text{Log}[\text{Cos}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a^2\,c\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{5\,\text{Log}[1-\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{16\,a^2\,c\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{11\,\text{Log}[1+\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{16\,a^2\,c\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{8\,a^2\,c\,f\,(1-\text{Sec}[e+f\,x])\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{8\,a^2\,c\,f\,(1+\text{Sec}[e+f\,x])^2\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Tan}[e+f\,x]}{2\,a^2\,c\,f\,(1+\text{Sec}[e+f\,x])\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 275 leaves):

$$\left(\left(-14+16\,i\,f\,x-8\,i\,f\,x\,\text{Cos}[3\,(e+f\,x)]-10\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+5\,\text{Cos}[3\,(e+f\,x)]\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+\text{Cos}[e+f\,x]\left(-12+8\,i\,f\,x-5\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]-11\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)-22\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+11\,\text{Cos}[3\,(e+f\,x)]\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+2\,\text{Cos}[2\,(e+f\,x)]\left(5-8\,i\,f\,x+5\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+11\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\right)\text{Tan}[e+f\,x]\right)\Big/\left(32\,a^2\,c\,f\,(-1+\text{Cos}[e+f\,x])\,(1+\text{Cos}[e+f\,x])^2\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

- **Problem 130: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{(a+a\,\text{Sec}[e+f\,x])^{5/2}\,(c-c\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 151 leaves, 4 steps):

$$\frac{\text{Cot}[e+f\,x]}{2\,a^2\,c^2\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{\text{Cot}[e+f\,x]^3}{4\,a^2\,c^2\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}+\frac{\text{Log}[\text{Sin}[e+f\,x]]\,\text{Tan}[e+f\,x]}{a^2\,c^2\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 195 leaves):

$$\left(\text{Csc}[e+f\,x]^3\left(2-3\,i\,f\,x+3\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+\text{Cos}[2\,(e+f\,x)]\left(-4+4\,i\,f\,x-4\,\text{Log}\left[1-e^{i\,(e+f\,x)}\right]-4\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+3\,\text{Log}\left[1+e^{i\,(e+f\,x)}\right]+\text{Cos}[4\,(e+f\,x)]\left(-i\,f\,x+\text{Log}\left[1-e^{i\,(e+f\,x)}\right]+\text{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)\right)\text{Sec}[e+f\,x]\right)\Big/\left(8\,a^2\,c^2\,f\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\right)$$

- **Problem 131: Unable to integrate problem.**

$$\int(1+\text{Sec}[e+f\,x])^m\,(c-c\,\text{Sec}[e+f\,x])^n\,dx$$

Optimal (type 6, 92 leaves, 2 steps):

$$\left(2^{\frac{1}{2}+m}\,\text{AppellF1}\left[\frac{1}{2}+n,\frac{1}{2}-m,1,\frac{3}{2}+n,\frac{1}{2}\left(1-\text{Sec}[e+f x]\right),1-\text{Sec}[e+f x]\right]\left(c-c\,\text{Sec}[e+f x]\right)^n\text{Tan}[e+f x]\right)\Big/\left(f\,(1+2 n)\,\sqrt{1+\text{Sec}[e+f x]}\right)$$

Result (type 8, 26 leaves):

$$\int (1+\text{Sec}[e+f x])^m\,(c-c\,\text{Sec}[e+f x])^n\,dx$$

- **Problem 132: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[e+f x])^m\,(c-c\,\text{Sec}[e+f x])^n\,dx$$

Optimal (type 6, 109 leaves, 3 steps):

$$\frac{1}{f\,(1+2 m)}2^{\frac{1}{2}+n}\,c\,\text{AppellF1}\left[\frac{1}{2}+m,\frac{1}{2}-n,1,\frac{3}{2}+m,\frac{1}{2}\left(1+\text{Sec}[e+f x]\right),1+\text{Sec}[e+f x]\right]$$
$$(1-\text{Sec}[e+f x])^{\frac{1}{2}-n}\,(a+a\,\text{Sec}[e+f x])^m\,(c-c\,\text{Sec}[e+f x])^{-1+n}\,\text{Tan}[e+f x]$$

Result (type 8, 28 leaves):

$$\int (a+a\,\text{Sec}[e+f x])^m\,(c-c\,\text{Sec}[e+f x])^n\,dx$$

- **Problem 133: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[e+f x])^3\,(c-c\,\text{Sec}[e+f x])^n\,dx$$

Optimal (type 6, 101 leaves, 3 steps):

$$\frac{1}{7 f}2^{\frac{1}{2}+n}\,c\,\text{AppellF1}\left[\frac{7}{2},\frac{1}{2}-n,1,\frac{9}{2},\frac{1}{2}\left(1+\text{Sec}[e+f x]\right),1+\text{Sec}[e+f x]\right]$$
$$(1-\text{Sec}[e+f x])^{\frac{1}{2}-n}\,(a+a\,\text{Sec}[e+f x])^3\,(c-c\,\text{Sec}[e+f x])^{-1+n}\,\text{Tan}[e+f x]$$

Result (type 8, 28 leaves):

$$\int (a+a\,\text{Sec}[e+f x])^3\,(c-c\,\text{Sec}[e+f x])^n\,dx$$

- **Problem 134: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^n\,dx$$

Optimal (type 6, 101 leaves, 3 steps):

$$\frac{1}{5 f}2^{\frac{1}{2}+n}\,c\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}-n,1,\frac{7}{2},\frac{1}{2}\left(1+\text{Sec}[e+f x]\right),1+\text{Sec}[e+f x]\right]$$
$$(1-\text{Sec}[e+f x])^{\frac{1}{2}-n}\,(a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^{-1+n}\,\text{Tan}[e+f x]$$

Result (type 8, 28 leaves):

$$\int (a + a \operatorname{Sec}[e + f x])^2 (c - c \operatorname{Sec}[e + f x])^n \, dx$$

Problem 135: Unable to integrate problem.

$$\int (a + a \operatorname{Sec}[e + f x]) (c - c \operatorname{Sec}[e + f x])^n \, dx$$

Optimal (type 6, 99 leaves, 3 steps):

$$\frac{1}{3 f} 2^{\frac{1}{2}+n} c \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{2} - n, 1, \frac{5}{2}, \frac{1}{2} (1 + \operatorname{Sec}[e + f x]), 1 + \operatorname{Sec}[e + f x]\right] (1 - \operatorname{Sec}[e + f x])^{\frac{1}{2}-n} (a + a \operatorname{Sec}[e + f x]) (c - c \operatorname{Sec}[e + f x])^{-1+n} \operatorname{Tan}[e + f x]$$

Result (type 8, 26 leaves):

$$\int (a + a \operatorname{Sec}[e + f x]) (c - c \operatorname{Sec}[e + f x])^n \, dx$$

Problem 136: Unable to integrate problem.

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^n}{a + a \operatorname{Sec}[e + f x]} \, dx$$

Optimal (type 6, 99 leaves, 3 steps):

$$-\frac{1}{f (a + a \operatorname{Sec}[e + f x])} 2^{\frac{1}{2}+n} c \operatorname{AppellF1}\left[-\frac{1}{2}, \frac{1}{2} - n, 1, \frac{1}{2}, \frac{1}{2} (1 + \operatorname{Sec}[e + f x]), 1 + \operatorname{Sec}[e + f x]\right] (1 - \operatorname{Sec}[e + f x])^{\frac{1}{2}-n} (c - c \operatorname{Sec}[e + f x])^{-1+n} \operatorname{Tan}[e + f x]$$

Result (type 8, 28 leaves):

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^n}{a + a \operatorname{Sec}[e + f x]} \, dx$$

Problem 137: Unable to integrate problem.

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^n}{(a + a \operatorname{Sec}[e + f x])^2} \, dx$$

Optimal (type 6, 101 leaves, 3 steps):

$$-\frac{1}{3 f (a + a \operatorname{Sec}[e + f x])^2} 2^{\frac{1}{2}+n} c \operatorname{AppellF1}\left[-\frac{3}{2}, \frac{1}{2} - n, 1, -\frac{1}{2}, \frac{1}{2} (1 + \operatorname{Sec}[e + f x]), 1 + \operatorname{Sec}[e + f x]\right] (1 - \operatorname{Sec}[e + f x])^{\frac{1}{2}-n} (c - c \operatorname{Sec}[e + f x])^{-1+n} \operatorname{Tan}[e + f x]$$

Result (type 8, 28 leaves):

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^n}{(a + a \operatorname{Sec}[e + f x])^2} \, dx$$

- **Problem 138: Unable to integrate problem.**

$$\int (a + a \operatorname{Sec}[e + f x])^{5/2} (c - c \operatorname{Sec}[e + f x])^n \, dx$$

Optimal (type 5, 172 leaves, 4 steps):

$$\frac{6 a^3 (c - c \operatorname{Sec}[e + f x])^n \operatorname{Tan}[e + f x]}{f (1 + 2 n) \sqrt{a + a \operatorname{Sec}[e + f x]}} + \frac{2 a^3 \operatorname{Hypergeometric2F1}\left[1, \frac{1}{2} + n, \frac{3}{2} + n, 1 - \operatorname{Sec}[e + f x]\right] (c - c \operatorname{Sec}[e + f x])^n \operatorname{Tan}[e + f x]}{f (1 + 2 n) \sqrt{a + a \operatorname{Sec}[e + f x]}} - \frac{2 a^3 (c - c \operatorname{Sec}[e + f x])^{1+n} \operatorname{Tan}[e + f x]}{c f (3 + 2 n) \sqrt{a + a \operatorname{Sec}[e + f x]}}$$

Result (type 8, 30 leaves):

$$\int (a + a \operatorname{Sec}[e + f x])^{5/2} (c - c \operatorname{Sec}[e + f x])^n \, dx$$

- **Problem 139: Unable to integrate problem.**

$$\int (a + a \operatorname{Sec}[e + f x])^{3/2} (c - c \operatorname{Sec}[e + f x])^n \, dx$$

Optimal (type 5, 119 leaves, 3 steps):

$$\frac{2 a^2 (c - c \operatorname{Sec}[e + f x])^n \operatorname{Tan}[e + f x]}{f (1 + 2 n) \sqrt{a + a \operatorname{Sec}[e + f x]}} + \frac{2 a^2 \operatorname{Hypergeometric2F1}\left[1, \frac{1}{2} + n, \frac{3}{2} + n, 1 - \operatorname{Sec}[e + f x]\right] (c - c \operatorname{Sec}[e + f x])^n \operatorname{Tan}[e + f x]}{f (1 + 2 n) \sqrt{a + a \operatorname{Sec}[e + f x]}}$$

Result (type 8, 30 leaves):

$$\int (a + a \operatorname{Sec}[e + f x])^{3/2} (c - c \operatorname{Sec}[e + f x])^n \, dx$$

- **Problem 140: Unable to integrate problem.**

$$\int \sqrt{a + a \operatorname{Sec}[e + f x]} \, (c - c \operatorname{Sec}[e + f x])^n \, dx$$

Optimal (type 5, 68 leaves, 2 steps):

$$\frac{2 a \operatorname{Hypergeometric2F1}\left[1, \frac{1}{2} + n, \frac{3}{2} + n, 1 - \operatorname{Sec}[e + f x]\right] (c - c \operatorname{Sec}[e + f x])^n \operatorname{Tan}[e + f x]}{f (1 + 2 n) \sqrt{a + a \operatorname{Sec}[e + f x]}}$$

Result (type 8, 30 leaves):

$$\int \sqrt{a + a \operatorname{Sec}[e + f x]} \, (c - c \operatorname{Sec}[e + f x])^n \, dx$$

- **Problem 141: Unable to integrate problem.**

$$\int \frac{(c - c \operatorname{Sec}[e + f x])^n}{\sqrt{a + a \operatorname{Sec}[e + f x]}} \, dx$$

Optimal (type 5, 139 leaves, 4 steps):

$$-\frac{\text{Hypergeometric2F1}\left[1,\frac{1}{2}+n,\frac{3}{2}+n,\frac{1}{2}(1-\text{Sec}[e+fx])\right](c-c\,\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f(1+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}+\frac{2\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+n,\frac{3}{2}+n,1-\text{Sec}[e+fx]\right](c-c\,\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{f(1+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 8, 30 leaves):

$$\int\frac{(c-c\,\text{Sec}[e+fx])^n}{\sqrt{a+a\,\text{Sec}[e+fx]}}\,dx$$

Problem 142: Unable to integrate problem.

$$\int\frac{(c-c\,\text{Sec}[e+fx])^n}{(a+a\,\text{Sec}[e+fx])^{3/2}}\,dx$$

Optimal (type 5, 205 leaves, 5 steps):

$$-\frac{(5-2n)\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+n,\frac{3}{2}+n,\frac{1}{2}(1-\text{Sec}[e+fx])\right](c-c\,\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{4af(1+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}+\frac{2\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+n,\frac{3}{2}+n,1-\text{Sec}[e+fx]\right](c-c\,\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{af(1+2n)\sqrt{a+a\,\text{Sec}[e+fx]}}-\frac{(c-c\,\text{Sec}[e+fx])^n\,\text{Tan}[e+fx]}{2af(1+\text{Sec}[e+fx])\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 8, 30 leaves):

$$\int\frac{(c-c\,\text{Sec}[e+fx])^n}{(a+a\,\text{Sec}[e+fx])^{3/2}}\,dx$$

Problem 143: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{a+a\,\text{Sec}[e+fx]}}{c+c\,\text{Sec}[e+fx]}\,dx$$

Optimal (type 3, 91 leaves, 6 steps):

$$\frac{2\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+a\,\text{Sec}[e+fx]}}\right]}{cf}-\frac{\sqrt{2}\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[e+fx]}}\right]}{cf}$$

Result (type 3, 168 leaves):

$$\frac{1}{c\left(1+e^{i(e+fx)}\right)f}\sqrt{1+e^{2i(e+fx)}}\left(fx-i\,\text{ArcSinh}\left[e^{i(e+fx)}\right]+i\sqrt{2}\,\text{Log}\left[1+e^{i(e+fx)}\right]+i\,\text{Log}\left[1+\sqrt{1+e^{2i(e+fx)}}\right]-i\sqrt{2}\,\text{Log}\left[1-e^{i(e+fx)}+\sqrt{2}\sqrt{1+e^{2i(e+fx)}}\right]\right)\Big/\sqrt{a\,(1+\text{Sec}[e+fx])}$$

- **Problem 146: Unable to integrate problem.**

$$\int\frac{1}{(a+a\,\text{Sec}[e+fx])\sqrt{c+d\,\text{Sec}[e+fx]}}\,dx$$

Optimal (type 4, 319 leaves, 5 steps):

$$\frac{2\sqrt{c+d}\,\text{Cot}[e+fx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{c+d\,\text{Sec}[e+fx]}}{\sqrt{c+d}}\right],\frac{c+d}{c-d}\right]\sqrt{\frac{d\,(1-\text{Sec}[e+fx])}{c+d}}\sqrt{-\frac{d\,(1+\text{Sec}[e+fx])}{c-d}}}{a\,(c-d)\,f}-$$

$$\frac{2\sqrt{c+d}\,\text{Cot}[e+fx]\,\text{EllipticPi}\left[\frac{c+d}{c},\text{ArcSin}\left[\frac{\sqrt{c+d\,\text{Sec}[e+fx]}}{\sqrt{c+d}}\right],\frac{c+d}{c-d}\right]\sqrt{\frac{d\,(1-\text{Sec}[e+fx])}{c+d}}\sqrt{-\frac{d\,(1+\text{Sec}[e+fx])}{c-d}}}{a\,c\,f}-$$

$$\frac{\text{EllipticE}\left[\text{ArcSin}\left[\frac{\text{Tan}[e+fx]}{1+\text{Sec}[e+fx]}\right],\frac{c-d}{c+d}\right]\sqrt{\frac{1}{1+\text{Sec}[e+fx]}}\sqrt{c+d\,\text{Sec}[e+fx]}}{a\,(c-d)\,f\sqrt{\frac{c+d\,\text{Sec}[e+fx]}{(c+d)\,(1+\text{Sec}[e+fx])}}}$$

Result (type 8, 29 leaves):

$$\int\frac{1}{(a+a\,\text{Sec}[e+fx])\sqrt{c+d\,\text{Sec}[e+fx]}}\,dx$$

- **Problem 147: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[e+fx]}\,(c+d\,\text{Sec}[e+fx])^4\,dx$$

Optimal (type 3, 271 leaves, 5 steps):

$$\frac{2\,a\,d\,(2\,c+d)\left(2\,c^2+2\,c\,d+d^2\right)\text{Tan}[e+fx]}{f\sqrt{a+a\,\text{Sec}[e+fx]}}+\frac{2\,a^{3/2}\,c^4\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+fx]}}{\sqrt{a}}\right]\text{Tan}[e+fx]}{f\sqrt{a-a\,\text{Sec}[e+fx]}\sqrt{a+a\,\text{Sec}[e+fx]}}-$$

$$\frac{2\,d^2\left(6\,c^2+8\,c\,d+3\,d^2\right)(a-a\,\text{Sec}[e+fx])\,\text{Tan}[e+fx]}{3\,f\sqrt{a+a\,\text{Sec}[e+fx]}}+\frac{2\,d^3\,(4\,c+3\,d)\,(a-a\,\text{Sec}[e+fx])^2\,\text{Tan}[e+fx]}{5\,a\,f\sqrt{a+a\,\text{Sec}[e+fx]}}-\frac{2\,d^4\,(a-a\,\text{Sec}[e+fx])^3\,\text{Tan}[e+fx]}{7\,a^2\,f\sqrt{a+a\,\text{Sec}[e+fx]}}$$

Result (type 4, 589 leaves):

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^4}\,\text{Cos}[e+f\,x]^4\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,(c+d\,\text{Sec}[e+f\,x])^4\left(\frac{8}{105}\,d\,\left(105\,c^3+105\,c^2\,d+56\,c\,d^2+12\,d^3\right)\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{2}{7}\,d^4\,\text{Sec}[e+f\,x]^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{4}{35}\,\text{Sec}[e+f\,x]^2\left(14\,c\,d^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+3\,d^4\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)+\frac{4}{105}\,\text{Sec}[e+f\,x]\left(105\,c^2\,d^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+56\,c\,d^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+12\,d^4\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^4}\,8\left(-3-2\sqrt{2}\right)c^4\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Cos}[e+f\,x]^3\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,(c+d\,\text{Sec}[e+f\,x])^4\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 148: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])^3\,dx$$

Optimal (type 3, 205 leaves, 5 steps):

$$\frac{2\,a\,d\,\left(3\,c^2+3\,c\,d+d^2\right)\text{Tan}[e+f\,x]}{f\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^{3/2}\,c^3\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\text{Tan}[e+f\,x]}{f\sqrt{a-a\,\text{Sec}[e+f\,x]}\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{2\,d^2\,(3\,c+2\,d)\,(a-a\,\text{Sec}[e+f\,x])\,\text{Tan}[e+f\,x]}{3\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,d^3\,(a-a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{5\,a\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 519 leaves):

$$\frac{1}{f\,(d+c\,\mathrm{Cos}[e+f\,x])^3}\mathrm{Cos}[e+f\,x]^3\,\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,(c+d\,\mathrm{Sec}[e+f\,x])^3\left(\frac{2}{15}\,d\,\left(45\,c^2+30\,c\,d+8\,d^2\right)\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{2}{5}\,d^3\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{2}{15}\,\mathrm{Sec}[e+f\,x]\left(15\,c\,d^2\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+4\,d^3\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)-$$

$$\frac{1}{f\,(d+c\,\mathrm{Cos}[e+f\,x])^3}\,8\,\left(-3-2\,\sqrt{2}\right)c^3\,\mathrm{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\mathrm{Cos}[e+f\,x]^2$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\,\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]$$
$$\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,(c+d\,\mathrm{Sec}[e+f\,x])^3\sqrt{3-2\,\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 149: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}\,(c+d\,\mathrm{Sec}[e+f\,x])^2\,dx$$

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{2\,a\,d\,(2\,c+d)\,\mathrm{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}+\frac{2\,a^{3/2}\,c^2\,\mathrm{ArcTanh}\left[\frac{\sqrt{a-a\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a}}\right]\mathrm{Tan}[e+f\,x]}{f\,\sqrt{a-a\,\mathrm{Sec}[e+f\,x]}\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}-\frac{2\,d^2\,(a-a\,\mathrm{Sec}[e+f\,x])\,\mathrm{Tan}[e+f\,x]}{3\,f\,\sqrt{a+a\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 4, 463 leaves):

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^2}\text{Cos}[e+f\,x]^2\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,(c+d\,\text{Sec}[e+f\,x])^2\left(\frac{4}{3}d\,(3\,c+d)\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+\frac{2}{3}d^2\,\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^2}8\left(-3-2\sqrt{2}\right)c^2\,\text{Cos}\left[\frac{1}{4}(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\text{Cos}[e+f\,x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]$$

$$\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,(c+d\,\text{Sec}[e+f\,x])^2\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]^2}$$

- **Problem 150: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])\,dx$$

Optimal (type 3, 66 leaves, 4 steps) :

$$\frac{2\sqrt{a}\,c\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{f}+\frac{2\,a\,d\,\text{Tan}[e+f\,x]}{f\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 407 leaves) :

$$-\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])}\,8\,\left(-3-2\sqrt{2}\right)\,c\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]$$

$$\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\left(c+d\,\text{Sec}[e+f\,x]\right)\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}+$$

$$\frac{2\,d\,\text{Cos}[e+f\,x]\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\left(c+d\,\text{Sec}[e+f\,x]\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{f\,(d+c\,\text{Cos}[e+f\,x])}$$

- **Problem 154: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^3\,dx$$

Optimal (type 3, 241 leaves, 6 steps):

$$\frac{2\,a^{5/2}\,c^3\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\text{Tan}[e+f\,x]}{f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^2\,(6\,c+13\,d)\,(c+d\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{35\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+$$

$$\frac{2\,a^2\,(c+d\,\text{Sec}[e+f\,x])^3\,\text{Tan}[e+f\,x]}{7\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^2\,\left(2\,\left(36\,c^3+243\,c^2\,d+189\,c\,d^2+52\,d^3\right)+d\,\left(24\,c^2+111\,c\,d+52\,d^2\right)\text{Sec}[e+f\,x]\right)\text{Tan}[e+f\,x]}{105\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 590 leaves):

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^3}\text{Cos}[e+f\,x]^4\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^3\left(\frac{1}{105}\,\left(105\,c^3+525\,c^2\,d+378\,c\,d^2+104\,d^3\right)\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{7}\,d^3\,\text{Sec}[e+f\,x]^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{35}\,\text{Sec}[e+f\,x]^2\,\left(21\,c\,d^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+13\,d^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)+\frac{1}{105}\,\text{Sec}[e+f\,x]\,\left(105\,c^2\,d\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+189\,c\,d^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+52\,d^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^3}4\,\left(-3-2\,\sqrt{2}\right)\,c^3\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Cos}[e+f\,x]^3\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^3\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 155: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^2\,dx$$

Optimal (type 3, 176 leaves, 5 steps):

$$\frac{2\,a^{5/2}\,c^2\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\,\text{Tan}[e+f\,x]}{f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^2\,(c+d\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{5\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^2\,\left(2\,\left(6\,c^2+25\,c\,d+9\,d^2\right)+d\,(4\,c+9\,d)\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{15\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 520 leaves):

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^2}\text{Cos}[e+f\,x]^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^2\,\left(\frac{1}{15}\,\left(15\,c^2+50\,c\,d+18\,d^2\right)\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{5}\,d^2\,\text{Sec}[e+f\,x]^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{15}\,\text{Sec}[e+f\,x]\,\left(10\,c\,d\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+9\,d^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^2}\,4\,\left(-3-2\,\sqrt{2}\right)\,c^2\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Cos}[e+f\,x]^2\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^2\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 156: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c+d\,\text{Sec}[e+f\,x])\,dx$$

Optimal (type 3, 105 leaves, 5 steps) :

$$\frac{2\,a^{3/2}\,c\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{f}+\frac{2\,a^2\,(3\,c+4\,d)\,\text{Tan}[e+f\,x]}{3\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a\,d\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\text{Tan}[e+f\,x]}{3\,f}$$

Result (type 4, 460 leaves) :

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])}\text{Cos}[e+f\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])\,\left(\frac{1}{3}\,(3\,c+5\,d)\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{3}\,d\,\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])}\,4\,\left(-3-2\,\sqrt{2}\right)\,c\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Cos}[e+f\,x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^3$$

$$(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 160: Result unnecessarily involves higher level functions.**

$$\int(a+a\,\text{Sec}[e+f\,x])^{5/2}\,(c+d\,\text{Sec}[e+f\,x])^3\,dx$$

Optimal (type 3, 336 leaves, 5 steps) :

$$\frac{2\,a^3\,\left(3\,c^3+12\,c^2\,d+12\,c\,d^2+4\,d^3\right)\,\text{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^{7/2}\,c^3\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\,\text{Tan}[e+f\,x]}{f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+$$

$$\frac{2\,a\,d\,\left(3\,c^2+15\,c\,d+13\,d^2\right)\,(a-a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{5\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{6\,d^2\,(c+2\,d)\,(a-a\,\text{Sec}[e+f\,x])^3\,\text{Tan}[e+f\,x]}{7\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+$$

$$\frac{2\,d^3\,(a-a\,\text{Sec}[e+f\,x])^4\,\text{Tan}[e+f\,x]}{9\,a\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{2\,\left(c^3+12\,c^2\,d+24\,c\,d^2+12\,d^3\right)\,\left(a^3-a^3\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{3\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 665 leaves) :

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^3}\text{Cos}[e+f\,x]^5\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^5(a\,(1+\text{Sec}[e+f\,x]))^{5/2}(c+d\,\text{Sec}[e+f\,x])^3\left(\frac{1}{630}\left(840\,c^3+2709\,c^2\,d+2070\,c\,d^2+584\,d^3\right)\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+\frac{1}{18}d^3\,\text{Sec}[e+f\,x]^4\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+\frac{1}{126}\text{Sec}[e+f\,x]^3\left(27\,c\,d^2\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+26\,d^3\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)+\frac{1}{210}\text{Sec}[e+f\,x]^2\left(63\,c^2\,d\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+180\,c\,d^2\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+73\,d^3\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)+\frac{1}{630}\text{Sec}[e+f\,x]\left(105\,c^3\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+882\,c^2\,d\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+1035\,c\,d^2\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+292\,d^3\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^3}2\left(-3-2\sqrt{2}\right)c^3\,\text{Cos}\left[\frac{1}{4}(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\text{Cos}[e+f\,x]^4\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^5\;(a\,(1+\text{Sec}[e+f\,x]))^{5/2}(c+d\,\text{Sec}[e+f\,x])^3\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(e+f\,x)\right]^2}$$

- **Problem 161: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[e+f\,x])^{5/2}(c+d\,\text{Sec}[e+f\,x])^2\,dx$$

Optimal (type 3, 258 leaves, 5 steps):

$$\frac{2\,a^3\,(c+2\,d)\,(3\,c+2\,d)\,\text{Tan}[e+f\,x]}{f\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^{7/2}\,c^2\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\text{Tan}[e+f\,x]}{f\sqrt{a-a\,\text{Sec}[e+f\,x]}\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a\,d\,(2\,c+5\,d)\,(a-a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{5\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{2\,d^2\,(a-a\,\text{Sec}[e+f\,x])^3\,\text{Tan}[e+f\,x]}{7\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{2\left(c^2+8\,c\,d+8\,d^2\right)\left(a^3-a^3\,\text{Sec}[e+f\,x]\right)\text{Tan}[e+f\,x]}{3\,f\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 577 leaves):

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^2}\,\text{Cos}[e+f\,x]^4\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,(c+d\,\text{Sec}[e+f\,x])^2\left(\frac{1}{105}\left(140\,c^2+301\,c\,d+115\,d^2\right)\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{14}\,d^2\,\text{Sec}[e+f\,x]^3\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{35}\,\text{Sec}[e+f\,x]^2\left(7\,c\,d\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+10\,d^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)+\frac{1}{210}\,\text{Sec}[e+f\,x]\left(35\,c^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+196\,c\,d\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+115\,d^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)-$$

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])^2}\,2\left(-3-2\sqrt{2}\right)c^2\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Cos}[e+f\,x]^3$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5$$

$$(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,(c+d\,\text{Sec}[e+f\,x])^2\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 162: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[e+f\,x])^{5/2}\,(c+d\,\text{Sec}[e+f\,x])\,dx$$

Optimal (type 3, 142 leaves, 6 steps):

$$\frac{2\,a^{5/2}\,c\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{f}+\frac{2\,a^3\,(35\,c+32\,d)\,\text{Tan}[e+f\,x]}{15\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,a^2\,(5\,c+8\,d)\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\text{Tan}[e+f\,x]}{15\,f}+\frac{2\,a\,d\,(a+a\,\text{Sec}[e+f\,x])^{3/2}\,\text{Tan}[e+f\,x]}{5\,f}$$

Result (type 4, 501 leaves):

$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])}\text{Cos}[e+f\,x]^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,(c+d\,\text{Sec}[e+f\,x])$$
$$\left(\frac{1}{30}\,(40\,c+43\,d)\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{10}\,d\,\text{Sec}[e+f\,x]^2\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{30}\,\text{Sec}[e+f\,x]\left(5\,c\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+14\,d\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)-$$
$$\frac{1}{f\,(d+c\,\text{Cos}[e+f\,x])}\,2\left(-3-2\sqrt{2}\right)c\,\text{Cos}\left[\frac{1}{4}\,(e+f\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Cos}[e+f\,x]^2$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(e+f\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^5$$
$$(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,(c+d\,\text{Sec}[e+f\,x])\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(e+f\,x)\right]^2}$$

- **Problem 170: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 416 leaves, 12 steps):

$$\frac{2\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\text{Tan}[e+f\,x]}{c^2\,f\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-$$
$$\frac{\sqrt{2}\,\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{2}\,\sqrt{a}}\right]\text{Tan}[e+f\,x]}{(c-d)^2\,f\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{\sqrt{a}\,d^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\text{Tan}[e+f\,x]}{c\,(c-d)\,(c+d)^{3/2}\,f\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+$$
$$\frac{2\sqrt{a}\,(2\,c-d)\,d^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\text{Tan}[e+f\,x]}{c^2\,(c-d)^2\sqrt{c+d}\,f\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{d^2\,\text{Tan}[e+f\,x]}{c\left(c^2-d^2\right)f\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])}$$

Result (type 3, 2477 leaves):

$$\frac{\text{Cos}\left[\frac{1}{2}(e+fx)\right](d+c\,\text{Cos}[e+fx])^2\,\text{Sec}[e+fx]^3\left(-\frac{2d^2\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]}{c^2(-c+d)(c+d)}+\frac{2d^3\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]}{c^2(-c+d)(c+d)(d+c\,\text{Cos}[e+fx])}\right)}{f\sqrt{a(1+\text{Sec}[e+fx])}\,(c+d\,\text{Sec}[e+fx])^2}-$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right](d+c\,\text{Cos}[e+fx])^2\left(\frac{2\sqrt{2}\,d^{3/2}\left(5c^2+cd-2d^2\right)\text{ArcTan}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{-c-d}\sqrt{-\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]}{\sqrt{-c-d}\,(c-d)}-\right.\right.$$

$$\sqrt{2}\left(c^2-d^2\right)\text{Log}\left[\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(-1+2\,\text{Cos}[e+fx]-2\sqrt{-\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}\,\text{Sin}[e+fx]\right)\right]+$$

$$\sqrt{2}\left(c^2-d^2\right)\text{Log}\left[\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(-1+2\,\text{Cos}[e+fx]+2\sqrt{-\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}\,\text{Sin}[e+fx]\right)\right]+$$

$$\left.\frac{4c^2(c+d)\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\sqrt{-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}\right]}{c-d}\right)$$

$$\left(\frac{d\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{(-c+d)(c+d)(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}+\frac{d^2\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{2c(-c+d)(c+d)(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}-\right.$$

$$\frac{c\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{2(-c+d)(c+d)(d+c\,\text{Cos}[e+fx])}-\frac{c\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{2(-c+d)(c+d)(d+c\,\text{Cos}[e+fx])}+$$

$$\left.\left.\frac{d^2\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{2c(-c+d)(c+d)(d+c\,\text{Cos}[e+fx])}\right)\text{Sec}[e+fx]^{5/2}\sqrt{\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]}\sqrt{-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}\right)\Big/$$

$$\left(2\,c^2\,(c-d)\,(c+d)\,f\,\sqrt{a\,(1+\mathrm{Sec}[e+f\,x])}\,(c+d\,\mathrm{Sec}[e+f\,x])^2\right)\left(-\frac{1}{4\,c^2\,(c-d)\,(c+d)\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}}\right.$$

$$\left(\frac{2\,\sqrt{2}\,d^{3/2}\,\left(5\,c^2+c\,d-2\,d^2\right)\,\mathrm{ArcTan}\left[\frac{\sqrt{d}\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{-c-d}\,\sqrt{-\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}}\right]}{\sqrt{-c-d}\,(c-d)}-\sqrt{2}\,\left(c^2-d^2\right)\,\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\left(-1+2\,\mathrm{Cos}[e+f\,x]-2\,\sqrt{-\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}\right.\right.\right.$$

$$\left.\left.\mathrm{Sin}[e+f\,x]\right)\right]+\sqrt{2}\,\left(c^2-d^2\right)\,\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\left(-1+2\,\mathrm{Cos}[e+f\,x]+2\,\sqrt{-\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}\,\mathrm{Sin}[e+f\,x]\right)\right]+$$

$$\left.\frac{4\,c^2\,(c+d)\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\right]}{c-d}\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\mathrm{Sec}[e+f\,x]}\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-$$

$$\frac{1}{2\,c^2\,(c-d)\,(c+d)}\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\mathrm{Sec}[e+f\,x]}\,\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\,\left(-\left(\sqrt{2}\,\left(c^2-d^2\right)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right.\right.$$

$$\left(\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\left(-2\,\mathrm{Cos}[e+f\,x]\,\sqrt{-\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}-2\,\mathrm{Sin}[e+f\,x]-\frac{\mathrm{Sin}[e+f\,x]\,\left(-\frac{\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]}{(1+\mathrm{Cos}[e+f\,x])^2}+\frac{\mathrm{Sin}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}\right)}{\sqrt{-\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}}\right)+\right.$$

$$\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2\,\mathrm{Cos}[e+f x]-2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg/$$

$$\left(-1+2\,\mathrm{Cos}[e+f x]-2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)+\Bigg(\sqrt{2}\left(c^2-d^2\right)\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\Bigg(\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Bigg(2\,\mathrm{Cos}[e+f x]$$

$$\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}-2\,\mathrm{Sin}[e+f x]+\frac{\mathrm{Sin}[e+f x]\left(-\frac{\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]}{(1+\mathrm{Cos}[e+f x])^2}+\frac{\mathrm{Sin}[e+f x]}{1+\mathrm{Cos}[e+f x]}\right)}{\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}}\Bigg)+\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Bigg(-1+2\,\mathrm{Cos}[e+$$

$$f x]+2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg/\left(-1+2\,\mathrm{Cos}[e+f x]+2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)+$$

$$\Bigg(2\sqrt{2}\,d^{3/2}\left(5c^2+c\,d-2d^2\right)\Bigg(\frac{\sqrt{d}\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{-c-d}\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}}-\frac{\sqrt{d}\left(-\frac{\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]}{(1+\mathrm{Cos}[e+f x])^2}+\frac{\mathrm{Sin}[e+f x]}{1+\mathrm{Cos}[e+f x]}\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\sqrt{-c-d}\left(-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}\right)^{3/2}}\Bigg)\Bigg)\Bigg/\Bigg(\sqrt{-c-d}$$

$$(c-d)\left(1-\frac{d\,(1+\mathrm{Cos}[e+f x])\,\mathrm{Sec}[e+f x]\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{-c-d}\right)\Bigg)+\frac{4c^2(c+d)\left(\frac{1}{2}\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2+\frac{\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\right)}{(c-d)\left(\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)}\Bigg)-$$

$$\frac{1}{4\,c^2\,(c-d)\,(c+d)\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]}}\left(\frac{2\,\sqrt{2}\,d^{3/2}\,\left(5\,c^2+c\,d-2\,d^2\right)\,\text{ArcTan}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{-c-d}\,\sqrt{-\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}}\right]}{\sqrt{-c-d}\,(c-d)}-\right.$$

$$\sqrt{2}\,\left(c^2-d^2\right)\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\left(-1+2\,\text{Cos}[e+f\,x]-2\,\sqrt{-\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}\,\text{Sin}[e+f\,x]\right)\right]+$$

$$\sqrt{2}\,\left(c^2-d^2\right)\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\left(-1+2\,\text{Cos}[e+f\,x]+2\,\sqrt{-\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}\,\text{Sin}[e+f\,x]\right)\right]+$$

$$\left.\frac{4\,c^2\,(c+d)\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+\sqrt{-1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\right]}{c-d}\right)\sqrt{-1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}$$

$$\left.\left.\left(-\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]\right)\right)\right)$$

- **Problem 171: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\left(c+d\,\text{Sec}[e+f\,x]\right)^3}\,dx$$

Optimal (type 3, 653 leaves, 16 steps):

$$\frac{2\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}}\right]\text{Tan}[e+f x]}{c^3 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{\sqrt{2}\,\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{2}\,\sqrt{a}}\right]\text{Tan}[e+f x]}{(c-d)^3 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+$$

$$\frac{3\sqrt{a}\,d^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\text{Tan}[e+f x]}{4 c (c-d) (c+d)^{5/2} f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+\frac{\sqrt{a}\,(2 c-d)\,d^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\text{Tan}[e+f x]}{c^2 (c-d)^2 (c+d)^{3/2} f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+$$

$$\frac{2\sqrt{a}\,d^{3/2}\left(3 c^2-3 c d+d^2\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\text{Tan}[e+f x]}{c^3 (c-d)^3\sqrt{c+d}\,f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+\frac{d^2\,\text{Tan}[e+f x]}{2 c\left(c^2-d^2\right) f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c+d\,\text{Sec}[e+f x])^2}+$$

$$\frac{3 d^2\,\text{Tan}[e+f x]}{4 c (c-d) (c+d)^2 f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c+d\,\text{Sec}[e+f x])}+\frac{(2 c-d)\,d^2\,\text{Tan}[e+f x]}{c^2 (c-d)^2 (c+d) f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c+d\,\text{Sec}[e+f x])}$$

Result (type 3, 2940 leaves) :

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right](d+c\,\text{Cos}[e+f x])^3\,\text{Sec}[e+f x]^4\left(-\frac{d^2\left(-13 c^2-c d+6 d^2\right)\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{2 c^3(-c+d)^2(c+d)^2}-\frac{d^4\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{c^3(-c+d)(c+d)(d+c\,\text{Cos}[e+f x])^2}+\right.\right.$$

$$\left.\left.\frac{-15 c^2 d^3\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]-c d^4\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+8 d^5\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{2 c^3(-c+d)^2(c+d)^2(d+c\,\text{Cos}[e+f x])}\right)\right)\Big/\left(f\sqrt{a(1+\text{Sec}[e+f x])}\,(c+d\,\text{Sec}[e+f x])^3\right)-$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right](d+c\,\text{Cos}[e+f x])^3\left(\frac{\sqrt{2}\,d^{3/2}\left(35 c^4+14 c^3 d-21 c^2 d^2-4 c d^3+8 d^4\right)\text{ArcTan}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\,\sqrt{-\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}\,(c-d)}-\right.\right.$$

$$2\sqrt{2}\left(c^2-d^2\right)^2\text{Log}\left[\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2\,\text{Cos}[e+f x]-2\sqrt{-\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{Sin}[e+f x]\right)\right]+$$

$$2\sqrt{2}\left(c^2-d^2\right)^2\text{Log}\left[\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2\,\text{Cos}[e+f x]+2\sqrt{-\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{Sin}[e+f x]\right)\right]+$$

$$\left.\frac{8 c^3 (c+d)^2\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\sqrt{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right]}{c-d}\right)\left(-\frac{2 c d\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{(-c+d)^2(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-\right.$$

$$\frac{13\, d^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{8(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])\sqrt{\operatorname{Sec}[e+f x]}}+\frac{d^3 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{8 c(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])\sqrt{\operatorname{Sec}[e+f x]}}+$$

$$\frac{d^4 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{2 c^2(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])\sqrt{\operatorname{Sec}[e+f x]}}+\frac{c^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{2(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])}+$$

$$\frac{3\, d^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{8(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])}+\frac{d^3 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{8 c(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])}+\frac{c^2 \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{2(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])}-$$

$$\left.\frac{d^2 \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])}+\frac{d^4 \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{2 c^2(-c+d)^2(c+d)^2(d+c\operatorname{Cos}[e+f x])}\right) \operatorname{Sec}[e+f x]^{7/2}$$

$$\left.\sqrt{\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sec}[e+f x]}\ \sqrt{-1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right) \Big/ \left(4 c^3(c-d)^2(c+d)^2 f \sqrt{a(1+\operatorname{Sec}[e+f x])}\ (c+d \operatorname{Sec}[e+f x])^3\right.$$

$$\left(-\frac{1}{8 c^3(c-d)^2(c+d)^2\sqrt{-1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\left(\frac{\sqrt{2}\, d^{3/2}\left(35 c^4+14 c^3 d-21 c^2 d^2-4 c d^3+8 d^4\right) \operatorname{ArcTan}\left[\frac{\sqrt{d} \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}\,(c-d)}-\right.\right.$$

$$2\sqrt{2}\left(c^2-d^2\right)^2 \operatorname{Log}\left[\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2 \operatorname{Cos}[e+f x]-2\sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}\ \operatorname{Sin}[e+f x]\right)\right]+$$

$$2\sqrt{2}\left(c^2-d^2\right)^2 \operatorname{Log}\left[\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2 \operatorname{Cos}[e+f x]+2\sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}\ \operatorname{Sin}[e+f x]\right)\right]+$$

$$\left.\frac{8 c^3 (c+d)^2 \operatorname{Log}\left[\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]+\sqrt{-1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right]}{c-d}\right) \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \sqrt{\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sec}[e+f x]} \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]-$$

$$\frac{1}{4 c^3 (c-d)^2 (c+d)^2} \sqrt{\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sec}[e+f x]} \sqrt{-1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2} \left(-\left(2 \sqrt{2} \left(c^2-d^2\right)^2 \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right.\right.$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \left(-2 \operatorname{Cos}[e+f x] \sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}-2 \operatorname{Sin}[e+f x]-\frac{\operatorname{Sin}[e+f x] \left(-\frac{\operatorname{Cos}[e+f x] \operatorname{Sin}[e+f x]}{(1+\operatorname{Cos}[e+f x])^2}+\frac{\operatorname{Sin}[e+f x]}{1+\operatorname{Cos}[e+f x]}\right)}{\sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right)+\right.$$

$$\left.\left.\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \left(-1+2 \operatorname{Cos}[e+f x]-2 \sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}} \operatorname{Sin}[e+f x]\right) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right) \Big/$$

$$\left(-1+2 \operatorname{Cos}[e+f x]-2 \sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}} \operatorname{Sin}[e+f x]\right)+\left(2 \sqrt{2} \left(c^2-d^2\right)^2 \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right.$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \left(2 \operatorname{Cos}[e+f x] \sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}-2 \operatorname{Sin}[e+f x]+\frac{\operatorname{Sin}[e+f x] \left(-\frac{\operatorname{Cos}[e+f x] \operatorname{Sin}[e+f x]}{(1+\operatorname{Cos}[e+f x])^2}+\frac{\operatorname{Sin}[e+f x]}{1+\operatorname{Cos}[e+f x]}\right)}{\sqrt{-\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right)+\right.$$

$$\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \left(-1+2\,\mathrm{Cos}[e+f x]+2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg/$$

$$\left(-1+2\,\mathrm{Cos}[e+f x]+2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)+\Bigg(\sqrt{2}\,d^{3/2}\left(35 c^4+14 c^3 d-21 c^2 d^2-4 c d^3+8 d^4\right)$$

$$\left(\frac{\sqrt{d}\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{-c-d}\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}}-\frac{\sqrt{d}\left(-\frac{\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]}{(1+\mathrm{Cos}[e+f x])^2}+\frac{\mathrm{Sin}[e+f x]}{1+\mathrm{Cos}[e+f x]}\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\sqrt{-c-d}\left(-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}\right)^{3/2}}\right)\Bigg)\Bigg/\left(\sqrt{-c-d}\,(c-d)\right.$$

$$\left.\left(1-\frac{d\,(1+\mathrm{Cos}[e+f x])\,\mathrm{Sec}[e+f x]\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{-c-d}\right)\right)+\frac{8 c^3 (c+d)^2\left(\frac{1}{2}\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2+\frac{\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\right)}{(c-d)\left(\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\sqrt{-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)}\Bigg)-$$

$$\frac{1}{8 c^3 (c-d)^2 (c+d)^2\sqrt{\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Sec}[e+f x]}}\left(\frac{\sqrt{2}\,d^{3/2}\left(35 c^4+14 c^3 d-21 c^2 d^2-4 c d^3+8 d^4\right)\mathrm{ArcTan}\left[\frac{\sqrt{d}\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}\,(c-d)}-\right.$$

$$2\sqrt{2}\left(c^2-d^2\right)^2\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2\,\mathrm{Cos}[e+f x]-2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)\right]+$$

$$2\sqrt{2}\left(c^2-d^2\right)^2\mathrm{Log}\left[\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-1+2\,\mathrm{Cos}[e+f x]+2\sqrt{-\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\,\mathrm{Sin}[e+f x]\right)\right]+$$

$$\left.\frac{8 c^3 (c+d)^2 \text{Log}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\sqrt{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right]}{c-d}\right)\sqrt{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\left.\left.\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\right)\right)$$

Problem 175: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+a\,\text{Sec}[e+f x])^{3/2}(c+d\,\text{Sec}[e+f x])}\,dx$$

Optimal (type 3, 394 leaves, 12 steps):

$$-\frac{\text{Tan}[e+f x]}{2 a (c-d) f (1+\text{Sec}[e+f x])\sqrt{a+a\,\text{Sec}[e+f x]}}+\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}}\right]\text{Tan}[e+f x]}{\sqrt{a}\,c f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{\sqrt{2}\,(c-2 d)\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{2}\sqrt{a}}\right]\text{Tan}[e+f x]}{\sqrt{a}\,(c-d)^2 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{2}\sqrt{a}}\right]\text{Tan}[e+f x]}{2\sqrt{2}\sqrt{a}\,(c-d) f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{2 d^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}\sqrt{c+d}}\right]\text{Tan}[e+f x]}{\sqrt{a}\,c\,(c-d)^2\sqrt{c+d}\,f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}$$

Result (type 3, 1574 leaves):

$$\frac{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^3 (d+c\,\text{Cos}[e+f x])\,\text{Sec}[e+f x]^3\left(\frac{2\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{-c+d}-\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{-c+d}\right)}{f\,(a\,(1+\text{Sec}[e+f x]))^{3/2}(c+d\,\text{Sec}[e+f x])}+$$

$$\left(\left(\sqrt{-c-d}\left(-c\,(5 c-9 d)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right]+4\sqrt{2}\,(c-d)^2\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)+4\sqrt{2}\,d^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)\right.$$

$$\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]^3 \sqrt{\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\ (d+c\,\mathrm{Cos}[e+f x])$$

$$\left(\frac{c\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]}{2(-c+d)(d+c\,\mathrm{Cos}[e+f x])\sqrt{\mathrm{Sec}[e+f x]}} - \frac{2 d\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]}{(-c+d)(d+c\,\mathrm{Cos}[e+f x])\sqrt{\mathrm{Sec}[e+f x]}} - \frac{c\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\mathrm{Sec}[e+f x]}}{(-c+d)(d+c\,\mathrm{Cos}[e+f x])} + \frac{3 d\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\mathrm{Sec}[e+f x]}}{2(-c+d)(d+c\,\mathrm{Cos}[e+f x])} - \frac{c\,\mathrm{Cos}[2(e+f x)]\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\mathrm{Sec}[e+f x]}}{(-c+d)(d+c\,\mathrm{Cos}[e+f x])} + \frac{d\,\mathrm{Cos}[2(e+f x)]\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\mathrm{Sec}[e+f x]}}{(-c+d)(d+c\,\mathrm{Cos}[e+f x])}\right)$$

$$\left.\mathrm{Sec}[e+f x]^{5/2}\sqrt{1+\mathrm{Sec}[e+f x]}\right) \Big/ \left(c\sqrt{-c-d}\ (c-d)^2 f\,(a(1+\mathrm{Sec}[e+f x]))^{3/2}(c+d\,\mathrm{Sec}[e+f x])\right.$$

$$\left(\left(\left(\sqrt{-c-d}\left(-c(5c-9d)\,\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right] + 4\sqrt{2}\,(c-d)^2\,\mathrm{ArcTan}\left[\frac{\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}}\right]\right) + \right.\right.\right.$$

$$\left.4\sqrt{2}\,d^{5/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{d}\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}}\right]\right)\sqrt{1+\mathrm{Sec}[e+f x]}\left(\frac{\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]}{(1+\mathrm{Cos}[e+f x])^2} - \frac{\mathrm{Sin}[e+f x]}{1+\mathrm{Cos}[e+f x]}\right)\Bigg) \Big/$$

$$\left(2c\sqrt{-c-d}\ (c-d)^2\sqrt{\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\right) + \frac{1}{c\sqrt{-c-d}\ (c-d)^2}\sqrt{\frac{\mathrm{Cos}[e+f x]}{1+\mathrm{Cos}[e+f x]}}\ \sqrt{1+\mathrm{Sec}[e+f x]}$$

$$\left(\frac{4\sqrt{2}\,d^{5/2}\left(\frac{\sqrt{d}\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{-c-d}\,\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}-\frac{\sqrt{d}\left(\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\sqrt{-c-d}\left(\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}\right)^{3/2}}\right)}{1-\frac{d\,(1+\text{Cos}[e+f x])\,\text{Sec}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{-c-d}}+\right.$$

$$\left.\sqrt{-c-d}\left(-\frac{c\,(5c-9d)\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}+\frac{4\sqrt{2}\,(c-d)^2\left(\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}-\frac{\left(\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\left(\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}\right)^{3/2}}\right)}{1+(1+\text{Cos}[e+f x])\,\text{Sec}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)\right)\right)+$$

$$\left(\left(\sqrt{-c-d}\left(-c\,(5c-9d)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right]+4\sqrt{2}\,(c-d)^2\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)+4\sqrt{2}\,d^{5/2}\right.\right.$$

$$\left.\left.\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\,\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Big/\left(2c\sqrt{-c-d}\,(c-d)^2\sqrt{1+\text{Sec}[e+f x]}\right)\right)\right)$$

Problem 176: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{(a+a\,\text{Sec}[e+f x])^{3/2}\,(c+d\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 560 leaves, 15 steps) :

$$-\frac{\operatorname{Tan}[e+f x]}{2 a (c-d)^2 f (1+\operatorname{Sec}[e+f x]) \sqrt{a+a \operatorname{Sec}[e+f x]}}+\frac{2 \operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{a}}\right] \operatorname{Tan}[e+f x]}{\sqrt{a}\, c^2 f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{\sqrt{2} (c-3 d) \operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \operatorname{Tan}[e+f x]}{\sqrt{a} (c-d)^3 f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{\operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \operatorname{Tan}[e+f x]}{2 \sqrt{2} \sqrt{a} (c-d)^2 f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{d^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{d} \sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{a} \sqrt{c+d}}\right] \operatorname{Tan}[e+f x]}{\sqrt{a}\, c (c-d)^2 (c+d)^{3/2} f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{2 (3 c-d) d^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{d} \sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{a} \sqrt{c+d}}\right] \operatorname{Tan}[e+f x]}{\sqrt{a}\, c^2 (c-d)^3 \sqrt{c+d}\, f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{d^3 \operatorname{Tan}[e+f x]}{a c (c-d)^2 (c+d) f \sqrt{a+a \operatorname{Sec}[e+f x]} (c+d \operatorname{Sec}[e+f x])}$$

Result (type 3, 2118 leaves) :

$$\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^3 (d+c \operatorname{Cos}[e+f x])^2 \operatorname{Sec}[e+f x]^4 \left(-\frac{2 \left(c^3+c^2 d+2 d^3\right) \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]}{c^2 (-c+d)^2 (c+d)}+\frac{4 d^4 \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]}{c^2 (-c+d)^2 (c+d) (d+c \operatorname{Cos}[e+f x])}+\frac{\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right] \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{(-c+d)^2}\right)\right) \Big/ \left(f (a (1+\operatorname{Sec}[e+f x]))^{3/2} (c+d \operatorname{Sec}[e+f x])^2\right)+$$

$$\left(\left((-c-d)^{3/2}\left(-c^2 (5 c-13 d) \operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right]+4 \sqrt{2} (c-d)^3 \operatorname{ArcTan}\left[\frac{\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right]\right)+\right.\right.$$

$$\left.2 \sqrt{2}\, d^{5/2} \left(-7 c^2-3 c d+2 d^2\right) \operatorname{ArcTanh}\left[\frac{\sqrt{d} \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d} \sqrt{\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right]\right) \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^3 (d+c \operatorname{Cos}[e+f x])^2 \sqrt{\operatorname{Cos}[e+f x] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\left(-\frac{c^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{2 (-c+d)^2 (c+d) (d+c \operatorname{Cos}[e+f x]) \sqrt{\operatorname{Sec}[e+f x]}}+\frac{3 c d \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{2 (-c+d)^2 (c+d) (d+c \operatorname{Cos}[e+f x]) \sqrt{\operatorname{Sec}[e+f x]}}+\right.$$

$$\frac{4 d^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{(-c+d)^2 (c+d) (d+c \operatorname{Cos}[e+f x]) \sqrt{\operatorname{Sec}[e+f x]}}+\frac{d^3 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]}{c (-c+d)^2 (c+d) (d+c \operatorname{Cos}[e+f x]) \sqrt{\operatorname{Sec}[e+f x]}}+$$

$$\frac{c^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}-\frac{3 c d \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{2(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}-\frac{3 d^2 \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{2(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}+$$

$$\frac{c^2 \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}-\frac{c d \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}-$$

$$\left.\frac{d^2 \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}+\frac{d^3 \operatorname{Cos}[2(e+f x)] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\operatorname{Sec}[e+f x]}}{c(-c+d)^2 (c+d)(d+c \operatorname{Cos}[e+f x])}\right)$$

$$\left.\operatorname{Sec}[e+f x]^{7/2}\sqrt{\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sec}[e+f x]}\right)\Big/\left(c^2 (-c-d)^{3/2} (c-d)^3 f (a(1+\operatorname{Sec}[e+f x]))^{3/2} (c+d \operatorname{Sec}[e+f x])^2\right.$$

$$\left(\frac{1}{2 c^2 (-c-d)^{3/2} (c-d)^3}\left((-c-d)^{3/2}\left(-c^2 (5 c-13 d) \operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right]+4\sqrt{2}(c-d)^3 \operatorname{ArcTan}\left[\frac{\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right]\right)+\right.\right.$$

$$\left.2\sqrt{2}\, d^{5/2}\left(-7 c^2-3 c d+2 d^2\right) \operatorname{ArcTanh}\left[\frac{\sqrt{d}\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right]\right)\sqrt{\operatorname{Cos}[e+f x] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sec}[e+f x]\right)^{3/2}\left(-\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sin}[e+f x]+\operatorname{Cos}[e+f x] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$\frac{1}{c^2 (-c-d)^{3/2} (c-d)^3}\sqrt{\operatorname{Cos}[e+f x] \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\sqrt{\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Sec}[e+f x]}$$

$$\left(\left(2\sqrt{2}\,d^{5/2}\left(-7c^2-3cd+2d^2\right)\left(\frac{\sqrt{d}\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{-c-d}\,\sqrt{\frac{\mathrm{Cos}[e+fx]}{1+\mathrm{Cos}[e+fx]}}}-\frac{\sqrt{d}\left(\frac{\mathrm{Cos}[e+fx]\,\mathrm{Sin}[e+fx]}{(1+\mathrm{Cos}[e+fx])^2}-\frac{\mathrm{Sin}[e+fx]}{1+\mathrm{Cos}[e+fx]}\right)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]}{2\sqrt{-c-d}\left(\frac{\mathrm{Cos}[e+fx]}{1+\mathrm{Cos}[e+fx]}\right)^{3/2}}\right)\right)\Big/\right.$$

$$\left.\left(1-\frac{d\,(1+\mathrm{Cos}[e+fx])\,\mathrm{Sec}[e+fx]\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{-c-d}\right)\right)+$$

$$(-c-d)^{3/2}\left(-\frac{c^2\,(5c-13d)\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2}}+\frac{4\sqrt{2}\,(c-d)^3\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{\frac{\mathrm{Cos}[e+fx]}{1+\mathrm{Cos}[e+fx]}}}-\frac{\left(\frac{\mathrm{Cos}[e+fx]\,\mathrm{Sin}[e+fx]}{(1+\mathrm{Cos}[e+fx])^2}-\frac{\mathrm{Sin}[e+fx]}{1+\mathrm{Cos}[e+fx]}\right)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]}{2\left(\frac{\mathrm{Cos}[e+fx]}{1+\mathrm{Cos}[e+fx]}\right)^{3/2}}\right)}{1+(1+\mathrm{Cos}[e+fx])\,\mathrm{Sec}[e+fx]\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2}\right)\Bigg)\Bigg)+$$

$$\frac{1}{2c^2\,(-c-d)^{3/2}\,(c-d)^3\sqrt{\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Sec}[e+fx]}}\left((-c-d)^{3/2}\left(-c^2\,(5c-13d)\,\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]\right]+\right.\right.$$

$$\left.4\sqrt{2}\,(c-d)^3\,\mathrm{ArcTan}\left[\frac{\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\frac{\mathrm{Cos}[e+fx]}{1+\mathrm{Cos}[e+fx]}}}\right]\right)+2\sqrt{2}\,d^{5/2}\left(-7c^2-3cd+2d^2\right)\mathrm{ArcTanh}\left[\frac{\sqrt{d}\,\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{-c-d}\,\sqrt{\frac{\mathrm{Cos}[e+fx]}{1+\mathrm{Cos}[e+fx]}}}\right]\Bigg)$$

$$\left.\left.\sqrt{\mathrm{Cos}[e+fx]\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2}\left(-\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]\mathrm{Sec}[e+fx]\,\mathrm{Sin}\left[\frac{1}{2}(e+fx)\right]+\mathrm{Cos}\left[\frac{1}{2}(e+fx)\right]^2\mathrm{Sec}[e+fx]\,\mathrm{Tan}[e+fx]\right)\right)\right)$$

- **Problem 177: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a\,\text{Sec}[e+f\,x])^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 802 leaves, 19 steps):

$$-\frac{\text{Tan}[e+f\,x]}{2\,a\,(c-d)^3\,f\,(1+\text{Sec}[e+f\,x])\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}}\right]\,\text{Tan}[e+f\,x]}{\sqrt{a}\,c^3\,f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{\sqrt{2}\,(c-4\,d)\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{2}\,\sqrt{a}}\right]\,\text{Tan}[e+f\,x]}{\sqrt{a}\,(c-d)^4\,f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{2}\,\sqrt{a}}\right]\,\text{Tan}[e+f\,x]}{2\,\sqrt{2}\,\sqrt{a}\,(c-d)^3\,f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{3\,d^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\,\text{Tan}[e+f\,x]}{4\,\sqrt{a}\,c\,(c-d)^2\,(c+d)^{5/2}\,f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{(3\,c-d)\,d^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\,\text{Tan}[e+f\,x]}{\sqrt{a}\,c^2\,(c-d)^3\,(c+d)^{3/2}\,f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{2\,d^{5/2}\,\left(6\,c^2-4\,c\,d+d^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\sqrt{a-a\,\text{Sec}[e+f\,x]}}{\sqrt{a}\,\sqrt{c+d}}\right]\,\text{Tan}[e+f\,x]}{\sqrt{a}\,c^3\,(c-d)^4\,\sqrt{c+d}\,f\,\sqrt{a-a\,\text{Sec}[e+f\,x]}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{d^3\,\text{Tan}[e+f\,x]}{2\,a\,c\,(c-d)^2\,(c+d)\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])^2}-\frac{(3\,c-d)\,d^3\,\text{Tan}[e+f\,x]}{a\,c^2\,(c-d)^3\,(c+d)\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])}-\frac{3\,d^3\,\text{Tan}[e+f\,x]}{4\,a\,c\,\left(c^2-d^2\right)^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])}$$

Result (type 3, 2632 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^3\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}[e+f\,x]^5\right.$$
$$\left(-\frac{\left(-2\,c^5-4\,c^4\,d-2\,c^3\,d^2-17\,c^2\,d^3-5\,c\,d^4+6\,d^5\right)\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{c^3\,(-c+d)^3\,(c+d)^2}-\frac{2\,d^5\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{c^3\,(-c+d)^2\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])^2}+\right.$$
$$\left.\left.\frac{-19\,c^2\,d^4\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]-5\,c\,d^5\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+8\,d^6\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{c^3\,(-c+d)^3\,(c+d)^2\,(d+c\,\text{Cos}[e+f\,x])}-\frac{\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{(-c+d)^3}\right)\right)\Big/$$
$$\left(f\,(a\,(1+\text{Sec}[e+f\,x]))^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^3\right)-\left(\left(\left(2\,c^3\,(5\,c-17\,d)\,(c+d)^2\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right]-\right.\right.\right.$$

$$8\sqrt{2}\,(c-d)^4(c+d)^2\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]-\frac{\sqrt{2}\,d^{5/2}\left(63c^4+54c^3 d-17c^2 d^2-12 c d^3+8 d^4\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}}\Bigg)$$

$$\text{Cos}\left[\frac{1}{2}(e+f x)\right]^3(d+c\,\text{Cos}[e+f x])^3\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\left(\frac{c^3\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{2(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-\right.$$

$$\frac{c^2 d\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-\frac{19 c d^2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{2(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-$$

$$\frac{33 d^3\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{4(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-\frac{3 d^4\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{4c(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}+$$

$$\frac{d^5\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{c^2(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-\frac{c^3\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+\frac{3c^2 d\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{2(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+$$

$$\frac{3 c d^2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+\frac{9 d^3\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{4(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+\frac{d^4\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{4c(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}-$$

$$\frac{c^3\,\text{Cos}[2(e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+\frac{c^2 d\,\text{Cos}[2(e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+$$

$$\frac{2 c d^2\,\text{Cos}[2(e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}-\frac{2 d^3\,\text{Cos}[2(e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}-$$

$$\left.\frac{d^4\,\text{Cos}[2(e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{c(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}+\frac{d^5\,\text{Cos}[2(e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{c^2(-c+d)^3(c+d)^2(d+c\,\text{Cos}[e+f x])}\right)$$

$$\text{Sec}[e+f x]^{9/2}\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}\Bigg)\Bigg/\Bigg(2c^3(c-d)^4(c+d)^2 f\,(a(1+\text{Sec}[e+f x]))^{3/2}(c+d\,\text{Sec}[e+f x])^3$$

$$\left(-\frac{1}{4 c^3 (c-d)^4 (c+d)^2}\left(2 c^3 (5 c-17 d) (c+d)^2 \text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]-8 \sqrt{2} (c-d)^4 (c+d)^2 \text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]-\right.\right.$$

$$\left.\frac{\sqrt{2} d^{5/2} \left(63 c^4+54 c^3 d-17 c^2 d^2-12 c d^3+8 d^4\right) \text{ArcTanh}\left[\frac{\sqrt{d} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{-c-d} \sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}}\right) \sqrt{\text{Cos}[e+f x] \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2}$$

$$\left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sec}[e+f x]\right)^{3/2} \left(-\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sin}[e+f x]+\text{Cos}[e+f x] \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)-$$

$$\frac{1}{2 c^3 (c-d)^4 (c+d)^2} \sqrt{\text{Cos}[e+f x] \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2} \sqrt{\text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \text{Sec}[e+f x]}$$

$$\left(\frac{c^3 (5 c-17 d) (c+d)^2 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2} (e+f x)\right]^2}}-\frac{8 \sqrt{2} (c-d)^4 (c+d)^2 \left(\frac{\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2}{2 \sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}-\frac{\left(\frac{\text{Cos}[e+f x] \text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{2 \left(\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}\right)^{3/2}}\right)}{1+(1+\text{Cos}[e+f x]) \text{Sec}[e+f x] \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2}-\right.$$

$$\left.\left.\left(\sqrt{2} d^{5/2} \left(63 c^4+54 c^3 d-17 c^2 d^2-12 c d^3+8 d^4\right) \left(\frac{\sqrt{d} \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2}{2 \sqrt{-c-d} \sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}-\frac{\sqrt{d} \left(\frac{\text{Cos}[e+f x] \text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{2 \sqrt{-c-d} \left(\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}\right)^{3/2}}\right)\right)\right)\right/$$

$$\left(\sqrt{-c-d}\left(1-\frac{d\,(1+\text{Cos}[e+f\,x])\,\text{Sec}[e+f\,x]\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{-c-d}\right)\right)\Bigg) -$$

$$\frac{1}{4\,c^3\,(c-d)^4\,(c+d)^2\sqrt{\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]}}\Bigg(2\,c^3\,(5\,c-17\,d)\,(c+d)^2\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right] -$$

$$8\sqrt{2}\,(c-d)^4\,(c+d)^2\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}}\right] - \frac{\sqrt{2}\,d^{5/2}\left(63\,c^4+54\,c^3\,d-17\,c^2\,d^2-12\,c\,d^3+8\,d^4\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}}\right]}{\sqrt{-c-d}}\Bigg)$$

$$\sqrt{\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2}\left(-\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]\right)\Bigg)\Bigg)$$

- **Problem 180: Result more than twice size of optimal antiderivative.**

$$\int \frac{c+d\,\text{Sec}[e+f\,x]}{(a+a\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 164 leaves, 7 steps):

$$\frac{2\,c\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{5/2}\,f} - \frac{(43\,c-3\,d)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{16\sqrt{2}\,a^{5/2}\,f} - \frac{(c-d)\,\text{Tan}[e+f\,x]}{4\,f\,(a+a\,\text{Sec}[e+f\,x])^{5/2}} - \frac{(11\,c-3\,d)\,\text{Tan}[e+f\,x]}{16\,a\,f\,(a+a\,\text{Sec}[e+f\,x])^{3/2}}$$

Result (type 3, 343 leaves):

$$\left(\left((-43 c+3 d) \operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right]+32 \sqrt{2}\, c \operatorname{ArcTan}\left[\frac{\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}}\right]\right)\right.$$

$$\left.\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^4 \sqrt{\frac{\operatorname{Cos}[e+f x]}{1+\operatorname{Cos}[e+f x]}}\, \operatorname{Sec}[e+f x]^{3/2} \sqrt{1+\operatorname{Sec}[e+f x]}\,(c+d \operatorname{Sec}[e+f x])\right) \Big/$$

$$\left(4 f (d+c \operatorname{Cos}[e+f x]) \sqrt{\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\,(a(1+\operatorname{Sec}[e+f x]))^{5/2}\right)+\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^5 \operatorname{Sec}[e+f x]^2 (c+d \operatorname{Sec}[e+f x])\right.$$

$$\left(\frac{1}{2}(-15 c+7 d) \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{4} \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(19 c \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]-11 d \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)+\right.$$

$$\left.\left.\frac{1}{2} \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^4\left(-c \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]+d \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right) \Big/ \left(f (d+c \operatorname{Cos}[e+f x])\,(a(1+\operatorname{Sec}[e+f x]))^{5/2}\right)$$

- **Problem 181: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{(a+a \operatorname{Sec}[e+f x])^{5/2}(c+d \operatorname{Sec}[e+f x])}\, dx$$

Optimal (type 3, 592 leaves, 16 steps):

$$-\frac{\operatorname{Tan}[e+f x]}{4 a^2 (c-d) f (1+\operatorname{Sec}[e+f x])^2 \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{(c-2 d) \operatorname{Tan}[e+f x]}{2 a^2 (c-d)^2 f (1+\operatorname{Sec}[e+f x]) \sqrt{a+a \operatorname{Sec}[e+f x]}}-$$

$$\frac{3 \operatorname{Tan}[e+f x]}{16 a^2 (c-d) f (1+\operatorname{Sec}[e+f x]) \sqrt{a+a \operatorname{Sec}[e+f x]}}+\frac{2 \operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{a}}\right] \operatorname{Tan}[e+f x]}{a^{3/2} c f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-$$

$$\frac{(c-2 d) \operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \operatorname{Tan}[e+f x]}{2 \sqrt{2}\, a^{3/2} (c-d)^2 f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-\frac{3 \operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \operatorname{Tan}[e+f x]}{16 \sqrt{2}\, a^{3/2} (c-d) f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}-$$

$$\frac{\sqrt{2}\left(c^2-3 c d+3 d^2\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \operatorname{Tan}[e+f x]}{a^{3/2} (c-d)^3 f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}+\frac{2 d^{7/2} \operatorname{ArcTanh}\left[\frac{\sqrt{d} \sqrt{a-a \operatorname{Sec}[e+f x]}}{\sqrt{a} \sqrt{c+d}}\right] \operatorname{Tan}[e+f x]}{a^{3/2} c (c-d)^3 \sqrt{c+d}\, f \sqrt{a-a \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}$$

Result (type 3, 1826 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^5 (d+c\,\text{Cos}[e+f x])\,\text{Sec}[e+f x]^4 \left(\frac{(-15 c+23 d)\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{2 (-c+d)^2}+\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \left(19 c\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]-27 d\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)}{4 (-c+d)^2}+\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^3 \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{2 (-c+d)}\right)\right)\Big/$$

$$\left(f\,(a\,(1+\text{Sec}[e+f x]))^{5/2} (c+d\,\text{Sec}[e+f x])\right)-$$

$$\left(\left(\sqrt{-c-d}\left(c\left(43 c^2-126 c d+115 d^2\right)\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right]-32\sqrt{2}\,(c-d)^3\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)+\right.\right.$$

$$\left.32\sqrt{2}\,d^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)\text{Cos}\left[\frac{1}{2}(e+f x)\right]^5\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}$$

$$(d+c\,\text{Cos}[e+f x])\left(-\frac{11 c^2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{8 (-c+d)^2 (d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}+\frac{51 c d\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{8 (-c+d)^2 (d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}-\right.$$

$$\frac{8 d^2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]}{(-c+d)^2 (d+c\,\text{Cos}[e+f x])\sqrt{\text{Sec}[e+f x]}}+\frac{2 c^2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^2 (d+c\,\text{Cos}[e+f x])}-\frac{43 c d\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{8 (-c+d)^2 (d+c\,\text{Cos}[e+f x])}+$$

$$\frac{35 d^2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{8 (-c+d)^2 (d+c\,\text{Cos}[e+f x])}+\frac{2 c^2\,\text{Cos}[2 (e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^2 (d+c\,\text{Cos}[e+f x])}-$$

$$\left.\frac{4 c d\,\text{Cos}[2 (e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^2 (d+c\,\text{Cos}[e+f x])}+\frac{2 d^2\,\text{Cos}[2 (e+f x)]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{\text{Sec}[e+f x]}}{(-c+d)^2 (d+c\,\text{Cos}[e+f x])}\right)$$

$$\left.\text{Sec}[e+f x]^{7/2}\sqrt{1+\text{Sec}[e+f x]}\right)\Big/\left(4 c\sqrt{-c-d}\,(c-d)^3 f\,(a\,(1+\text{Sec}[e+f x]))^{5/2} (c+d\,\text{Sec}[e+f x])\right)$$

$$-\left(\left(\left(\sqrt{-c-d}\left(c\left(43c^2-126cd+115d^2\right)\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right]-32\sqrt{2}(c-d)^3\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]+\right.\right.\right.\right.$$

$$\left.\left.32\sqrt{2}\,d^{7/2}\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]\right)\sqrt{1+\text{Sec}[e+fx]}\left(\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{(1+\text{Cos}[e+fx])^2}-\frac{\text{Sin}[e+fx]}{1+\text{Cos}[e+fx]}\right)\right)\Big/$$

$$\left(8c\sqrt{-c-d}(c-d)^3\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}\right)-\frac{1}{4c\sqrt{-c-d}(c-d)^3}\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}\sqrt{1+\text{Sec}[e+fx]}$$

$$\left(\frac{32\sqrt{2}\,d^{7/2}\left(\frac{\sqrt{d}\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}-\frac{\sqrt{d}\left(\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{(1+\text{Cos}[e+fx])^2}-\frac{\text{Sin}[e+fx]}{1+\text{Cos}[e+fx]}\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{2\sqrt{-c-d}\left(\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}\right)^{3/2}}\right)}{1-\frac{d(1+\text{Cos}[e+fx])\,\text{Sec}[e+fx]\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{-c-d}}+\right.$$

$$\left.\left.\sqrt{-c-d}\left(\frac{c\left(43c^2-126cd+115d^2\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}}-\frac{32\sqrt{2}(c-d)^3\left(\frac{\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}-\frac{\left(\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{(1+\text{Cos}[e+fx])^2}-\frac{\text{Sin}[e+fx]}{1+\text{Cos}[e+fx]}\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{2\left(\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}\right)^{3/2}}\right)}{1+(1+\text{Cos}[e+fx])\,\text{Sec}[e+fx]\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}\right)\right)\right)-$$

$$\left(\left(\sqrt{-c-d}\left(c\left(43c^2-126cd+115d^2\right)\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right]-32\sqrt{2}(c-d)^3\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]\right)+32\sqrt{2}\,d^{7/2}\right.\right.$$

$$\left.\left.\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\,\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]\right)\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\Big/\left(8 c\sqrt{-c-d}\,(c-d)^3\sqrt{1+\text{Sec}[e+f x]}\right)\Bigg)\Bigg)$$

Problem 182: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+a\,\text{Sec}[e+f x])^{5/2}\,(c+d\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 756 leaves, 19 steps):

$$-\frac{\text{Tan}[e+f x]}{4 a^2 (c-d)^2 f (1+\text{Sec}[e+f x])^2\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{(c-3 d)\,\text{Tan}[e+f x]}{2 a^2 (c-d)^3 f (1+\text{Sec}[e+f x])\sqrt{a+a\,\text{Sec}[e+f x]}}-$$
$$\frac{3\,\text{Tan}[e+f x]}{16 a^2 (c-d)^2 f (1+\text{Sec}[e+f x])\sqrt{a+a\,\text{Sec}[e+f x]}}+\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}}\right]\text{Tan}[e+f x]}{a^{3/2} c^2 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-$$
$$\frac{(c-3 d)\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{2}\sqrt{a}}\right]\text{Tan}[e+f x]}{2\sqrt{2}\,a^{3/2} (c-d)^3 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-\frac{3\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{2}\sqrt{a}}\right]\text{Tan}[e+f x]}{16\sqrt{2}\,a^{3/2} (c-d)^2 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}-$$
$$\frac{\sqrt{2}\,(c^2-4 c d+6 d^2)\,\text{ArcTanh}\left[\frac{\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{2}\sqrt{a}}\right]\text{Tan}[e+f x]}{a^{3/2} (c-d)^4 f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+\frac{d^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}\sqrt{c+d}}\right]\text{Tan}[e+f x]}{a^{3/2} c (c-d)^3 (c+d)^{3/2} f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+$$
$$\frac{2 (4 c-d)\,d^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{d}\sqrt{a-a\,\text{Sec}[e+f x]}}{\sqrt{a}\sqrt{c+d}}\right]\text{Tan}[e+f x]}{a^{3/2} c^2 (c-d)^4\sqrt{c+d}\,f\sqrt{a-a\,\text{Sec}[e+f x]}\,\sqrt{a+a\,\text{Sec}[e+f x]}}+\frac{d^4\,\text{Tan}[e+f x]}{a^2 c (c-d)^3 (c+d) f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c+d\,\text{Sec}[e+f x])}$$

Result (type 3, 2343 leaves):

$$\Bigg(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^5 (d+c\,\text{Cos}[e+f x])^2\,\text{Sec}[e+f x]^5$$
$$\Bigg(-\frac{(-15 c^4+16 c^3 d+31 c^2 d^2+16 d^4)\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{2 c^2 (-c+d)^3 (c+d)}+\frac{8 d^5\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{c^2 (-c+d)^3 (c+d) (d+c\,\text{Cos}[e+f x])}+$$
$$\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(-19 c\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+35 d\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)}{4 (-c+d)^3}-\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^3\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{2 (-c+d)^2}\Bigg)\Bigg)\Big/$$

$$\left(f\,(a\,(1+\text{Sec}[e+f\,x]))^{5/2}\,(c+d\,\text{Sec}[e+f\,x])^2\right)-\left(\left(c^2\left(43\,c^3-123\,c^2\,d+53\,c\,d^2+219\,d^3\right)\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right]-\right.\right.$$

$$\left.32\,\sqrt{2}\,(c-d)^4\,(c+d)\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}}\right]+\frac{16\,\sqrt{2}\,d^{7/2}\left(9\,c^2+5\,c\,d-2\,d^2\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{-c-d}\,\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}}\right]}{\sqrt{-c-d}}\right)$$

$$\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^5\,(d+c\,\text{Cos}[e+f\,x])^2\,\sqrt{\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2}$$

$$\left(\frac{11\,c^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]}{8\,(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{\text{Sec}[e+f\,x]}}-\frac{6\,c^2\,d\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{\text{Sec}[e+f\,x]}}+\right.$$

$$\frac{37\,c\,d^2\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]}{8\,(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{\text{Sec}[e+f\,x]}}+\frac{16\,d^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{\text{Sec}[e+f\,x]}}+$$

$$\frac{2\,d^4\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]}{c\,(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{\text{Sec}[e+f\,x]}}-\frac{2\,c^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}+$$

$$\frac{43\,c^2\,d\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{8\,(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}-\frac{2\,c\,d^2\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}-\frac{59\,d^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{8\,(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}-$$

$$\frac{2\,c^3\,\text{Cos}[2\,(e+f\,x)]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}+\frac{4\,c^2\,d\,\text{Cos}[2\,(e+f\,x)]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}-$$

$$\left.\frac{4\,d^3\,\text{Cos}[2\,(e+f\,x)]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}+\frac{2\,d^4\,\text{Cos}[2\,(e+f\,x)]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{\text{Sec}[e+f\,x]}}{c\,(-c+d)^3\,(c+d)\,(d+c\,\text{Cos}[e+f\,x])}\right)$$

$$\left.\text{Sec}[e+f x]^{9/2}\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}\right)\Bigg/\left(4 c^2 (c-d)^4 (c+d) f (a (1+\text{Sec}[e+f x]))^{5/2} (c+d\,\text{Sec}[e+f x])^2\right.$$

$$\left(-\frac{1}{8 c^2 (c-d)^4 (c+d)}\left(c^2\left(43 c^3-123 c^2 d+53 c d^2+219 d^3\right)\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right]-32\sqrt{2}(c-d)^4 (c+d)\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]+\right.\right.$$

$$\left.\frac{16\sqrt{2}\,d^{7/2}\left(9 c^2+5 c d-2 d^2\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}}\right)\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{3/2}\left(-\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sin}[e+f x]+\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)-$$

$$\frac{1}{4 c^2 (c-d)^4 (c+d)}\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}$$

$$\left(\frac{c^2\left(43 c^3-123 c^2 d+53 c d^2+219 d^3\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}-\frac{32\sqrt{2}(c-d)^4 (c+d)\left(\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}-\frac{\left(\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\left(\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}\right)^{3/2}}\right)}{1+(1+\text{Cos}[e+f x])\,\text{Sec}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}+\right.$$

$$\left(16\sqrt{2}\, d^{7/2}\left(9c^2+5cd-2d^2\right)\left(\frac{\sqrt{d}\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{2\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}-\frac{\sqrt{d}\left(\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{(1+\text{Cos}[e+fx])^2}-\frac{\text{Sin}[e+fx]}{1+\text{Cos}[e+fx]}\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{2\sqrt{-c-d}\left(\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}\right)^{3/2}}\right)\right)\Big/$$

$$\left(\sqrt{-c-d}\left(1-\frac{d\,(1+\text{Cos}[e+fx])\,\text{Sec}[e+fx]\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{-c-d}\right)\right)\Bigg)-$$

$$\frac{1}{8c^2(c-d)^4(c+d)\sqrt{\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]}}\left(c^2\left(43c^3-123c^2d+53cd^2+219d^3\right)\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right]-\right.$$

$$\left(32\sqrt{2}\,(c-d)^4(c+d)\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]+\frac{16\sqrt{2}\,d^{7/2}\left(9c^2+5cd-2d^2\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]}{\sqrt{-c-d}}\right)$$

$$\left.\sqrt{\text{Cos}[e+fx]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\right)$$

- **Problem 183: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{(a+a\,\text{Sec}[e+fx])^{5/2}\,(c+d\,\text{Sec}[e+fx])^3}\,dx$$

Optimal (type 3, 999 leaves, 23 steps):

$$-\frac{\text{Tan}[e+f x]}{4 a^2 (c-d)^3 f (1+\text{Sec}[e+f x])^2 \sqrt{a+a \text{Sec}[e+f x]}}-\frac{(c-4 d) \text{Tan}[e+f x]}{2 a^2 (c-d)^4 f (1+\text{Sec}[e+f x]) \sqrt{a+a \text{Sec}[e+f x]}}-\frac{3 \text{Tan}[e+f x]}{16 a^2 (c-d)^3 f (1+\text{Sec}[e+f x]) \sqrt{a+a \text{Sec}[e+f x]}}+$$

$$\frac{2 \text{ArcTanh}\left[\frac{\sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{a}}\right] \text{Tan}[e+f x]}{a^{3/2} c^3 f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}-\frac{(c-4 d) \text{ArcTanh}\left[\frac{\sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \text{Tan}[e+f x]}{2 \sqrt{2} a^{3/2} (c-d)^4 f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}-$$

$$\frac{3 \text{ArcTanh}\left[\frac{\sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \text{Tan}[e+f x]}{16 \sqrt{2} a^{3/2} (c-d)^3 f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}-\frac{\sqrt{2} \left(c^2-5 c d+10 d^2\right) \text{ArcTanh}\left[\frac{\sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{2} \sqrt{a}}\right] \text{Tan}[e+f x]}{a^{3/2} (c-d)^5 f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}+$$

$$\frac{3 d^{7/2} \text{ArcTanh}\left[\frac{\sqrt{d} \sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{a} \sqrt{c+d}}\right] \text{Tan}[e+f x]}{4 a^{3/2} c (c-d)^3 (c+d)^{5/2} f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}+\frac{(4 c-d) d^{7/2} \text{ArcTanh}\left[\frac{\sqrt{d} \sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{a} \sqrt{c+d}}\right] \text{Tan}[e+f x]}{a^{3/2} c^2 (c-d)^4 (c+d)^{3/2} f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}+$$

$$\frac{2 d^{7/2} \left(10 c^2-5 c d+d^2\right) \text{ArcTanh}\left[\frac{\sqrt{d} \sqrt{a-a \text{Sec}[e+f x]}}{\sqrt{a} \sqrt{c+d}}\right] \text{Tan}[e+f x]}{a^{3/2} c^3 (c-d)^5 \sqrt{c+d} f \sqrt{a-a \text{Sec}[e+f x]} \sqrt{a+a \text{Sec}[e+f x]}}+\frac{d^4 \text{Tan}[e+f x]}{2 a^2 c (c-d)^3 (c+d) f \sqrt{a+a \text{Sec}[e+f x]} (c+d \text{Sec}[e+f x])^2}+$$

$$\frac{3 d^4 \text{Tan}[e+f x]}{4 a^2 c (c-d)^3 (c+d)^2 f \sqrt{a+a \text{Sec}[e+f x]} (c+d \text{Sec}[e+f x])}+\frac{(4 c-d) d^4 \text{Tan}[e+f x]}{a^2 c^2 (c-d)^4 (c+d) f \sqrt{a+a \text{Sec}[e+f x]} (c+d \text{Sec}[e+f x])}$$

Result (type 3, 2904 leaves):

$$\left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]^5 (d+c \text{Cos}[e+f x])^3 \text{Sec}[e+f x]^6 \left(-\frac{3 \left(5 c^6-3 c^5 d-21 c^4 d^2-13 c^3 d^3-28 c^2 d^4-12 c d^5+8 d^6\right) \text{Sin}\left[\frac{1}{2} (e+f x)\right]}{2 c^3 (-c+d)^4 (c+d)^2}-\right.\right.$$

$$\frac{4 d^6 \text{Sin}\left[\frac{1}{2} (e+f x)\right]}{c^3 (-c+d)^3 (c+d) (d+c \text{Cos}[e+f x])^2}+\frac{\text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \left(19 c \text{Sin}\left[\frac{1}{2} (e+f x)\right]-43 d \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)}{4 (-c+d)^4}+$$

$$\left.\left.\frac{2 \left(-23 c^2 d^5 \text{Sin}\left[\frac{1}{2} (e+f x)\right]-9 c d^6 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+8 d^7 \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)}{c^3 (-c+d)^4 (c+d)^2 (d+c \text{Cos}[e+f x])}+\frac{\text{Sec}\left[\frac{1}{2} (e+f x)\right]^3 \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{2 (-c+d)^3}\right)\right)\Big/$$

$$\left(f (a (1+\text{Sec}[e+f x]))^{5/2} (c+d \text{Sec}[e+f x])^3\right)-\left(\left(c^3 (c+d)^2 \left(43 c^2-206 c d+355 d^2\right) \text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right]-\right.\right.$$

$$32\sqrt{2}\,(c-d)^5(c+d)^2\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]+\frac{4\sqrt{2}\,d^{7/2}\left(99c^4+110c^3d-5c^2d^2-20cd^3+8d^4\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+fx]}{1+\text{Cos}[e+fx]}}}\right]}{\sqrt{-c-d}}\Bigg)$$

$$\text{Cos}\left[\frac{1}{2}(e+fx)\right]^5(d+c\,\text{Cos}[e+fx])^3\sqrt{\text{Cos}[e+fx]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2}$$

$$\Bigg(-\frac{11c^4\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}+\frac{45c^3d\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}-$$

$$\frac{5c^2d^2\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}-\frac{317cd^3\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}-$$

$$\frac{69d^4\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{2(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}-\frac{7d^5\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{2c(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}+$$

$$\frac{2d^6\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]}{c^2(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])\sqrt{\text{Sec}[e+fx]}}+\frac{2c^4\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}-\frac{43c^3d\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}-$$

$$\frac{3c^2d^2\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}+\frac{123cd^3\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}+\frac{95d^4\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{8(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}+$$

$$\frac{d^5\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{2c(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}+\frac{2c^4\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}-$$

$$\frac{4c^3d\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}-\frac{2c^2d^2\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}+$$

$$\frac{8cd^3\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}-\frac{2d^4\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}-$$

$$\frac{4d^5\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{c(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}+\frac{2d^6\,\text{Cos}[2(e+fx)]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]\sqrt{\text{Sec}[e+fx]}}{c^2(-c+d)^4(c+d)^2(d+c\,\text{Cos}[e+fx])}\Bigg)$$

$$\left.\text{Sec}[e+f x]^{11/2}\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}\right)\Big/\left(4 c^3 (c-d)^5 (c+d)^2 f (a (1+\text{Sec}[e+f x]))^{5/2} (c+d\,\text{Sec}[e+f x])^3\right.$$

$$\left(-\frac{1}{8 c^3 (c-d)^5 (c+d)^2}\left(c^3 (c+d)^2 \left(43 c^2-206 c d+355 d^2\right) \text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right]-32\sqrt{2}(c-d)^5 (c+d)^2 \text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]+\right.\right.$$

$$\left.\frac{4\sqrt{2}\, d^{7/2}\left(99 c^4+110 c^3 d-5 c^2 d^2-20 c d^3+8 d^4\right)\text{ArcTanh}\left[\frac{\sqrt{d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{-c-d}\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}\right]}{\sqrt{-c-d}}\right)\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{3/2}\left(-\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sin}[e+f x]+\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)-$$

$$\frac{1}{4 c^3 (c-d)^5 (c+d)^2}\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}$$

$$\left(\frac{c^3 (c+d)^2\left(43 c^2-206 c d+355 d^2\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}-\frac{32\sqrt{2}(c-d)^5 (c+d)^2\left(\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{2\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}-\frac{\left(\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{2\left(\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}\right)^{3/2}}\right)}{1+(1+\text{Cos}[e+f x])\,\text{Sec}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}+\right.$$

$$\left(4\sqrt{2}\,d^{7/2}\left(99\,c^4+110\,c^3\,d-5\,c^2\,d^2-20\,c\,d^3+8\,d^4\right)\left(\frac{\sqrt{d}\,\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{2\,\sqrt{-c-d}\,\sqrt{\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}}-\right.\right.$$

$$\left.\left.\left.\frac{\sqrt{d}\,\left(\frac{\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]}{(1+\mathrm{Cos}[e+f\,x])^2}-\frac{\mathrm{Sin}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}\right)\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{2\,\sqrt{-c-d}\,\left(\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}\right)^{3/2}}\right)\right)\Big/\left(\sqrt{-c-d}\,\left(1-\frac{d\,(1+\mathrm{Cos}[e+f\,x])\,\mathrm{Sec}[e+f\,x]\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{-c-d}\right)\right)\right)-$$

$$\frac{1}{8\,c^3\,(c-d)^5\,(c+d)^2\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\mathrm{Sec}[e+f\,x]}}\left(c^3\,(c+d)^2\,\left(43\,c^2-206\,c\,d+355\,d^2\right)\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right]-\right.$$

$$\left(32\,\sqrt{2}\,(c-d)^5\,(c+d)^2\,\mathrm{ArcTan}\left[\frac{\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}}\right]+\frac{4\,\sqrt{2}\,d^{7/2}\left(99\,c^4+110\,c^3\,d-5\,c^2\,d^2-20\,c\,d^3+8\,d^4\right)\mathrm{ArcTanh}\left[\frac{\sqrt{d}\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{-c-d}\,\sqrt{\frac{\mathrm{Cos}[e+f\,x]}{1+\mathrm{Cos}[e+f\,x]}}}\right]}{\sqrt{-c-d}}\right)$$

$$\left.\left.\sqrt{\mathrm{Cos}[e+f\,x]\,\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\,\left(-\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\mathrm{Sec}[e+f\,x]\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2\mathrm{Sec}[e+f\,x]\,\mathrm{Tan}[e+f\,x]\right)\right)\right)$$

- **Problem 193: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+b\,\mathrm{Sec}[e+f\,x])^2}{(c+d\,\mathrm{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 237 leaves, 6 steps):

$$\frac{a^2 x}{c^3}-\frac{\left(3 b^2 c^4 d-2 a b c^3 \left(2 c^2+d^2\right)+a^2 \left(6 c^4 d-5 c^2 d^3+2 d^5\right)\right) \text{ArcTanh}\left[\frac{\sqrt{c-d}\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{c^3 (c-d)^{5/2} (c+d)^{5/2} f}-\frac{d (b c-a d)^2 \text{Sin}[e+f x]}{2 c^2 \left(c^2-d^2\right) f (d+c \text{Cos}[e+f x])^2}-\frac{(b c-a d) \left(3 a d \left(2 c^2-d^2\right)-b c \left(2 c^2+d^2\right)\right) \text{Sin}[e+f x]}{2 c^2 \left(c^2-d^2\right)^2 f (d+c \text{Cos}[e+f x])}$$

Result (type 3, 493 leaves) :

$$\frac{1}{4 c^3 f (b+a \text{Cos}[e+f x])^2 (c+d \text{Sec}[e+f x])^3}(d+c \text{Cos}[e+f x]) \text{Sec}[e+f x] (a+b \text{Sec}[e+f x])^2 \left(\frac{1}{\left(c^2-d^2\right)^{5/2}}4 \left(3 b^2 c^4 d-2 a b c^3 \left(2 c^2+d^2\right)+a^2 \left(6 c^4 d-5 c^2 d^3+2 d^5\right)\right) \text{ArcTanh}\left[\frac{(-c+d) \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c^2-d^2}}\right] (d+c \text{Cos}[e+f x])^2+\frac{1}{\left(c^2-d^2\right)^2}\left(2 a^2 c^6 e-6 a^2 c^2 d^4 e+4 a^2 d^6 e+2 a^2 c^6 f x-6 a^2 c^2 d^4 f x+4 a^2 d^6 f x+8 a^2 c d \left(c^2-d^2\right)^2 (e+f x) \text{Cos}[e+f x]+2 a^2 c^2 \left(c^2-d^2\right)^2 (e+f x) \text{Cos}[2 (e+f x)]+2 b^2 c^5 d \text{Sin}[e+f x]-12 a b c^4 d^2 \text{Sin}[e+f x]+10 a^2 c^3 d^3 \text{Sin}[e+f x]+4 b^2 c^3 d^3 \text{Sin}[e+f x]-4 a^2 c d^5 \text{Sin}[e+f x]+2 b^2 c^6 \text{Sin}[2 (e+f x)]-8 a b c^5 d \text{Sin}[2 (e+f x)]+6 a^2 c^4 d^2 \text{Sin}[2 (e+f x)]+b^2 c^4 d^2 \text{Sin}[2 (e+f x)]+2 a b c^3 d^3 \text{Sin}[2 (e+f x)]-3 a^2 c^2 d^4 \text{Sin}[2 (e+f x)]\right)\right)$$

- **Problem 195: Result more than twice size of optimal antiderivative.**

$$\int \frac{(a+b \text{Sec}[e+f x])^3}{(c+d \text{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 254 leaves, 6 steps) :

$$\frac{a^3 x}{c^3}-\frac{(b c-a d) \left(2 a b c d \left(4 c^2-d^2\right)-b^2 c^2 \left(c^2+2 d^2\right)-a^2 \left(6 c^4-5 c^2 d^2+2 d^4\right)\right) \text{ArcTanh}\left[\frac{\sqrt{c-d}\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{c^3 (c-d)^{5/2} (c+d)^{5/2} f}+\frac{(b c-a d)^2 (b+a \text{Cos}[e+f x]) \text{Sin}[e+f x]}{2 c \left(c^2-d^2\right) f (d+c \text{Cos}[e+f x])^2}+\frac{(b c-a d)^2 \left(5 a c^2-3 b c d-2 a d^2\right) \text{Sin}[e+f x]}{2 c^2 \left(c^2-d^2\right)^2 f (d+c \text{Cos}[e+f x])}$$

Result (type 3, 517 leaves) :

$$\frac{1}{4 c^3 f}\left(-\frac{1}{\left(c^2-d^2\right)^{5/2}}4\left(-9 a b^2 c^4 d+3 a^2 b c^3\left(2 c^2+d^2\right)+b^3 c^3\left(c^2+2 d^2\right)+a^3\left(-6 c^4 d+5 c^2 d^3-2 d^5\right)\right) \text{ArcTanh}\left[\frac{(-c+d) \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c^2-d^2}}\right]+\frac{1}{\left(c^2-d^2\right)^2 (d+c \text{Cos}[e+f x])^2}\left(2 a^3 c^6 e-6 a^3 c^2 d^4 e+4 a^3 d^6 e+2 a^3 c^6 f x-6 a^3 c^2 d^4 f x+4 a^3 d^6 f x+8 a^3 c d\left(c^2-d^2\right)^2 (e+f x) \text{Cos}[e+f x]+2 a^3\left(c^3-c d^2\right)^2 (e+f x) \text{Cos}[2 (e+f x)]+2 b^3 c^6 \text{Sin}[e+f x]+6 a b^2 c^5 d \text{Sin}[e+f x]-18 a^2 b c^4 d^2 \text{Sin}[e+f x]-8 b^3 c^4 d^2 \text{Sin}[e+f x]+10 a^3 c^3 d^3 \text{Sin}[e+f x]+12 a b^2 c^3 d^3 \text{Sin}[e+f x]-4 a^3 c d^5 \text{Sin}[e+f x]+6 a b^2 c^6 \text{Sin}[2 (e+f x)]-12 a^2 b c^5 d \text{Sin}[2 (e+f x)]-3 b^3 c^5 d \text{Sin}[2 (e+f x)]+6 a^3 c^4 d^2 \text{Sin}[2 (e+f x)]+3 a b^2 c^4 d^2 \text{Sin}[2 (e+f x)]+3 a^2 b c^3 d^3 \text{Sin}[2 (e+f x)]-3 a^3 c^2 d^4 \text{Sin}[2 (e+f x)]\right)\right)$$

Problem 196: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b \text{Sec}[e+f x])^3}{(c+d \text{Sec}[e+f x])^4} \, dx$$

Optimal (type 3, 412 leaves, 7 steps):

$$\frac{a^3 x}{c^4}-\left(\left(3 a b^2 c^4 d\left(4 c^2+d^2\right)-b^3 c^5\left(c^2+4 d^2\right)-a^2 b\left(6 c^7+9 c^5 d^2\right)+a^3\left(8 c^6 d-8 c^4 d^3+7 c^2 d^5-2 d^7\right)\right) \text{ArcTanh}\left[\frac{\sqrt{c-d} \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]\right) \Big/ \left(c^4 \sqrt{c-d} \sqrt{c+d}\left(c^2-d^2\right)^3 f\right)-\frac{d (b c-a d)(b+a \text{Cos}[e+f x])^2 \text{Sin}[e+f x]}{3 c\left(c^2-d^2\right) f(d+c \text{Cos}[e+f x])^3}+\frac{(b c-a d)^2\left(3 b c^3-8 a c^2 d+2 b c d^2+3 a d^3\right) \text{Sin}[e+f x]}{6 c^3\left(c^2-d^2\right)^2 f(d+c \text{Cos}[e+f x])^2}-\frac{(b c-a d)\left(b^2 c^2 d\left(13 c^2+2 d^2\right)-a b c\left(18 c^4+17 c^2 d^2-5 d^4\right)+a^2\left(34 c^4 d-28 c^2 d^3+9 d^5\right)\right) \text{Sin}[e+f x]}{6 c^3\left(c^2-d^2\right)^3 f(d+c \text{Cos}[e+f x])}$$

Result (type 3, 885 leaves):

$$\frac{a^3 (e+f x) (d+c \operatorname{Cos}[e+f x])^4 \operatorname{Sec}[e+f x] (a+b \operatorname{Sec}[e+f x])^3}{c^4 f (b+a \operatorname{Cos}[e+f x])^3 (c+d \operatorname{Sec}[e+f x])^4}+$$

$$\left(\left(6 a^2 b c^7+b^3 c^7-8 a^3 c^6 d-12 a b^2 c^6 d+9 a^2 b c^5 d^2+4 b^3 c^5 d^2+8 a^3 c^4 d^3-3 a b^2 c^4 d^3-7 a^3 c^2 d^5+2 a^3 d^7\right) \operatorname{ArcTanh}\left[\frac{(-c+d) \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{c^2-d^2}}\right]\right.$$

$$\left.(d+c \operatorname{Cos}[e+f x])^4 \operatorname{Sec}[e+f x] (a+b \operatorname{Sec}[e+f x])^3\right) \Big/ \left(c^4 \sqrt{c^2-d^2} \left(-c^2+d^2\right)^3 f (b+a \operatorname{Cos}[e+f x])^3 (c+d \operatorname{Sec}[e+f x])^4\right)+$$

$$\left((d+c \operatorname{Cos}[e+f x]) \operatorname{Sec}[e+f x] (a+b \operatorname{Sec}[e+f x])^3 \left(-b^3 c^3 d \operatorname{Sin}[e+f x]+3 a b^2 c^2 d^2 \operatorname{Sin}[e+f x]-3 a^2 b c d^3 \operatorname{Sin}[e+f x]+a^3 d^4 \operatorname{Sin}[e+f x]\right)\right) \Big/$$
$$\left(3 c^3 \left(c^2-d^2\right) f (b+a \operatorname{Cos}[e+f x])^3 (c+d \operatorname{Sec}[e+f x])^4\right)+$$

$$\left((d+c \operatorname{Cos}[e+f x])^2 \operatorname{Sec}[e+f x] (a+b \operatorname{Sec}[e+f x])^3 \left(3 b^3 c^5 \operatorname{Sin}[e+f x]-18 a b^2 c^4 d \operatorname{Sin}[e+f x]+27 a^2 b c^3 d^2 \operatorname{Sin}[e+f x]+\right.\right.$$
$$\left.\left.2 b^3 c^3 d^2 \operatorname{Sin}[e+f x]-12 a^3 c^2 d^3 \operatorname{Sin}[e+f x]+3 a b^2 c^2 d^3 \operatorname{Sin}[e+f x]-12 a^2 b c d^4 \operatorname{Sin}[e+f x]+7 a^3 d^5 \operatorname{Sin}[e+f x]\right)\right) \Big/$$

$$\left(6 c^3 \left(c^2-d^2\right)^2 f (b+a \operatorname{Cos}[e+f x])^3 (c+d \operatorname{Sec}[e+f x])^4\right)+\frac{1}{6 c^3 \left(c^2-d^2\right)^3 f (b+a \operatorname{Cos}[e+f x])^3 (c+d \operatorname{Sec}[e+f x])^4}$$

$$(d+c \operatorname{Cos}[e+f x])^3 \operatorname{Sec}[e+f x] (a+b \operatorname{Sec}[e+f x])^3$$
$$\left(18 a b^2 c^6 \operatorname{Sin}[e+f x]-54 a^2 b c^5 d \operatorname{Sin}[e+f x]-13 b^3 c^5 d \operatorname{Sin}[e+f x]+36 a^3 c^4 d^2 \operatorname{Sin}[e+f x]+30 a b^2 c^4 d^2 \operatorname{Sin}[e+f x]+15 a^2 b c^3 d^3\right.$$
$$\left.\operatorname{Sin}[e+f x]-2 b^3 c^3 d^3 \operatorname{Sin}[e+f x]-32 a^3 c^2 d^4 \operatorname{Sin}[e+f x]-3 a b^2 c^2 d^4 \operatorname{Sin}[e+f x]-6 a^2 b c d^5 \operatorname{Sin}[e+f x]+11 a^3 d^6 \operatorname{Sin}[e+f x]\right)$$

- **Problem 197: Result more than twice size of optimal antiderivative.**

$$\int \frac{(a+b \operatorname{Sec}[e+f x])^3}{(c+d \operatorname{Sec}[e+f x])^5} \, dx$$

Optimal (type 3, 622 leaves, 8 steps):

$$\frac{a^3 x}{c^5}-\left(\left(15 a b^2 c^6 d \left(4 c^2+3 d^2\right)-3 a^2 b c^5 \left(8 c^4+24 c^2 d^2+3 d^4\right)-b^3 c^5 \left(4 c^4+27 c^2 d^2+4 d^4\right)+a^3 \left(40 c^8 d-40 c^6 d^3+63 c^4 d^5-36 c^2 d^7+8 d^9\right)\right)\right.$$

$$\left.\operatorname{ArcTanh}\left[\frac{\sqrt{c-d} \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{c+d}}\right]\right) \Big/ \left(4 c^5 \sqrt{c-d} \sqrt{c+d} \left(c^2-d^2\right)^4 f\right)+$$

$$\frac{d^2 (b+a \operatorname{Cos}[e+f x])^3 \operatorname{Sin}[e+f x]}{4 c \left(c^2-d^2\right) f (d+c \operatorname{Cos}[e+f x])^4}-\frac{d \left(8 b c^3-11 a c^2 d-b c d^2+4 a d^3\right) (b+a \operatorname{Cos}[e+f x])^2 \operatorname{Sin}[e+f x]}{12 c^2 \left(c^2-d^2\right)^2 f (d+c \operatorname{Cos}[e+f x])^3}-$$

$$\left((b c-a d) \left(2 a b c d \left(32 c^4+c^2 d^2+2 d^4\right)-a^2 d^2 \left(58 c^4-35 c^2 d^2+12 d^4\right)-b^2 \left(12 c^6+25 c^4 d^2-2 c^2 d^4\right)\right) \operatorname{Sin}[e+f x]\right) \Big/$$
$$\left(24 c^4 \left(c^2-d^2\right)^3 f (d+c \operatorname{Cos}[e+f x])^2\right)-$$

$$\left(\left(b^3 c^3 d \left(68 c^4+39 c^2 d^2-2 d^4\right)+a^2 b c d \left(272 c^6+10 c^4 d^2+49 c^2 d^4-16 d^6\right)-3 a b^2 c^2 \left(24 c^6+84 c^4 d^2-5 c^2 d^4+2 d^6\right)-\right.\right.$$
$$\left.\left.a^3 \left(212 c^6 d^2-210 c^4 d^4+139 c^2 d^6-36 d^8\right)\right) \operatorname{Sin}[e+f x]\right) \Big/ \left(24 c^4 \left(c^2-d^2\right)^4 f (d+c \operatorname{Cos}[e+f x])\right)$$

Result (type 3, 1285 leaves):

$$\frac{a^3 (e+f x) (d+c \text{Cos}[e+f x])^5 \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^3}{c^5 f (b+a \text{Cos}[e+f x])^3 (c+d \text{Sec}[e+f x])^5}+$$

$$\Big(\big(-24 a^2 b c^9-4 b^3 c^9+40 a^3 c^8 d+60 a b^2 c^8 d-72 a^2 b c^7 d^2-27 b^3 c^7 d^2-40 a^3 c^6 d^3+45 a b^2 c^6 d^3-9 a^2 b c^5 d^4-4 b^3 c^5 d^4+$$
$$63 a^3 c^4 d^5-36 a^3 c^2 d^7+8 a^3 d^9\big) \text{ArcTanh}\Big[\frac{(-c+d) \text{Tan}[\frac{1}{2} (e+f x)]}{\sqrt{c^2-d^2}}\Big] (d+c \text{Cos}[e+f x])^5 \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^3\Big)\Big/$$
$$\left(4 c^5 \sqrt{c^2-d^2} \left(-c^2+d^2\right)^4 f (b+a \text{Cos}[e+f x])^3 (c+d \text{Sec}[e+f x])^5\right)+$$
$$\left((d+c \text{Cos}[e+f x]) \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^3 \left(b^3 c^3 d^2 \text{Sin}[e+f x]-3 a b^2 c^2 d^3 \text{Sin}[e+f x]+3 a^2 b c d^4 \text{Sin}[e+f x]-a^3 d^5 \text{Sin}[e+f x]\right)\right)\Big/$$
$$\left(4 c^4 \left(c^2-d^2\right) f (b+a \text{Cos}[e+f x])^3 (c+d \text{Sec}[e+f x])^5\right)+$$
$$\Big((d+c \text{Cos}[e+f x])^2 \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^3 \big(-8 b^3 c^5 d \text{Sin}[e+f x]+36 a b^2 c^4 d^2 \text{Sin}[e+f x]-48 a^2 b c^3 d^3 \text{Sin}[e+f x]+$$
$$b^3 c^3 d^3 \text{Sin}[e+f x]+20 a^3 c^2 d^4 \text{Sin}[e+f x]-15 a b^2 c^2 d^4 \text{Sin}[e+f x]+27 a^2 b c d^5 \text{Sin}[e+f x]-13 a^3 d^6 \text{Sin}[e+f x]\big)\Big)\Big/$$
$$\left(12 c^4 \left(c^2-d^2\right)^2 f (b+a \text{Cos}[e+f x])^3 (c+d \text{Sec}[e+f x])^5\right)+\frac{1}{24 c^4 \left(c^2-d^2\right)^3 f (b+a \text{Cos}[e+f x])^3 (c+d \text{Sec}[e+f x])^5}$$
$$(d+c \text{Cos}[e+f x])^3 \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^3 \big(12 b^3 c^7 \text{Sin}[e+f x]-108 a b^2 c^6 d \text{Sin}[e+f x]+$$
$$216 a^2 b c^5 d^2 \text{Sin}[e+f x]+25 b^3 c^5 d^2 \text{Sin}[e+f x]-120 a^3 c^4 d^3 \text{Sin}[e+f x]+9 a b^2 c^4 d^3 \text{Sin}[e+f x]-165 a^2 b c^3 d^4 \text{Sin}[e+f x]-$$
$$2 b^3 c^3 d^4 \text{Sin}[e+f x]+131 a^3 c^2 d^5 \text{Sin}[e+f x]-6 a b^2 c^2 d^5 \text{Sin}[e+f x]+54 a^2 b c d^6 \text{Sin}[e+f x]-46 a^3 d^7 \text{Sin}[e+f x]\big)+$$
$$\frac{1}{24 c^4 \left(c^2-d^2\right)^4 f (b+a \text{Cos}[e+f x])^3 (c+d \text{Sec}[e+f x])^5} (d+c \text{Cos}[e+f x])^4 \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^3$$
$$\big(72 a b^2 c^8 \text{Sin}[e+f x]-288 a^2 b c^7 d \text{Sin}[e+f x]-68 b^3 c^7 d \text{Sin}[e+f x]+240 a^3 c^6 d^2 \text{Sin}[e+f x]+252 a b^2 c^6 d^2 \text{Sin}[e+f x]+$$
$$24 a^2 b c^5 d^3 \text{Sin}[e+f x]-39 b^3 c^5 d^3 \text{Sin}[e+f x]-280 a^3 c^4 d^4 \text{Sin}[e+f x]-15 a b^2 c^4 d^4 \text{Sin}[e+f x]-69 a^2 b c^3 d^5 \text{Sin}[e+f x]+$$
$$2 b^3 c^3 d^5 \text{Sin}[e+f x]+195 a^3 c^2 d^6 \text{Sin}[e+f x]+6 a b^2 c^2 d^6 \text{Sin}[e+f x]+18 a^2 b c d^7 \text{Sin}[e+f x]-50 a^3 d^8 \text{Sin}[e+f x]\big)$$

- **Problem 198: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{a+b \text{Sec}[e+f x]} (c+d \text{Sec}[e+f x]) \, dx$$

Optimal (type 4, 320 leaves, 5 steps) :

$$-\frac{1}{b\,f}2\,(a-b)\,\sqrt{a+b}\,d\,\text{Cot}[e+f\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}+\frac{1}{b\,f}$$

$$2\,\sqrt{a+b}\,\left(b\,(c-d)+a\,d\right)\,\text{Cot}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}-$$

$$\frac{2\,\sqrt{a+b}\,c\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}}{f}$$

Result (type 4, 913 leaves) :

$$\frac{2\,d\,\text{Cos}[e+f\,x]\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\,(c+d\,\text{Sec}[e+f\,x])\,\text{Sin}[e+f\,x]}{f\,(d+c\,\text{Cos}[e+f\,x])}+$$

$$\Bigg(2\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\,(c+d\,\text{Sec}[e+f\,x])\,\Bigg(a\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+b\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]-2\,a\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^3+$$

$$a\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^5-b\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^5+2\,i\,a\,c\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,+$$

$$2\,i\,a\,c\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,-i\,(a-b)\,d\,\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}\,\,\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,-$$

$$i\,(a-b)\,(c-d)\,\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2}$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{a+b}}\,\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\sqrt{\frac{-a+b}{a+b}}\,\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\,(d+c\,\text{Cos}[e+f\,x])\,\text{Sec}[e+f\,x]^{3/2}\,\sqrt{\frac{1}{1-\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}}\,\,\Big(-1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]^2}}\,\Bigg)$$

Problem 199: Unable to integrate problem.

$$\int \frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{c+d\,\mathrm{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 220 leaves, 3 steps):

$$-\frac{2\sqrt{a+b}\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{c\,f}+\frac{2\,(b\,c-a\,d)\,\mathrm{EllipticPi}\left[\frac{2\,d}{c+d},\mathrm{ArcSin}\left[\frac{\sqrt{1-\mathrm{Sec}[e+f\,x]}}{\sqrt{2}}\right],\frac{2\,b}{a+b}\right]\sqrt{\frac{a+b\,\mathrm{Sec}[e+f\,x]}{a+b}}\,\mathrm{Tan}[e+f\,x]}{c\,(c+d)\,f\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\sqrt{-\mathrm{Tan}[e+f\,x]^2}}$$

Result (type 8, 29 leaves):

$$\int \frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{c+d\,\mathrm{Sec}[e+f\,x]}\,dx$$

Problem 201: Unable to integrate problem.

$$\int \frac{(a+b\,\mathrm{Sec}[e+f\,x])^{3/2}}{c+d\,\mathrm{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 326 leaves, 5 steps):

$$\frac{2\,b\sqrt{a+b}\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{d\,f}-\frac{2\,a\sqrt{a+b}\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{c\,f}-\frac{2\,(b\,c-a\,d)^2\,\mathrm{EllipticPi}\left[\frac{2\,d}{c+d},\mathrm{ArcSin}\left[\frac{\sqrt{1-\mathrm{Sec}[e+f\,x]}}{\sqrt{2}}\right],\frac{2\,b}{a+b}\right]\sqrt{\frac{a+b\,\mathrm{Sec}[e+f\,x]}{a+b}}\,\mathrm{Tan}[e+f\,x]}{c\,d\,(c+d)\,f\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\sqrt{-\mathrm{Tan}[e+f\,x]^2}}$$

Result (type 8, 29 leaves):

$$\int \frac{(a+b\,\mathrm{Sec}[e+f\,x])^{3/2}}{c+d\,\mathrm{Sec}[e+f\,x]}\,dx$$

Problem 204: Unable to integrate problem.

$$\int \frac{1}{\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\left(c+d\,\text{Sec}[e+f\,x]\right)}\,dx$$

Optimal (type 4, 216 leaves, 3 steps):

$$-\frac{2\sqrt{a+b}\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}}{a\,c\,f}-\frac{2\,d\,\text{EllipticPi}\left[\frac{2\,d}{c+d},\,\text{ArcSin}\left[\frac{\sqrt{1-\text{Sec}[e+f\,x]}}{\sqrt{2}}\right],\,\frac{2\,b}{a+b}\right]\sqrt{\frac{a+b\,\text{Sec}[e+f\,x]}{a+b}}\,\text{Tan}[e+f\,x]}{c\,(c+d)\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\sqrt{-\text{Tan}[e+f\,x]^2}}$$

Result (type 8, 29 leaves):

$$\int \frac{1}{\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\left(c+d\,\text{Sec}[e+f\,x]\right)}\,dx$$

Problem 205: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{c+d\,\text{Sec}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 376 leaves, 6 steps):

$$\frac{2\,(b\,c-a\,d)\,\text{Cot}[e+f\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}}{a\,b\,\sqrt{a+b}\,f}-\frac{2\,(b\,c-a\,d)\,\text{Cot}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}}{a\,b\,\sqrt{a+b}\,f}-\frac{2\sqrt{a+b}\,c\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[e+f\,x])}{a-b}}}{a^2\,f}+\frac{2\,b\,(b\,c-a\,d)\,\text{Tan}[e+f\,x]}{a\left(a^2-b^2\right)f\sqrt{a+b\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 1491 leaves):

$$\frac{(b+a\,\text{Cos}[e+f\,x])^2\,\text{Sec}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])\left(\frac{2\,(-b\,c+a\,d)\,\text{Sin}[e+f\,x]}{a\,(a^2-b^2)}-\frac{2\,\left(-b^2\,c\,\text{Sin}[e+f\,x]+a\,b\,d\,\text{Sin}[e+f\,x]\right)}{a\,(a^2-b^2)\,(b+a\,\text{Cos}[e+f\,x])}\right)}{f\,(d+c\,\text{Cos}[e+f\,x])\,(a+b\,\text{Sec}[e+f\,x])^{3/2}}+$$

$$\left(2\,(b+a\,\mathrm{Cos}[e+f\,x])^{3/2}\,\sqrt{\mathrm{Sec}[e+f\,x]}\,\,(c+d\,\mathrm{Sec}[e+f\,x])\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}}\right.$$

$$\left(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,c\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,\,c\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-a^2\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-\right.$$

$$2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,c\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^3+2\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^3+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,c\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^5-$$

$$b^2\,\sqrt{\frac{-a+b}{a+b}}\,\,c\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^5-a^2\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^5+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,d\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^5-$$

$$2\,i\,a^2\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{a+b}}\,+2\,i\,b^2\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\,\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{a+b}}\,-$$

$$2\,i\,a^2\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{a+b}}\,+2\,i\,b^2\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\,\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{a+b}}\,+$$

$$i\,(a-b)\,(-b\,c+a\,d)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2}\,\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+i\,(a-b)\,(2\,b\,c+a\,(c-d))\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)f\,(d+c\,\text{Cos}[e+f x])\,(a+b\,\text{Sec}[e+f x])^{3/2}\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)$$

- **Problem 206: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{c+d\,\text{Sec}[e+f x]}{(a+b\,\text{Sec}[e+f x])^{5/2}}\,dx$$

Optimal (type 4, 495 leaves, 7 steps) :

$$\frac{1}{3\,a^2\,(a-b)\,b\,(a+b)^{3/2}\,f}2\left(7\,a^2\,b\,c-3\,b^3\,c-4\,a^3\,d\right)\text{Cot}[e+f x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}-$$

$$\frac{1}{3\,a^2\,(a-b)\,b\,(a+b)^{3/2}\,f}2\left(6\,a^2\,b\,c-a\,b^2\,c-3\,b^3\,c-3\,a^3\,d+a^2\,b\,d\right)\text{Cot}[e+f x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}-$$

$$\frac{2\sqrt{a+b}\,c\,\text{Cot}[e+f x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{a^3\,f}+$$

$$\frac{2\,b\,(b\,c-a\,d)\,\text{Tan}[e+f x]}{3\,a\left(a^2-b^2\right)f\,(a+b\,\text{Sec}[e+f x])^{3/2}}+\frac{2\,b\left(7\,a^2\,b\,c-3\,b^3\,c-4\,a^3\,d\right)\text{Tan}[e+f x]}{3\,a^2\left(a^2-b^2\right)^2f\sqrt{a+b\,\text{Sec}[e+f x]}}$$

Result (type 4, 2083 leaves) :

$$\left((b+a\,\mathrm{Cos}[e+f\,x])^3\,\mathrm{Sec}[e+f\,x]^2\,(c+d\,\mathrm{Sec}[e+f\,x])\left(\frac{2\left(-7\,a^2\,b\,c+3\,b^3\,c+4\,a^3\,d\right)\mathrm{Sin}[e+f\,x]}{3\,a^2\left(a^2-b^2\right)^2}-\frac{2\left(b^3\,c\,\mathrm{Sin}[e+f\,x]-a\,b^2\,d\,\mathrm{Sin}[e+f\,x]\right)}{3\,a^2\left(a^2-b^2\right)(b+a\,\mathrm{Cos}[e+f\,x])^2}-\frac{2\left(-8\,a^2\,b^2\,c\,\mathrm{Sin}[e+f\,x]+4\,b^4\,c\,\mathrm{Sin}[e+f\,x]+5\,a^3\,b\,d\,\mathrm{Sin}[e+f\,x]-a\,b^3\,d\,\mathrm{Sin}[e+f\,x]\right)}{3\,a^2\left(a^2-b^2\right)^2(b+a\,\mathrm{Cos}[e+f\,x])}\right)\right)\Big/\left(f\,(d+c\,\mathrm{Cos}[e+f\,x])\,(a+b\,\mathrm{Sec}[e+f\,x])^{5/2}\right)+$$

$$\left(2\,(b+a\,\mathrm{Cos}[e+f\,x])^{5/2}\,\mathrm{Sec}[e+f\,x]^{3/2}\,(c+d\,\mathrm{Sec}[e+f\,x])\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}}\right.$$

$$\left(7\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]+7\,a^2\,b^2\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]-3\,a\,b^3\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]-\right.$$

$$3\,b^4\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]-4\,a^4\sqrt{\frac{-a+b}{a+b}}\,d\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]-4\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,d\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]-$$

$$14\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^3+6\,a\,b^3\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^3+8\,a^4\sqrt{\frac{-a+b}{a+b}}\,d\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^3+$$

$$7\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^5-7\,a^2\,b^2\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^5-3\,a\,b^3\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^5+$$

$$3\,b^4\sqrt{\frac{-a+b}{a+b}}\,c\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^5-4\,a^4\sqrt{\frac{-a+b}{a+b}}\,d\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^5+4\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,d\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^5-$$

$$6\,i\,a^4\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}+12\,i\,a^2\,b^2\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}-$$

$$6\,i\,b^4\,c\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}-6\,i\,a^4\,c\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}+$$

$$12\,i\,a^2\,b^2\,c\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}-6\,i\,b^4\,c\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}+$$

$$i\,(a-b)\left(-7\,a^2\,b\,c+3\,b^3\,c+4\,a^3\,d\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}+$$

$$i\,(a-b)\left(-4\,a\,b^2\,c-6\,b^3\,c+3\,a^3\,(c-d)+a^2\,b\,(9\,c+d)\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(3\,a^2\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^2 f\,(d+c\,\text{Cos}[e+f\,x])\,(a+b\,\text{Sec}[e+f\,x])^{5/2}\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)\right)$$

Problem 207: Unable to integrate problem.

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 389 leaves, 3 steps):

$$-\frac{1}{\sqrt{a+b}\,f}2\sqrt{c+d}\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{a\,(c+d)}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{a+b}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}{\sqrt{c+d}\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]$$
$$\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\,\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\,(a+b\,\text{Sec}[e+f\,x])+$$
$$\frac{1}{\sqrt{\frac{a+b}{c+d}}\,f}2\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,(c+d)}{(a+b)\,d},\,\text{ArcSin}\left[\frac{\sqrt{\frac{a+b}{c+d}}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]$$
$$\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\,\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\,(a+b\,\text{Sec}[e+f\,x])$$

Result (type 8, 31 leaves):

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\,dx$$

- **Problem 208: Result more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{c+d\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 4, 198 leaves, 1 step):

$$-\frac{1}{\sqrt{a+b}\,c\,f}2\sqrt{c+d}\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{a\,(c+d)}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{a+b}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}{\sqrt{c+d}\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]$$
$$\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\,\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\,(a+b\,\text{Sec}[e+f\,x])$$

Result (type 4, 554 leaves):

$$\frac{1}{f\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}4\,(b\,c-a\,d)\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\,\sqrt{a+b\,\text{Sec}[e+f\,x]}$$

$$\left(\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\left.\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\right)\Big/$$

$$\left((c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\left(a\,\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\text{Csc}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\right)$$

- **Problem 209: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{(c+d\,\text{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 4, 598 leaves, 5 steps) :

$$-\frac{1}{\sqrt{a+b}\,c^2 f}2\sqrt{c+d}\,\mathrm{Cot}[e+fx]\,\mathrm{EllipticPi}\left[\frac{a(c+d)}{(a+b)c},\mathrm{ArcSin}\left[\frac{\sqrt{a+b}\,\sqrt{c+d\,\mathrm{Sec}[e+fx]}}{\sqrt{c+d}\,\sqrt{a+b\,\mathrm{Sec}[e+fx]}}\right],\frac{(a-b)(c+d)}{(a+b)(c-d)}\right]$$
$$\sqrt{-\frac{(bc-ad)(1-\mathrm{Sec}[e+fx])}{(c+d)(a+b\,\mathrm{Sec}[e+fx])}}\,\sqrt{\frac{(bc-ad)(1+\mathrm{Sec}[e+fx])}{(c-d)(a+b\,\mathrm{Sec}[e+fx])}}\,(a+b\,\mathrm{Sec}[e+fx])-$$
$$\left(2\sqrt{a+b}\,d\,\mathrm{Cot}[e+fx]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{a+b\,\mathrm{Sec}[e+fx]}}{\sqrt{a+b}\,\sqrt{c+d\,\mathrm{Sec}[e+fx]}}\right],\frac{(a+b)(c-d)}{(a-b)(c+d)}\right](1+\mathrm{Sec}[e+fx])\sqrt{\frac{(bc-ad)(1-\mathrm{Sec}[e+fx])}{(a+b)(c+d\,\mathrm{Sec}[e+fx])}}\right)\Big/$$
$$\left(c(c-d)\sqrt{c+d}\,f\sqrt{-\frac{(bc-ad)(1+\mathrm{Sec}[e+fx])}{(a-b)(c+d\,\mathrm{Sec}[e+fx])}}\right)-$$
$$\left(2(a-b)\sqrt{a+b}\,d\,\mathrm{Cot}[e+fx]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{a+b\,\mathrm{Sec}[e+fx]}}{\sqrt{a+b}\,\sqrt{c+d\,\mathrm{Sec}[e+fx]}}\right],\frac{(a+b)(c-d)}{(a-b)(c+d)}\right]\right.$$
$$\left.\sqrt{\frac{(bc-ad)(1-\mathrm{Sec}[e+fx])}{(a+b)(c+d\,\mathrm{Sec}[e+fx])}}\,\sqrt{-\frac{(bc-ad)(1+\mathrm{Sec}[e+fx])}{(a-b)(c+d\,\mathrm{Sec}[e+fx])}}\,(c+d\,\mathrm{Sec}[e+fx])\right)\Big/\left(c(c-d)\sqrt{c+d}\,(bc-ad)f\right)$$

Result (type 4, 1678 leaves) :

$$\frac{1}{(c-d)(c+d)f\sqrt{b+a\,\mathrm{Cos}[e+fx]}\,(c+d\,\mathrm{Sec}[e+fx])^{3/2}}(d+c\,\mathrm{Cos}[e+fx])^{3/2}\,\mathrm{Sec}[e+fx]\sqrt{a+b\,\mathrm{Sec}[e+fx]}$$
$$\left(\left(4bc(bc-ad)\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+fx)\right]^2}{c-d}}\sqrt{\frac{(c+d)(b+a\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\left[\frac{1}{2}(e+fx)\right]^2}{bc-ad}}\sqrt{-\frac{(a+b)(d+c\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\left[\frac{1}{2}(e+fx)\right]^2}{bc-ad}}\right.\right.$$
$$\left.\mathrm{Csc}[e+fx]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)(d+c\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\left[\frac{1}{2}(e+fx)\right]^2}{bc-ad}}}{\sqrt{2}}\right],\frac{2(bc-ad)}{(a+b)(c-d)}\right]\mathrm{Sin}\left[\frac{1}{2}(e+fx)\right]^4\right)\Big/$$
$$\left((a+b)(c+d)\sqrt{b+a\,\mathrm{Cos}[e+fx]}\,\sqrt{d+c\,\mathrm{Cos}[e+fx]}\right)+4(bc-ad)(ac+bd)$$

$$\left(\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.$$

$$\left.\text{Csc}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{d+c\,\text{Cos}[e+f x]}\right)-\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\,\text{Csc}[e+f x]\,\text{EllipticPi}\left[\frac{b c-a d}{(a+b)\,c},\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{d+c\,\text{Cos}[e+f x]}\right)\right)+$$

$$2\,a\,d\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{d+c\,\text{Cos}[e+f x]}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}}\right],\frac{2\,(b c-a d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.$$

$$\left(a\,c\,\sqrt{\frac{(a+b)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2}{b+a\,\text{Cos}[e+f x]}}\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\,\sqrt{\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])}{(c+d)\,(b+a\,\text{Cos}[e+f x])}}\right)-$$

$$\frac{1}{a\,c}2\,(b\,c-a\,d)\left(\left((b\,c+(a+b)\,d)\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\left((b\,c+a\,d)\right.$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)+$$

$$\left.\left.\frac{\sqrt{d+c\,\text{Cos}[e+f\,x]}\;\text{Sin}[e+f\,x]}{c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right)\right)+\frac{2\,d\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\;\text{Tan}[e+f\,x]}{\left(-c^2+d^2\right)\,f\,(c+d\,\text{Sec}[e+f\,x])^{3/2}}$$

- **Problem 210: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]}}{(c+d\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 4, 899 leaves, 7 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,d\,\left(6\,b\,c^3-7\,a\,c^2\,d-2\,b\,c\,d^2+3\,a\,d^3\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\mathrm{Cos}[e+f\,x])}{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Cos}[e+f\,x])}{(a-b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\right.$$

$$\left.(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right)\Big/$$

$$\left(3\,c^2\,(c-d)^2\,(c+d)^{3/2}\,(b\,c-a\,d)^2\,f\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}\right)+$$

$$\left(2\,\sqrt{a+b}\,\left(b\,c^2\,\left(3\,c^2+3\,c\,d-2\,d^2\right)-a\,d\,\left(9\,c^3-2\,c^2\,d-6\,c\,d^2+3\,d^3\right)\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\mathrm{Cos}[e+f\,x])}{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Cos}[e+f\,x])}{(a-b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\right.$$

$$\left.(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right)\Big/$$

$$\left(3\,c^3\,(c-d)^2\,(c+d)^{3/2}\,(b\,c-a\,d)\,f\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}\right)-$$

$$\left(2\,\sqrt{a+b}\,\sqrt{-\frac{(b\,c-a\,d)\,(1-\mathrm{Cos}[e+f\,x])}{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Cos}[e+f\,x])}{(a-b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Csc}[e+f\,x]\right.$$

$$\left.\mathrm{EllipticPi}\left[\frac{(a+b)\,c}{a\,(c+d)},\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right)\Big/$$

$$\left(c^3\,\sqrt{c+d}\,f\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}\right)+\frac{2\,d^2\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\,\mathrm{Sin}[e+f\,x]}{3\,c\,\left(c^2-d^2\right)\,f\,(d+c\,\mathrm{Cos}[e+f\,x])\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 4, 1960 leaves):

$$\frac{1}{f\,(c+d\,\mathrm{Sec}[e+f\,x])^{5/2}}(d+c\,\mathrm{Cos}[e+f\,x])^3\,\mathrm{Sec}[e+f\,x]^2\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}$$

$$\left(\frac{2\,d^2\,\mathrm{Sin}[e+f\,x]}{3\,c\,\left(c^2-d^2\right)\,(d+c\,\mathrm{Cos}[e+f\,x])^2}-\frac{2\,\left(6\,b\,c^3\,d\,\mathrm{Sin}[e+f\,x]-7\,a\,c^2\,d^2\,\mathrm{Sin}[e+f\,x]-2\,b\,c\,d^3\,\mathrm{Sin}[e+f\,x]+3\,a\,d^4\,\mathrm{Sin}[e+f\,x]\right)}{3\,c\,(b\,c-a\,d)\,\left(c^2-d^2\right)^2\,(d+c\,\mathrm{Cos}[e+f\,x])}\right)+$$

$$\left((d+c\,\mathrm{Cos}[e+f\,x])^{5/2}\,\mathrm{Sec}[e+f\,x]^2\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right.\left(\left(4\,(b\,c-a\,d)\,\left(3\,b^2\,c^4-3\,a\,b\,c^3\,d-a^2\,c^2\,d^2+b^2\,c^2\,d^2-a\,b\,c\,d^3+a^2\,d^4\right)\right.\right.$$

$$\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\ \sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}$$

$$\left.\mathrm{Csc}[e+f x]\ \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\ \frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\ \mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f x]}\ \sqrt{d+c\,\mathrm{Cos}[e+f x]}\right)+4\,(b c-a d)\,\left(3 a b c^4-3 a^2 c^3 d+6 b^2 c^3 d-7 a b c^2 d^2-a^2 c d^3-2 b^2 c d^3+4 a b d^4\right)$$

$$\left(\left(\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\ \sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.$$

$$\mathrm{Csc}[e+f x]\ \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\ \frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f x]}\ \sqrt{d+c\,\mathrm{Cos}[e+f x]}\right)-$$

$$\left(\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\ \sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.$$

$$\left.\mathrm{Csc}[e+f x]\ \mathrm{EllipticPi}\left[\frac{b c-a d}{(a+b)\,c},\ \mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\ \frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\ \mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,c\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)\right)+2\left(6\,a\,b\,c^3\,d-7\,a^2\,c^2\,d^2-2\,a\,b\,c\,d^3+3\,a^2\,d^4\right)$$

$$\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}}\right],\,\frac{2\,(b\,c-a\,d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.$$

$$\left(a\,c\,\sqrt{\frac{(a+b)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b+a\,\mathrm{Cos}[e+f\,x]}}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\sqrt{\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])}}\right)-$$

$$\frac{1}{a\,c}\,2\,(b\,c-a\,d)\left(\left(\left((b\,c+(a+b)\,d)\,\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\mathrm{Csc}[e+f\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)-\left((b\,c+a\,d)\right.$$

$$\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\left.\mathrm{Csc}[e+f\,x]\;\mathrm{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/$$

$$\left((a+b)\, c \sqrt{b+a \cos[e+f x]} \sqrt{d+c \cos[e+f x]}\right) + \frac{\sqrt{d+c \cos[e+f x]}\, \sin[e+f x]}{c \sqrt{b+a \cos[e+f x]}}\Bigg)\Bigg)\Bigg) \Big/$$

$$\left(3 c\, (c-d)^2\, (c+d)^2\, (b c-a d)\, f \sqrt{b+a \cos[e+f x]}\, (c+d \sec[e+f x])^{5/2}\right)$$

- **Problem 211: Result more than twice size of optimal antiderivative.**

$$\int \frac{(a+b \sec[e+f x])^{3/2}}{(c+d \sec[e+f x])^{3/2}}\, dx$$

Optimal (type 4, 744 leaves, 6 steps) :

$$-\Bigg(2\, (a-b) \sqrt{a+b} \sqrt{-\frac{(b c-a d)\, (1-\cos[e+f x])}{(a+b)\, (d+c \cos[e+f x])}} \sqrt{-\frac{(b c-a d)\, (1+\cos[e+f x])}{(a-b)\, (d+c \cos[e+f x])}}\, (d+c \cos[e+f x])^{3/2} \csc[e+f x]\, \text{EllipticE}\Big[$$

$$\text{ArcSin}\Big[\frac{\sqrt{c+d} \sqrt{b+a \cos[e+f x]}}{\sqrt{a+b} \sqrt{d+c \cos[e+f x]}}\Big], \frac{(a+b)\, (c-d)}{(a-b)\, (c+d)}\Big] \sqrt{a+b \sec[e+f x]}\Bigg) \Big/ \left(c\, (c-d) \sqrt{c+d}\, f \sqrt{b+a \cos[e+f x]} \sqrt{c+d \sec[e+f x]}\right) -$$

$$\Bigg(2 \sqrt{a+b}\, (b c-a\, (2 c-d)) \sqrt{-\frac{(b c-a d)\, (1-\cos[e+f x])}{(a+b)\, (d+c \cos[e+f x])}} \sqrt{-\frac{(b c-a d)\, (1+\cos[e+f x])}{(a-b)\, (d+c \cos[e+f x])}}\, (d+c \cos[e+f x])^{3/2}$$

$$\csc[e+f x]\, \text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{c+d} \sqrt{b+a \cos[e+f x]}}{\sqrt{a+b} \sqrt{d+c \cos[e+f x]}}\Big], \frac{(a+b)\, (c-d)}{(a-b)\, (c+d)}\Big] \sqrt{a+b \sec[e+f x]}\Bigg) \Big/$$

$$\left(c^2\, (c-d) \sqrt{c+d}\, f \sqrt{b+a \cos[e+f x]} \sqrt{c+d \sec[e+f x]}\right) -$$

$$\Bigg(2 a \sqrt{a+b} \sqrt{-\frac{(b c-a d)\, (1-\cos[e+f x])}{(a+b)\, (d+c \cos[e+f x])}} \sqrt{-\frac{(b c-a d)\, (1+\cos[e+f x])}{(a-b)\, (d+c \cos[e+f x])}}\, (d+c \cos[e+f x])^{3/2} \csc[e+f x]$$

$$\text{EllipticPi}\Big[\frac{(a+b)\, c}{a\, (c+d)}, \text{ArcSin}\Big[\frac{\sqrt{c+d} \sqrt{b+a \cos[e+f x]}}{\sqrt{a+b} \sqrt{d+c \cos[e+f x]}}\Big], \frac{(a+b)\, (c-d)}{(a-b)\, (c+d)}\Big] \sqrt{a+b \sec[e+f x]}\Bigg) \Big/$$

$$\left(c^2 \sqrt{c+d}\, f \sqrt{b+a \cos[e+f x]} \sqrt{c+d \sec[e+f x]}\right)$$

Result (type 4, 1720 leaves) :

$$\frac{2\, (d+c \cos[e+f x])\, (a+b \sec[e+f x])^{3/2}\, (-b c \sin[e+f x]+a d \sin[e+f x])}{\left(-c^2+d^2\right) f\, (b+a \cos[e+f x])\, (c+d \sec[e+f x])^{3/2}} +$$

$$\frac{1}{(c-d)\,(c+d)\,f\,(b+a\cos[e+f x])^{3/2}\,(c+d\sec[e+f x])^{3/2}}\,(d+c\cos[e+f x])^{3/2}\,(a+b\sec[e+f x])^{3/2}$$

$$\left(\left(\left(4\,(b c-a d)\,\left(a b c-b^2 d\right)\sqrt{\frac{(c+d)\cot\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\,\csc[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\,\frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]$$

$$\left.\sin\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\cos[e+f x]}\,\sqrt{d+c\cos[e+f x]}\right)+4\left(a^2 c-b^2 c\right)(b c-a d)$$

$$\left(\left(\sqrt{\frac{(c+d)\cot\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\,\sqrt{-\frac{(a+b)\,(d+c\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.$$

$$\left.\csc[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\,\frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\sin\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\cos[e+f x]}\,\sqrt{d+c\cos[e+f x]}\right)-\left(\sqrt{\frac{(c+d)\cot\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\,\csc[e+f x]\,\text{EllipticPi}\left[\frac{b c-a d}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\cos[e+f x])\csc\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\right)+$$

$$2\,\left(-a\,b\,c+a^2\,d\right)\,\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}}\right],\,\frac{2\,(b\,c-a\,d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.$$

$$\left(a\,c\,\sqrt{\frac{(a+b)\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b+a\,\text{Cos}[e+f\,x]}}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}\,\sqrt{\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}{(c+d)\,(b+a\,\text{Cos}[e+f\,x])}}\right)-$$

$$\frac{1}{a\,c}\,2\,(b\,c-a\,d)\,\left(\left((b\,c+(a+b)\,d)\,\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\Bigg((b\,c+a\,d)$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\Bigg|+\frac{\sqrt{d+c\,\text{Cos}[e+f\,x]}\,\,\text{Sin}[e+f\,x]}{c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\Bigg)\Bigg)$$

Problem 212: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Sec}[e+f\,x])^{3/2}}{(c+d\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 4, 919 leaves, 7 steps):

$$-\left(2\,(a-b)\,\sqrt{a+b}\,\left(3\,b\,c^3-7\,a\,c^2\,d+b\,c\,d^2+3\,a\,d^3\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Cos}[e+f\,x])}{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Cos}[e+f\,x])}{(a-b)\,(d+c\,\text{Cos}[e+f\,x])}}\right.$$
$$\left.(d+c\,\text{Cos}[e+f\,x])^{3/2}\,\text{Csc}[e+f\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)\Big/$$
$$\left(3\,c^2\,(c-d)^2\,(c+d)^{3/2}\,(b\,c-a\,d)\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)-$$
$$\left(2\,\sqrt{a+b}\,\left(b^2\,c^3\,(3\,c+d)-2\,a\,b\,c^2\,\left(3\,c^2+2\,c\,d-d^2\right)+a^2\,d\,\left(9\,c^3-2\,c^2\,d-6\,c\,d^2+3\,d^3\right)\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Cos}[e+f\,x])}{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}}\right.$$
$$\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Cos}[e+f\,x])}{(a-b)\,(d+c\,\text{Cos}[e+f\,x])}}\,(d+c\,\text{Cos}[e+f\,x])^{3/2}\,\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]$$
$$\left.\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)\Big/\left(3\,c^3\,(c-d)^2\,(c+d)^{3/2}\,(b\,c-a\,d)\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)-$$
$$\left(2\,a\,\sqrt{a+b}\,\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Cos}[e+f\,x])}{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Cos}[e+f\,x])}{(a-b)\,(d+c\,\text{Cos}[e+f\,x])}}\,(d+c\,\text{Cos}[e+f\,x])^{3/2}\,\text{Csc}[e+f\,x]\right.$$
$$\left.\text{EllipticPi}\left[\frac{(a+b)\,c}{a\,(c+d)},\,\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)\Big/$$
$$\left(c^3\,\sqrt{c+d}\,\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)-\frac{2\,d\,(b\,c-a\,d)\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\,\text{Sin}[e+f\,x]}{3\,c\,\left(c^2-d^2\right)\,f\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 1930 leaves):

$$\Bigg((d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}[e+f\,x]\,(a+b\,\text{Sec}[e+f\,x])^{3/2}$$

$$\left(\frac{2\left(-b\,c\,d\,\text{Sin}[e+f\,x]+a\,d^2\,\text{Sin}[e+f\,x]\right)}{3\,c\left(c^2-d^2\right)(d+c\,\text{Cos}[e+f\,x])^2}+\frac{2\left(3\,b\,c^3\,\text{Sin}[e+f\,x]-7\,a\,c^2\,d\,\text{Sin}[e+f\,x]+b\,c\,d^2\,\text{Sin}[e+f\,x]+3\,a\,d^3\,\text{Sin}[e+f\,x]\right)}{3\,c\left(c^2-d^2\right)^2(d+c\,\text{Cos}[e+f\,x])}\right)\Bigg)\Big/$$

$$\left(f\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^{5/2}\right)+\frac{1}{3\,c\,(c-d)^2\,(c+d)^2\,f\,(b+a\,\text{Cos}[e+f\,x])^{3/2}\,(c+d\,\text{Sec}[e+f\,x])^{5/2}}$$

$$(d+c\,\text{Cos}[e+f\,x])^{5/2}\,\text{Sec}[e+f\,x]\,(a+b\,\text{Sec}[e+f\,x])^{3/2}$$

$$\Bigg(\Bigg(4\,(b\,c-a\,d)\left(3\,a\,b\,c^3+a^2\,c^2\,d-4\,b^2\,c^2\,d+a\,b\,c\,d^2-a^2\,d^3\right)\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]$$

$$\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\Bigg)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)+4\,(b\,c-a\,d)$$

$$\left(3\,a^2\,c^3-3\,b^2\,c^3+4\,a\,b\,c^2\,d+a^2\,c\,d^2-b^2\,c\,d^2-4\,a\,b\,d^3\right)\Bigg(\Bigg(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\Bigg)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-$$

$$\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\ \sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.$$

$$\left.\text{Csc}[e+f x]\,\text{EllipticPi}\left[\frac{b c-a d}{(a+b)\,c},\ \text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\ \frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f x]}\ \sqrt{d+c\,\text{Cos}[e+f x]}\right)\right)+2\left(-3 a b c^3+7 a^2 c^2 d-a b c d^2-3 a^2 d^3\right)$$

$$\left(\left(\left(\sqrt{\frac{-a+b}{a+b}}\ (a+b)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{d+c\,\text{Cos}[e+f x]}\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\ \text{Sin}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}}\right],\ \frac{2\,(b c-a d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.\right.$$

$$\left(a c\,\sqrt{\frac{(a+b)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2}{b+a\,\text{Cos}[e+f x]}}\ \sqrt{b+a\,\text{Cos}[e+f x]}\ \sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\ \sqrt{\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])}{(c+d)\,(b+a\,\text{Cos}[e+f x])}}\right)-$$

$$\frac{1}{a c}\,2\,(b c-a d)\left(\left(\left((b c+(a+b)\,d)\,\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\ \text{Csc}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right) \Big/ \left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\left((b\,c+a\,d)\right.$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\left.\text{Csc}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right) \Big/$$

$$\left.\left.\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\right)+\frac{\sqrt{d+c\,\text{Cos}[e+f\,x]}\,\text{Sin}[e+f\,x]}{c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right)\right)$$

- **Problem 213: Result more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\text{Sec}[e+f\,x])^{3/2}}{(c+d\,\text{Sec}[e+f\,x])^{7/2}}\,dx$$

Optimal (type 4, 1122 leaves, 8 steps) :

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(2\,a\,b\,c\,d\,\left(35\,c^4-8\,c^2\,d^2+5\,d^4\right)-a^2\,d^2\,\left(58\,c^4-41\,c^2\,d^2+15\,d^4\right)-b^2\,\left(15\,c^6+19\,c^4\,d^2-2\,c^2\,d^4\right)\right)\right.$$

$$\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Cos}[e+f\,x])}{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Cos}[e+f\,x])}{(a-b)\,(d+c\,\text{Cos}[e+f\,x])}}\,(d+c\,\text{Cos}[e+f\,x])^{3/2}$$

$$\left.\text{Csc}[e+f\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)\Big/$$

$$\left(15\,c^3\,(c-d)^3\,(c+d)^{5/2}\,(b\,c-a\,d)^2\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)-$$

$$\left(2\,\sqrt{a+b}\,\left(b^2\,c^3\,\left(15\,c^3+10\,c^2\,d+9\,c\,d^2-2\,d^3\right)-2\,a\,b\,c^2\,\left(15\,c^4+20\,c^3\,d-4\,c^2\,d^2-4\,c\,d^3+5\,d^4\right)+\right.\right.$$

$$\left.a^2\,d\,\left(60\,c^5-2\,c^4\,d-66\,c^3\,d^2+25\,c^2\,d^3+30\,c\,d^4-15\,d^5\right)\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Cos}[e+f\,x])}{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Cos}[e+f\,x])}{(a-b)\,(d+c\,\text{Cos}[e+f\,x])}}$$

$$\left.(d+c\,\text{Cos}[e+f\,x])^{3/2}\,\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)\Big/$$

$$\left(15\,c^4\,(c-d)^3\,(c+d)^{5/2}\,(b\,c-a\,d)\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)-$$

$$\left(2\,a\,\sqrt{a+b}\,\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Cos}[e+f\,x])}{(a+b)\,(d+c\,\text{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Cos}[e+f\,x])}{(a-b)\,(d+c\,\text{Cos}[e+f\,x])}}\,(d+c\,\text{Cos}[e+f\,x])^{3/2}\,\text{Csc}[e+f\,x]\right.$$

$$\left.\text{EllipticPi}\left[\frac{(a+b)\,c}{a\,(c+d)},\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)\Big/$$

$$\left(c^4\,\sqrt{c+d}\,f\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)+\frac{2\,d^2\,(b+a\,\text{Cos}[e+f\,x])\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\text{Sin}[e+f\,x]}{5\,c\,\left(c^2-d^2\right)\,f\,(d+c\,\text{Cos}[e+f\,x])^2\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}-$$

$$\frac{2\,d\,\left(10\,b\,c^3-13\,a\,c^2\,d-2\,b\,c\,d^2+5\,a\,d^3\right)\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\text{Sin}[e+f\,x]}{15\,c^2\,\left(c^2-d^2\right)^2\,f\,(d+c\,\text{Cos}[e+f\,x])\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 2355 leaves) :

$$\frac{1}{f\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^{7/2}}\,(d+c\,\text{Cos}[e+f\,x])^4\,\text{Sec}[e+f\,x]^2\,(a+b\,\text{Sec}[e+f\,x])^{3/2}$$

$$\left(-\frac{2\left(-b\,c\,d^2\,\text{Sin}[e+f\,x]+a\,d^3\,\text{Sin}[e+f\,x]\right)}{5\,c^2\left(c^2-d^2\right)(d+c\,\text{Cos}[e+f\,x])^3}-\frac{4\left(5\,b\,c^3\,d\,\text{Sin}[e+f\,x]-8\,a\,c^2\,d^2\,\text{Sin}[e+f\,x]-b\,c\,d^3\,\text{Sin}[e+f\,x]+4\,a\,d^4\,\text{Sin}[e+f\,x]\right)}{15\,c^2\left(c^2-d^2\right)^2(d+c\,\text{Cos}[e+f\,x])^2}+\right.$$

$$\left(2\left(15\,b^2\,c^6\,\text{Sin}[e+f\,x]-70\,a\,b\,c^5\,d\,\text{Sin}[e+f\,x]+58\,a^2\,c^4\,d^2\,\text{Sin}[e+f\,x]+19\,b^2\,c^4\,d^2\,\text{Sin}[e+f\,x]+16\,a\,b\,c^3\,d^3\,\text{Sin}[e+f\,x]-41\,a^2\,c^2\,d^4\,\text{Sin}[\right.\right.$$

$$\left.\left.\left.e+f\,x]-2\,b^2\,c^2\,d^4\,\text{Sin}[e+f\,x]-10\,a\,b\,c\,d^5\,\text{Sin}[e+f\,x]+15\,a^2\,d^6\,\text{Sin}[e+f\,x]\right)\right)\Big/\left(15\,c^2\,(b\,c-a\,d)\left(c^2-d^2\right)^3(d+c\,\text{Cos}[e+f\,x])\right)\right)+$$

$$\left((d+c\,\text{Cos}[e+f\,x])^{7/2}\,\text{Sec}[e+f\,x]^2\,(a+b\,\text{Sec}[e+f\,x])^{3/2}\left(\frac{1}{(a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}}\,4\,(b\,c-a\,d)\right.\right.$$

$$\left(-15\,a\,b^2\,c^6+5\,a^2\,b\,c^5\,d+25\,b^3\,c^5\,d+13\,a^3\,c^4\,d^2-38\,a\,b^2\,c^4\,d^2+25\,a^2\,b\,c^3\,d^3+7\,b^3\,c^3\,d^3-18\,a^3\,c^2\,d^4-11\,a\,b^2\,c^2\,d^4+2\,a^2\,b\,c\,d^5+5\,a^3\,d^6\right)$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4+$$

$$4\,(b\,c-a\,d)\left(-15\,a^2\,b\,c^6+15\,b^3\,c^6+15\,a^3\,c^5\,d-55\,a\,b^2\,c^5\,d+33\,a^2\,b\,c^4\,d^2+19\,b^3\,c^4\,d^2+13\,a^3\,c^3\,d^3+\right.$$

$$\left.35\,a\,b^2\,c^3\,d^3-70\,a^2\,b\,c^2\,d^4-2\,b^3\,c^2\,d^4+4\,a^3\,c\,d^5-12\,a\,b^2\,c\,d^5+20\,a^2\,b\,d^6\right)$$

$$\left(\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\left.\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\mathrm{Csc}[e+f\,x]\;\mathrm{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)\Bigg)+$$

$$2\,\left(15\,a\,b^2\,c^6-70\,a^2\,b\,c^5\,d+58\,a^3\,c^4\,d^2+19\,a\,b^2\,c^4\,d^2+16\,a^2\,b\,c^3\,d^3-41\,a^3\,c^2\,d^4-2\,a\,b^2\,c^2\,d^4-10\,a^2\,b\,c\,d^5+15\,a^3\,d^6\right)$$

$$\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}}\right],\,\frac{2\,(b\,c-a\,d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.\right.$$

$$\left(a\,c\,\sqrt{\frac{(a+b)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b+a\,\mathrm{Cos}[e+f\,x]}}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\sqrt{\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])}}\right)-$$

$$\frac{1}{a\,c}\,2\,(b\,c-a\,d)\left(\left((b\,c+(a+b)\,d)\,\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\mathrm{Csc}[e+f\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)-\Bigg((b\,c+a\,d)$$

$$\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f x]\ \text{EllipticPi}\left[\frac{b c-a d}{(a+b) c}, \text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\ (d+c \text{Cos}[e+f x])\ \text{Csc}\left[\frac{1}{2}\ (e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right], \frac{2\ (b c-a d)}{(a+b)\ (c-d)}\right]\ \text{Sin}\left[\frac{1}{2}\ (e+f x)\right]^4\Bigg) \Bigg/$$

$$\left((a+b)\ c \sqrt{b+a \text{Cos}[e+f x]}\ \sqrt{d+c \text{Cos}[e+f x]}\right)\Bigg) + \frac{\sqrt{d+c \text{Cos}[e+f x]}\ \text{Sin}[e+f x]}{c \sqrt{b+a \text{Cos}[e+f x]}}\Bigg)\Bigg)\Bigg) \Bigg/$$

$$\left(15 c^2\ (c-d)^3\ (c+d)^3\ (-b c+a d)\ f\ (b+a \text{Cos}[e+f x])^{3/2}\ (c+d \text{Sec}[e+f x])^{7/2}\right)$$

- **Problem 214: Result more than twice size of optimal antiderivative.**

$$\int \frac{(a+b \text{Sec}[e+f x])^{5/2}}{(c+d \text{Sec}[e+f x])^{5/2}}\, dx$$

Optimal (type 4, 891 leaves, 7 steps) :

$$-\left(2\,(a-b)\,\sqrt{a+b}\,\left(7\,a\,c^2-4\,b\,c\,d-3\,a\,d^2\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\mathrm{Cos}[e+f\,x])}{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Cos}[e+f\,x])}{(a-b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\right.$$

$$\left.(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right)\Big/$$

$$\left(3\,c^2\,(c-d)^2\,(c+d)^{3/2}\,f\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}\right)+$$

$$\left(2\,\sqrt{a+b}\,\left(b^2\,c^2\,(c+3\,d)-a\,b\,c\,\left(7\,c^2+4\,c\,d-3\,d^2\right)+a^2\,\left(9\,c^3-2\,c^2\,d-6\,c\,d^2+3\,d^3\right)\right)\sqrt{-\frac{(b\,c-a\,d)\,(1-\mathrm{Cos}[e+f\,x])}{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\right.$$

$$\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Cos}[e+f\,x])}{(a-b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]$$

$$\left.\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right)\Big/\left(3\,c^3\,(c-d)^2\,(c+d)^{3/2}\,f\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}\right)-$$

$$\left(2\,a^2\,\sqrt{a+b}\,\sqrt{-\frac{(b\,c-a\,d)\,(1-\mathrm{Cos}[e+f\,x])}{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Cos}[e+f\,x])}{(a-b)\,(d+c\,\mathrm{Cos}[e+f\,x])}}\,(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}\,\mathrm{Csc}[e+f\,x]\right.$$

$$\left.\mathrm{EllipticPi}\left[\frac{(a+b)\,c}{a\,(c+d)},\,\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\right)\Big/$$

$$\left(c^3\,\sqrt{c+d}\,f\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}\right)+\frac{2\,(b\,c-a\,d)^2\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\,\mathrm{Sin}[e+f\,x]}{3\,c\,\left(c^2-d^2\right)\,f\,(d+c\,\mathrm{Cos}[e+f\,x])\,\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 4, 1996 leaves) :

$$\left((d+c\,\mathrm{Cos}[e+f\,x])^3\,(a+b\,\mathrm{Sec}[e+f\,x])^{5/2}\left(\frac{2\,\left(b^2\,c^2\,\mathrm{Sin}[e+f\,x]-2\,a\,b\,c\,d\,\mathrm{Sin}[e+f\,x]+a^2\,d^2\,\mathrm{Sin}[e+f\,x]\right)}{3\,c\,\left(c^2-d^2\right)\,(d+c\,\mathrm{Cos}[e+f\,x])^2}+\right.\right.$$

$$\left(2\,\left(7\,a\,b\,c^3\,\mathrm{Sin}[e+f\,x]-7\,a^2\,c^2\,d\,\mathrm{Sin}[e+f\,x]-4\,b^2\,c^2\,d\,\mathrm{Sin}[e+f\,x]+a\,b\,c\,d^2\,\mathrm{Sin}[e+f\,x]+3\,a^2\,d^3\,\mathrm{Sin}[e+f\,x]\right)\right)\Big/$$

$$\left.\left.\left(3\,c\,\left(c^2-d^2\right)^2\,(d+c\,\mathrm{Cos}[e+f\,x])\right)\right)\right)\Big/\left(f\,(b+a\,\mathrm{Cos}[e+f\,x])^2\,(c+d\,\mathrm{Sec}[e+f\,x])^{5/2}\right)+$$

$$\frac{1}{3\,c\,(c-d)^2\,(c+d)^2\,f\,(b+a\,\mathrm{Cos}[e+f\,x])^{5/2}\,(c+d\,\mathrm{Sec}[e+f\,x])^{5/2}}\,(d+c\,\mathrm{Cos}[e+f\,x])^{5/2}\,(a+b\,\mathrm{Sec}[e+f\,x])^{5/2}$$

$$\left(\left(4\,(b\,c-a\,d)\,\left(2\,a^2\,b\,c^3+b^3\,c^3+a^3\,c^2\,d-8\,a\,b^2\,c^2\,d+2\,a^2\,b\,c\,d^2+3\,b^3\,c\,d^2-a^3\,d^3\right)\,\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\right.\right.$$

$$\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\left.\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)+4\,(b\,c-a\,d)\,\left(3\,a^3\,c^3-7\,a\,b^2\,c^3+4\,b^3\,c^2\,d+a^3\,c\,d^2+3\,a\,b^2\,c\,d^2-4\,a^2\,b\,d^3\right)$$

$$\left(\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-$$

$$\left(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.$$

$$\text{Csc}[e+f x]\,\text{EllipticPi}\left[\frac{b c-a d}{(a+b) c},\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\frac{2(b c-a d)}{(a+b)(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{d+c\,\text{Cos}[e+f x]}\right)\Bigg)+2\left(-7 a^2 b c^3+7 a^3 c^2 d+4 a b^2 c^2 d-a^2 b c d^2-3 a^3 d^3\right)$$

$$\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{d+c\,\text{Cos}[e+f x]}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}}\right],\frac{2(b c-a d)}{(-a+b)(c+d)}\right]\right)\Big/\right.$$

$$\left.\left(a\,c\sqrt{\frac{(a+b)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2}{b+a\,\text{Cos}[e+f x]}}\sqrt{b+a\,\text{Cos}[e+f x]}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\sqrt{\frac{(a+b)(d+c\,\text{Cos}[e+f x])}{(c+d)(b+a\,\text{Cos}[e+f x])}}\right)-\right.$$

$$\frac{1}{a c}2(b c-a d)\left(\left((b c+(a+b) d)\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\sqrt{\frac{(c+d)(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\,\text{Csc}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\right.$$

$$\left.\frac{2(b c-a d)}{(a+b)(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f x)\right]^4\Bigg)\Big/\left((a+b)(c+d)\sqrt{b+a\,\text{Cos}[e+f x]}\sqrt{d+c\,\text{Cos}[e+f x]}\right)-\Bigg((b c+a d)$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\sqrt{\frac{(c+d)(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\sqrt{-\frac{(a+b)(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}$$

$$\text{Csc}[e+f x]\,\text{EllipticPi}\left[\frac{b c-a d}{(a+b) c},\,\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\,\frac{2\,(b c-a d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{d+c\,\text{Cos}[e+f x]}\right)\Bigg)+\frac{\sqrt{d+c\,\text{Cos}[e+f x]}\,\text{Sin}[e+f x]}{c\,\sqrt{b+a\,\text{Cos}[e+f x]}}\Bigg)\Bigg)$$

- **Problem 215: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+b\,\text{Sec}[e+f x])^{5/2}}{(c+d\,\text{Sec}[e+f x])^{7/2}}\,dx$$

Optimal (type 4, 1150 leaves, 8 steps) :

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(b^2 c^2 d\,(29 c^2+3 d^2)-a b c\,(35 c^4+34 c^2 d^2-5 d^4)+a^2\,(58 c^4 d-41 c^2 d^3+15 d^5)\right)\sqrt{-\frac{(b c-a d)\,(1-\text{Cos}[e+f x])}{(a+b)\,(d+c\,\text{Cos}[e+f x])}}\right.$$

$$\sqrt{-\frac{(b c-a d)\,(1+\text{Cos}[e+f x])}{(a-b)\,(d+c\,\text{Cos}[e+f x])}}\,(d+c\,\text{Cos}[e+f x])^{3/2}\,\text{Csc}[e+f x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]$$

$$\left.\sqrt{a+b\,\text{Sec}[e+f x]}\right)\Big/\left(15 c^3\,(c-d)^3\,(c+d)^{5/2}\,(b c-a d)\,f\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{c+d\,\text{Sec}[e+f x]}\right)+$$

$$\left(2\sqrt{a+b}\,\left(b^3 c^4\,(5 c^2+24 c d+3 d^2)-a b^2 c^3\,(35 c^3+42 c^2 d+21 c d^2-2 d^3)+a^2 b c^2\,(45 c^4+48 c^3 d+c^2 d^2-8 c d^3+10 d^4)-\right.\right.$$

$$\left.a^3 d\,(60 c^5-2 c^4 d-66 c^3 d^2+25 c^2 d^3+30 c d^4-15 d^5)\right)\sqrt{-\frac{(b c-a d)\,(1-\text{Cos}[e+f x])}{(a+b)\,(d+c\,\text{Cos}[e+f x])}}\,\sqrt{-\frac{(b c-a d)\,(1+\text{Cos}[e+f x])}{(a-b)\,(d+c\,\text{Cos}[e+f x])}}$$

$$\left.(d+c\,\text{Cos}[e+f x])^{3/2}\,\text{Csc}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f x]}\right)\Big/$$

$$\left(15 c^4\,(c-d)^3\,(c+d)^{5/2}\,(b c-a d)\,f\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{c+d\,\text{Sec}[e+f x]}\right)-$$

$$\left(2 a^2\sqrt{a+b}\,\sqrt{-\frac{(b c-a d)\,(1-\text{Cos}[e+f x])}{(a+b)\,(d+c\,\text{Cos}[e+f x])}}\,\sqrt{-\frac{(b c-a d)\,(1+\text{Cos}[e+f x])}{(a-b)\,(d+c\,\text{Cos}[e+f x])}}\,(d+c\,\text{Cos}[e+f x])^{3/2}\,\text{Csc}[e+f x]\right.$$

$$\left.\text{EllipticPi}\left[\frac{(a+b)\,c}{a\,(c+d)},\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{b+a\,\text{Cos}[e+f x]}}{\sqrt{a+b}\,\sqrt{d+c\,\text{Cos}[e+f x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{a+b\,\text{Sec}[e+f x]}\right)\Big/$$

$$\left(c^4\sqrt{c+d}\,f\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{c+d\,\text{Sec}[e+f x]}\right)-\frac{2 d\,(b c-a d)\,(b+a\,\text{Cos}[e+f x])\,\sqrt{a+b\,\text{Sec}[e+f x]}\,\text{Sin}[e+f x]}{5 c\,(c^2-d^2)\,f\,(d+c\,\text{Cos}[e+f x])^2\,\sqrt{c+d\,\text{Sec}[e+f x]}}+$$

$$\frac{2\,(b c-a d)\,(5 b c^3-13 a c^2 d+3 b c d^2+5 a d^3)\,\sqrt{a+b\,\text{Sec}[e+f x]}\,\text{Sin}[e+f x]}{15 c^2\,(c^2-d^2)^2\,f\,(d+c\,\text{Cos}[e+f x])\,\sqrt{c+d\,\text{Sec}[e+f x]}}$$

Result (type 4, 2314 leaves) :

$$\frac{1}{f\,(b+a\,\text{Cos}[e+f x])^2\,(c+d\,\text{Sec}[e+f x])^{7/2}}$$

$$(d+c\,\text{Cos}[e+f x])^4\,\text{Sec}[e+f x]\,(a+b\,\text{Sec}[e+f x])^{5/2}\left(-\frac{2\left(b^2 c^2 d\,\text{Sin}[e+f x]-2 a b c d^2\,\text{Sin}[e+f x]+a^2 d^3\,\text{Sin}[e+f x]\right)}{5 c^2\,(c^2-d^2)\,(d+c\,\text{Cos}[e+f x])^3}+\right.$$

$$\left(2\left(5 b^2 c^4 \mathrm{Sin}[e+f x]-21 a b c^3 d\,\mathrm{Sin}[e+f x]+16 a^2 c^2 d^2 \mathrm{Sin}[e+f x]+3 b^2 c^2 d^2 \mathrm{Sin}[e+f x]+5 a b c d^3 \mathrm{Sin}[e+f x]-8 a^2 d^4 \mathrm{Sin}[e+f x]\right)\right)\Big/\left(15 c^2\left(c^2-d^2\right)^2(d+c\,\mathrm{Cos}[e+f x])^2\right)+$$

$$\left(2\left(35 a b c^5 \mathrm{Sin}[e+f x]-58 a^2 c^4 d\,\mathrm{Sin}[e+f x]-29 b^2 c^4 d\,\mathrm{Sin}[e+f x]+34 a b c^3 d^2 \mathrm{Sin}[e+f x]+41 a^2 c^2 d^3 \mathrm{Sin}[e+f x]-3 b^2 c^2 d^3 \mathrm{Sin}[e+f x]-5 a b c d^4 \mathrm{Sin}[e+f x]-15 a^2 d^5 \mathrm{Sin}[e+f x]\right)\right)\Big/\left(15 c^2\left(c^2-d^2\right)^3(d+c\,\mathrm{Cos}[e+f x])\right)\Bigg)+$$

$$\frac{1}{15 c^2 (c-d)^3 (c+d)^3 f (b+a\,\mathrm{Cos}[e+f x])^{5/2} (c+d\,\mathrm{Sec}[e+f x])^{7/2}}(d+c\,\mathrm{Cos}[e+f x])^{7/2}\,\mathrm{Sec}[e+f x]$$

$$(a+b\,\mathrm{Sec}[e+f x])^{5/2}\left(\frac{1}{(a+b)(c+d)\sqrt{b+a\,\mathrm{Cos}[e+f x]}\sqrt{d+c\,\mathrm{Cos}[e+f x]}}\right.$$

$$4(b c-a d)\left(10 a^2 b c^5+5 b^3 c^5+13 a^3 c^4 d-48 a b^2 c^4 d+15 a^2 b c^3 d^2+27 b^3 c^3 d^2-18 a^3 c^2 d^3-16 a b^2 c^2 d^3+7 a^2 b c d^4+5 a^3 d^5\right)$$

$$\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\sqrt{\frac{(c+d)(b+a\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\sqrt{-\frac{(a+b)(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}$$

$$\mathrm{Csc}[e+f x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\frac{2(b c-a d)}{(a+b)(c-d)}\right]\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]^4+$$

$$4(b c-a d)\left(15 a^3 c^5-35 a b^2 c^5+23 a^2 b c^4 d+29 b^3 c^4 d+13 a^3 c^3 d^2-5 a b^2 c^3 d^2-75 a^2 b c^2 d^3+3 b^3 c^2 d^3+4 a^3 c d^4+8 a b^2 c d^4+20 a^2 b d^5\right)$$

$$\left(\left(\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\sqrt{\frac{(c+d)(b+a\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\sqrt{-\frac{(a+b)(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.\right.$$

$$\left.\mathrm{Csc}[e+f x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)(d+c\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right],\frac{2(b c-a d)}{(a+b)(c-d)}\right]\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]^4\right)\Big/$$

$$\left((a+b)(c+d)\sqrt{b+a\,\mathrm{Cos}[e+f x]}\sqrt{d+c\,\mathrm{Cos}[e+f x]}\right)-\left(\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]^2}{c-d}}\sqrt{\frac{(c+d)(b+a\,\mathrm{Cos}[e+f x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{b c-a d}}\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\mathrm{Csc}[e+f\,x]\;\mathrm{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)\Bigg)+$$

$$2\,\left(-35\,a^2\,b\,c^5+58\,a^3\,c^4\,d+29\,a\,b^2\,c^4\,d-34\,a^2\,b\,c^3\,d^2-41\,a^3\,c^2\,d^3+3\,a\,b^2\,c^2\,d^3+5\,a^2\,b\,c\,d^4+15\,a^3\,d^5\right)$$

$$\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}}\right],\,\frac{2\,(b\,c-a\,d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.\right.$$

$$\left(a\,c\,\sqrt{\frac{(a+b)\,\mathrm{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b+a\,\mathrm{Cos}[e+f\,x]}}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\sqrt{\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])}}\right)-$$

$$\frac{1}{a\,c}\,2\,(b\,c-a\,d)\left(\left((b\,c+(a+b)\,d)\,\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\mathrm{Csc}[e+f\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)-\Bigg((b\,c+a\,d)$$

$$\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f x]\ \text{EllipticPi}\left[\frac{b c-a d}{(a+b) c}, \text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\ (d+c \text{Cos}[e+f x])\ \text{Csc}\left[\frac{1}{2}\ (e+f x)\right]^2}{b c-a d}}}{\sqrt{2}}\right], \frac{2\ (b c-a d)}{(a+b)\ (c-d)}\right] \text{Sin}\left[\frac{1}{2}\ (e+f x)\right]^4\Bigg) \Big/$$

$$\left((a+b)\ c \sqrt{b+a \text{Cos}[e+f x]}\ \sqrt{d+c \text{Cos}[e+f x]}\right)\Bigg) + \frac{\sqrt{d+c \text{Cos}[e+f x]}\ \text{Sin}[e+f x]}{c \sqrt{b+a \text{Cos}[e+f x]}}\Bigg)\Bigg)$$

Problem 216: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b \text{Sec}[e+f x])^{5/2}}{(c+d \text{Sec}[e+f x])^{9/2}}\, dx$$

Optimal (type 4, 1428 leaves, 9 steps):

$$\Bigg(2\ (a-b)\ \sqrt{a+b}\ \left(2 b^3 c^3 d \left(133 c^4+62 c^2 d^2-3 d^4\right)+2 a^2 b c d \left(406 c^6+73 c^4 d^2+132 c^2 d^4-35 d^6\right)-a b^2 c^2 \left(245 c^6+852 c^4 d^2+41 c^2 d^4+14 d^6\right)-\right.$$

$$\left.a^3 \left(582 c^6 d^2-485 c^4 d^4+392 c^2 d^6-105 d^8\right)\right) \sqrt{-\frac{(b c-a d)\ (1-\text{Cos}[e+f x])}{(a+b)\ (d+c \text{Cos}[e+f x])}}\ \sqrt{-\frac{(b c-a d)\ (1+\text{Cos}[e+f x])}{(a-b)\ (d+c \text{Cos}[e+f x])}}$$

$$(d+c \text{Cos}[e+f x])^{3/2} \text{Csc}[e+f x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\ \sqrt{b+a \text{Cos}[e+f x]}}{\sqrt{a+b}\ \sqrt{d+c \text{Cos}[e+f x]}}\right], \frac{(a+b)\ (c-d)}{(a-b)\ (c+d)}\right] \sqrt{a+b \text{Sec}[e+f x]}\Bigg) \Big/$$

$$\left(105 c^4\ (c-d)^4\ (c+d)^{7/2}\ (b c-a d)^2 f \sqrt{b+a \text{Cos}[e+f x]}\ \sqrt{c+d \text{Sec}[e+f x]}\right)+$$

$$\Bigg(2 \sqrt{a+b}\ \left(b^3 c^4 \left(35 c^4+231 c^3 d+67 c^2 d^2+57 c d^3-6 d^4\right)-a b^2 c^3 \left(245 c^5+413 c^4 d+439 c^3 d^2+53 c^2 d^3-12 c d^4+14 d^5\right)+\right.$$

$$a^2 b c^2 \left(315 c^6+497 c^5 d+219 c^4 d^2-73 c^3 d^3+208 c^2 d^4+56 c d^5-70 d^6\right)-$$

$$\left.a^3 d \left(525 c^7+57 c^6 d-699 c^5 d^2+214 c^4 d^3+672 c^3 d^4-280 c^2 d^5-210 c d^6+105 d^7\right)\right)$$

$$\sqrt{-\frac{(b c-a d)\ (1-\text{Cos}[e+f x])}{(a+b)\ (d+c \text{Cos}[e+f x])}}\ \sqrt{-\frac{(b c-a d)\ (1+\text{Cos}[e+f x])}{(a-b)\ (d+c \text{Cos}[e+f x])}}\ (d+c \text{Cos}[e+f x])^{3/2} \text{Csc}[e+f x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\ \sqrt{b+a \text{Cos}[e+f x]}}{\sqrt{a+b}\ \sqrt{d+c \text{Cos}[e+f x]}}\right], \frac{(a+b)\ (c-d)}{(a-b)\ (c+d)}\right] \sqrt{a+b \text{Sec}[e+f x]}\Bigg) \Big/$$

$$\left(105 c^5\ (c-d)^4\ (c+d)^{7/2}\ (b c-a d)\ f \sqrt{b+a \text{Cos}[e+f x]}\ \sqrt{c+d \text{Sec}[e+f x]}\right)-$$

$$\left(2 a^2 \sqrt{a+b} \sqrt{-\frac{(b c-a d) (1-\text{Cos}[e+f x])}{(a+b) (d+c \text{Cos}[e+f x])}} \sqrt{-\frac{(b c-a d) (1+\text{Cos}[e+f x])}{(a-b) (d+c \text{Cos}[e+f x])}} (d+c \text{Cos}[e+f x])^{3/2} \text{Csc}[e+f x]\right.$$
$$\left.\text{EllipticPi}\left[\frac{(a+b) c}{a (c+d)}, \text{ArcSin}\left[\frac{\sqrt{c+d} \sqrt{b+a \text{Cos}[e+f x]}}{\sqrt{a+b} \sqrt{d+c \text{Cos}[e+f x]}}\right], \frac{(a+b) (c-d)}{(a-b) (c+d)}\right] \sqrt{a+b \text{Sec}[e+f x]}\right) \Big/$$
$$\left(c^5 \sqrt{c+d}\, f \sqrt{b+a \text{Cos}[e+f x]} \sqrt{c+d \text{Sec}[e+f x]}\right) + \frac{2 d^2 (b+a \text{Cos}[e+f x])^2 \sqrt{a+b \text{Sec}[e+f x]}\, \text{Sin}[e+f x]}{7 c \left(c^2-d^2\right) f (d+c \text{Cos}[e+f x])^3 \sqrt{c+d \text{Sec}[e+f x]}} -$$
$$\frac{2 d \left(14 b c^3-19 a c^2 d-2 b c d^2+7 a d^3\right) (b+a \text{Cos}[e+f x]) \sqrt{a+b \text{Sec}[e+f x]}\, \text{Sin}[e+f x]}{35 c^2 \left(c^2-d^2\right)^2 f (d+c \text{Cos}[e+f x])^2 \sqrt{c+d \text{Sec}[e+f x]}} -$$
$$\left(2 \left(2 a b c d \left(91 c^4-2 c^2 d^2+7 d^4\right)-a^2 d^2 \left(162 c^4-101 c^2 d^2+35 d^4\right)-b^2 \left(35 c^6+67 c^4 d^2-6 c^2 d^4\right)\right) \sqrt{a+b \text{Sec}[e+f x]}\, \text{Sin}[e+f x]\right) \Big/$$
$$\left(105 c^3 \left(c^2-d^2\right)^3 f (d+c \text{Cos}[e+f x]) \sqrt{c+d \text{Sec}[e+f x]}\right)$$

Result (type 4, 2949 leaves):

$$\frac{1}{f (b+a \text{Cos}[e+f x])^2 (c+d \text{Sec}[e+f x])^{9/2}}$$
$$(d+c \text{Cos}[e+f x])^5 \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^{5/2} \left(\frac{2 \left(b^2 c^2 d^2 \text{Sin}[e+f x]-2 a b c d^3 \text{Sin}[e+f x]+a^2 d^4 \text{Sin}[e+f x]\right)}{7 c^3 \left(c^2-d^2\right) (d+c \text{Cos}[e+f x])^4}+\right.$$
$$\left(2 \left(-14 b^2 c^4 d \text{Sin}[e+f x]+43 a b c^3 d^2 \text{Sin}[e+f x]-29 a^2 c^2 d^3 \text{Sin}[e+f x]+2 b^2 c^2 d^3 \text{Sin}[e+f x]-\right.\right.$$
$$\left.\left.19 a b c d^4 \text{Sin}[e+f x]+17 a^2 d^5 \text{Sin}[e+f x]\right)\right) \Big/ \left(35 c^3 \left(c^2-d^2\right)^2 (d+c \text{Cos}[e+f x])^3\right)+$$
$$\left(2 \left(35 b^2 c^6 \text{Sin}[e+f x]-224 a b c^5 d \text{Sin}[e+f x]+234 a^2 c^4 d^2 \text{Sin}[e+f x]+67 b^2 c^4 d^2 \text{Sin}[e+f x]+52 a b c^3 d^3 \text{Sin}[e+f x]-\right.\right.$$
$$\left.\left.209 a^2 c^2 d^4 \text{Sin}[e+f x]-6 b^2 c^2 d^4 \text{Sin}[e+f x]-20 a b c d^5 \text{Sin}[e+f x]+71 a^2 d^6 \text{Sin}[e+f x]\right)\right) \Big/$$
$$\left(105 c^3 \left(c^2-d^2\right)^3 (d+c \text{Cos}[e+f x])^2\right)+\frac{1}{105 c^3 (b c-a d) \left(c^2-d^2\right)^4 (d+c \text{Cos}[e+f x])}$$
$$2 \left(245 a b^2 c^8 \text{Sin}[e+f x]-812 a^2 b c^7 d \text{Sin}[e+f x]-266 b^3 c^7 d \text{Sin}[e+f x]+582 a^3 c^6 d^2 \text{Sin}[e+f x]+852 a b^2 c^6 d^2 \text{Sin}[e+f x]-\right.$$
$$146 a^2 b c^5 d^3 \text{Sin}[e+f x]-124 b^3 c^5 d^3 \text{Sin}[e+f x]-485 a^3 c^4 d^4 \text{Sin}[e+f x]+41 a b^2 c^4 d^4 \text{Sin}[e+f x]-264 a^2 b c^3 d^5 \text{Sin}[e+f x]+$$
$$\left.\left.6 b^3 c^3 d^5 \text{Sin}[e+f x]+392 a^3 c^2 d^6 \text{Sin}[e+f x]+14 a b^2 c^2 d^6 \text{Sin}[e+f x]+70 a^2 b c d^7 \text{Sin}[e+f x]-105 a^3 d^8 \text{Sin}[e+f x]\right)\right)+$$
$$\left((d+c \text{Cos}[e+f x])^{9/2} \text{Sec}[e+f x]^2 (a+b \text{Sec}[e+f x])^{5/2} \left(\frac{1}{(a+b) (c+d) \sqrt{b+a \text{Cos}[e+f x]} \sqrt{d+c \text{Cos}[e+f x]}}\right.\right.$$
$$4 (b c-a d) \left(-70 a^2 b^2 c^8-35 b^4 c^8-77 a^3 b c^7 d+427 a b^3 c^7 d+162 a^4 c^6 d^2-522 a^2 b^2 c^6 d^2-298 b^4 c^6 d^2+348 a^3 b c^5 d^3+666 a b^3 c^5 d^3-\right.$$

$$263\,a^4\,c^4\,d^4-586\,a^2\,b^2\,c^4\,d^4-51\,b^4\,c^4\,d^4+127\,a^3\,b\,c^3\,d^5+59\,a\,b^3\,c^3\,d^5+136\,a^4\,c^2\,d^6+26\,a^2\,b^2\,c^2\,d^6-14\,a^3\,b\,c\,d^7-35\,a^4\,d^8\Big)$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\;\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\;\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4+4\,(b\,c-a\,d)$$

$$\Big(-105\,a^3\,b\,c^8+245\,a\,b^3\,c^8+105\,a^4\,c^7\,d-567\,a^2\,b^2\,c^7\,d-266\,b^4\,c^7\,d+190\,a^3\,b\,c^6\,d^2+586\,a\,b^3\,c^6\,d^2+162\,a^4\,c^5\,d^3+706\,a^2\,b^2\,c^5\,d^3-124\,b^4\,c^5\,d^3-$$
$$1261\,a^3\,b\,c^4\,d^4-83\,a\,b^3\,c^4\,d^4+145\,a^4\,c^3\,d^5-223\,a^2\,b^2\,c^3\,d^5+6\,b^4\,c^3\,d^5+548\,a^3\,b\,c^2\,d^6+20\,a\,b^3\,c^2\,d^6-28\,a^4\,c\,d^7+84\,a^2\,b^2\,c\,d^7-140\,a^3\,b\,d^8\Big)$$

$$\Bigg(\Bigg(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\;\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\;\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\;\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\Bigg(\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\;\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\text{Csc}[e+f\,x]\;\text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\;\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\Bigg)\Bigg/\left((a+b)\,c\,\sqrt{b+a\,\text{Cos}[e+f\,x]}\;\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\Bigg)+$$

$$2\,\Big(245\,a^2\,b^2\,c^8-812\,a^3\,b\,c^7\,d-266\,a\,b^3\,c^7\,d+582\,a^4\,c^6\,d^2+852\,a^2\,b^2\,c^6\,d^2-146\,a^3\,b\,c^5\,d^3-124\,a\,b^3\,c^5\,d^3-485\,a^4\,c^4\,d^4+$$
$$41\,a^2\,b^2\,c^4\,d^4-264\,a^3\,b\,c^3\,d^5+6\,a\,b^3\,c^3\,d^5+392\,a^4\,c^2\,d^6+14\,a^2\,b^2\,c^2\,d^6+70\,a^3\,b\,c\,d^7-105\,a^4\,d^8\Big)$$

$$\left(\left(\sqrt{\frac{-a+b}{a+b}}\ (a+b)\ \text{Cos}\left[\frac{1}{2}\ (e+f\,x)\right]\ \sqrt{d+c\,\text{Cos}[e+f\,x]}\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\ \text{Sin}\left[\frac{1}{2}\ (e+f\,x)\right]}{\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}}\right],\ \frac{2\ (b\,c-a\,d)}{(-a+b)\ (c+d)}\right]\right)\Big/\right.$$

$$\left(a\,c\ \sqrt{\frac{(a+b)\ \text{Cos}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b+a\,\text{Cos}[e+f\,x]}}\ \sqrt{b+a\,\text{Cos}[e+f\,x]}\ \sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}\ \sqrt{\frac{(a+b)\ (d+c\,\text{Cos}[e+f\,x])}{(c+d)\ (b+a\,\text{Cos}[e+f\,x])}}\right)-$$

$$\frac{1}{a\,c}\ 2\ (b\,c-a\,d)\ \left(\left((b\,c+(a+b)\ d)\ \sqrt{\frac{(c+d)\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\ (b+a\,\text{Cos}[e+f\,x])\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\ (d+c\,\text{Cos}[e+f\,x])\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b\,c-a\,d}}\ \text{Csc}[e+f\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\ (d+c\,\text{Cos}[e+f\,x])\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\ (b\,c-a\,d)}{(a+b)\ (c-d)}\right]\ \text{Sin}\left[\frac{1}{2}\ (e+f\,x)\right]^4\right)\Big/\left((a+b)\ (c+d)\ \sqrt{b+a\,\text{Cos}[e+f\,x]}\ \sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\left((b\,c+a\,d)\right.$$

$$\sqrt{\frac{(c+d)\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{c-d}}\ \sqrt{\frac{(c+d)\ (b+a\,\text{Cos}[e+f\,x])\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b\,c-a\,d}}\ \sqrt{-\frac{(a+b)\ (d+c\,\text{Cos}[e+f\,x])\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\left.\text{Csc}[e+f\,x]\ \text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\ c},\ \text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\ (d+c\,\text{Cos}[e+f\,x])\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\ \frac{2\ (b\,c-a\,d)}{(a+b)\ (c-d)}\right]\ \text{Sin}\left[\frac{1}{2}\ (e+f\,x)\right]^4\right)\Big/$$

$$\left.\left.\left.\left((a+b)\ c\ \sqrt{b+a\,\text{Cos}[e+f\,x]}\ \sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\right)+\frac{\sqrt{d+c\,\text{Cos}[e+f\,x]}\ \text{Sin}[e+f\,x]}{c\ \sqrt{b+a\,\text{Cos}[e+f\,x]}}\right)\right)\right)\Big/$$

$$\left(105\,c^3\ (c-d)^4\ (c+d)^4\ (-b\,c+a\,d)\ f\ (b+a\,\text{Cos}[e+f\,x])^{5/2}\ (c+d\,\text{Sec}[e+f\,x])^{9/2}\right)$$

Problem 217: Unable to integrate problem.

$$\int \frac{(c+d\,\text{Sec}[e+f\,x])^{3/2}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 4, 652 leaves, ? steps):

$$-\left(2\,c\,(c+d)\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{a\,(c+d)}{(a+b)\,c},\,\text{ArcSin}\left[\sqrt{\frac{(a+b)\,(c+d\,\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\right.$$
$$\left.(a+b\,\text{Sec}[e+f\,x])^{3/2}\sqrt{\frac{(a+b)\,(b\,c-a\,d)\,(-1+\text{Sec}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])}{(c+d)^2\,(a+b\,\text{Sec}[e+f\,x])^2}}\right)\bigg/\left(a\,(a+b)\,f\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)+$$
$$\left(2\,d\,(c+d)\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,(c+d)}{(a+b)\,d},\,\text{ArcSin}\left[\sqrt{\frac{(a+b)\,(c+d\,\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\right.$$
$$\left.(a+b\,\text{Sec}[e+f\,x])^{3/2}\sqrt{-\frac{(a+b)\,(-b\,c+a\,d)\,(-1+\text{Sec}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])}{(c+d)^2\,(a+b\,\text{Sec}[e+f\,x])^2}}\right)\bigg/\left(b\,(a+b)\,f\,\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)+$$
$$\frac{1}{a\,b\,f\,\sqrt{\frac{(a+b)\,(c+d\,\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}}2\,(b\,c-a\,d)\,\text{Cot}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\frac{(a+b)\,(c+d\,\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]$$
$$\sqrt{\frac{(b\,c-a\,d)\,(-1+\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\,\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}$$

Result (type 8, 31 leaves):

$$\int \frac{(c+d\,\text{Sec}[e+f\,x])^{3/2}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}}\,dx$$

- **Problem 218: Result more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{c+d\,\text{Sec}[e+f\,x]}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 4, 198 leaves, 1 step):

$$-\frac{1}{a\sqrt{c+d}\,f}2\sqrt{a+b}\,\mathrm{Cot}[e+fx]\,\mathrm{EllipticPi}\Big[\frac{(a+b)\,c}{a\,(c+d)},\,\mathrm{ArcSin}\Big[\frac{\sqrt{c+d}\,\sqrt{a+b\,\mathrm{Sec}[e+fx]}}{\sqrt{a+b}\,\sqrt{c+d\,\mathrm{Sec}[e+fx]}}\Big],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\Big]\sqrt{\frac{(b\,c-a\,d)\,(1-\mathrm{Sec}[e+fx])}{(a+b)\,(c+d\,\mathrm{Sec}[e+fx])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Sec}[e+fx])}{(a-b)\,(c+d\,\mathrm{Sec}[e+fx])}}\,(c+d\,\mathrm{Sec}[e+fx])$$

Result (type 4, 554 leaves) :

$$\frac{1}{f\sqrt{d+c\,\mathrm{Cos}[e+fx]}\,\sqrt{a+b\,\mathrm{Sec}[e+fx]}}4\,(-b\,c+a\,d)\,\sqrt{b+a\,\mathrm{Cos}[e+fx]}\,\sqrt{c+d\,\mathrm{Sec}[e+fx]}$$
$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\big[\frac{1}{2}(e+fx)\big]^2}{a-b}}\,\sqrt{-\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\big[\frac{1}{2}(e+fx)\big]^2}{-b\,c+a\,d}}\,\sqrt{\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\big[\frac{1}{2}(e+fx)\big]^2}{-b\,c+a\,d}}$$
$$\mathrm{Csc}[e+fx]\,\mathrm{EllipticF}\Bigg[\mathrm{ArcSin}\Bigg[\frac{\sqrt{-\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}[\frac{1}{2}(e+fx)]^2}{-b\,c+a\,d}}}{\sqrt{2}}\Bigg],\,\frac{2\,(-b\,c+a\,d)}{(a-b)\,(c+d)}\Bigg]\,\mathrm{Sin}\Big[\frac{1}{2}(e+fx)\Big]^4\Bigg)\Bigg/$$
$$\Big((a+b)\,\sqrt{b+a\,\mathrm{Cos}[e+fx]}\,\sqrt{d+c\,\mathrm{Cos}[e+fx]}\Big)-\Bigg(c\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\big[\frac{1}{2}(e+fx)\big]^2}{a-b}}\,\sqrt{-\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\big[\frac{1}{2}(e+fx)\big]^2}{-b\,c+a\,d}}$$
$$\sqrt{\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}\big[\frac{1}{2}(e+fx)\big]^2}{-b\,c+a\,d}}\,\mathrm{Csc}[e+fx]\,\mathrm{EllipticPi}\Big[\frac{-b\,c+a\,d}{a\,(c+d)},\,\mathrm{ArcSin}\Bigg[\frac{\sqrt{-\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+fx])\,\mathrm{Csc}[\frac{1}{2}(e+fx)]^2}{-b\,c+a\,d}}}{\sqrt{2}}\Bigg],$$
$$\frac{2\,(-b\,c+a\,d)}{(a-b)\,(c+d)}\Big]\,\mathrm{Sin}\Big[\frac{1}{2}(e+fx)\Big]^4\Bigg)\Bigg/\Big(a\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+fx]}\,\sqrt{d+c\,\mathrm{Cos}[e+fx]}\Big)\Bigg)$$

- **Problem 219: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{1}{\sqrt{a+b\,\mathrm{Sec}[e+fx]}\,\sqrt{c+d\,\mathrm{Sec}[e+fx]}}\,dx$$

Optimal (type 4, 398 leaves, 3 steps) :

$$-\frac{1}{a\sqrt{a+b}\;c\,f}2\sqrt{c+d}\;\text{Cot}[e+f\,x]\;\text{EllipticPi}\Big[\frac{a\,(c+d)}{(a+b)\,c},\,\text{ArcSin}\Big[\frac{\sqrt{a+b}\;\sqrt{c+d\,\text{Sec}[e+f\,x]}}{\sqrt{c+d}\;\sqrt{a+b\,\text{Sec}[e+f\,x]}}\Big],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\Big]$$
$$\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\;\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\;(a+b\,\text{Sec}[e+f\,x])-$$
$$\frac{1}{a\sqrt{c+d}\;(b\,c-a\,d)\,f}2\,b\sqrt{a+b}\;\text{Cot}[e+f\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{c+d}\;\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}\;\sqrt{c+d\,\text{Sec}[e+f\,x]}}\Big],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\Big]$$
$$\sqrt{\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(a+b)\,(c+d\,\text{Sec}[e+f\,x])}}\;\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(a-b)\,(c+d\,\text{Sec}[e+f\,x])}}\;(c+d\,\text{Sec}[e+f\,x])$$

Result (type 4, 249 leaves) :

$$\Bigg(4\,i\,\text{Cos}\Big[\frac{1}{2}(e+f\,x)\Big]^2\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}$$
$$\sqrt{\frac{d+c\,\text{Cos}[e+f\,x]}{(c+d)\,(1+\text{Cos}[e+f\,x])}}\;\Bigg(\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}(e+f\,x)\Big]\Big],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\Big]-$$
$$2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}(e+f\,x)\Big]\Big],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\Big]\Bigg)$$
$$\text{Sec}[e+f\,x]\Bigg)\Big/\Bigg(\sqrt{\frac{-a+b}{a+b}}\;f\sqrt{a+b\,\text{Sec}[e+f\,x]}\;\sqrt{c+d\,\text{Sec}[e+f\,x]}\Bigg)$$

- **Problem 220: Result more than twice size of optimal antiderivative.**

$$\int\frac{1}{\sqrt{a+b\,\text{Sec}[e+f\,x]}\;(c+d\,\text{Sec}[e+f\,x])^{3/2}}\,dx$$

Optimal (type 4, 622 leaves, 6 steps) :

$$-\left(2\,(a-b)\,\sqrt{a+b}\;d^2\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\;\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}\;\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{\frac{(b\,c-a\,d)\,(1-\mathrm{Sec}[e+f\,x])}{(a+b)\,(c+d\,\mathrm{Sec}[e+f\,x])}}\;\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Sec}[e+f\,x])}{(a-b)\,(c+d\,\mathrm{Sec}[e+f\,x])}}\;(c+d\,\mathrm{Sec}[e+f\,x])\right)\Big/\left(c\,(c-d)\,\sqrt{c+d}\;(b\,c-a\,d)^2\,f\right)-$$

$$\left(2\,\sqrt{a+b}\;(2\,c-d)\,d\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\;\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}\;\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{\frac{(b\,c-a\,d)\,(1-\mathrm{Sec}[e+f\,x])}{(a+b)\,(c+d\,\mathrm{Sec}[e+f\,x])}}\;\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Sec}[e+f\,x])}{(a-b)\,(c+d\,\mathrm{Sec}[e+f\,x])}}\;(c+d\,\mathrm{Sec}[e+f\,x])\right)\Big/\left(c^2\,(c-d)\,\sqrt{c+d}\;(b\,c-a\,d)\,f\right)-$$

$$\frac{1}{a\,c^2\,\sqrt{c+d}\;f}2\,\sqrt{a+b}\;\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticPi}\left[\frac{(a+b)\,c}{a\,(c+d)},\mathrm{ArcSin}\left[\frac{\sqrt{c+d}\;\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}\;\sqrt{c+d\,\mathrm{Sec}[e+f\,x]}}\right],\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]\sqrt{\frac{(b\,c-a\,d)\,(1-\mathrm{Sec}[e+f\,x])}{(a+b)\,(c+d\,\mathrm{Sec}[e+f\,x])}}\;\sqrt{-\frac{(b\,c-a\,d)\,(1+\mathrm{Sec}[e+f\,x])}{(a-b)\,(c+d\,\mathrm{Sec}[e+f\,x])}}\;(c+d\,\mathrm{Sec}[e+f\,x])$$

Result (type 4, 1731 leaves) :

$$\frac{1}{(c-d)\,(c+d)\,(b\,c-a\,d)\,f\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\;(c+d\,\mathrm{Sec}[e+f\,x])^{3/2}}\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\;(d+c\,\mathrm{Cos}[e+f\,x])^{3/2}$$

$$\mathrm{Sec}[e+f\,x]^2\left(-\left(4\,b\,c\,d\,(b\,c-a\,d)\,\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{c-d}}\;\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}\;\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right)\Big/\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\;\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)+4\,(b\,c-a\,d)\,\left(b\,c^2-a\,c\,d-2\,b\,d^2\right)$$

$$\left(\left(\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\right.\right.$$

$$\left.\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\,\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\mathrm{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,(c+d)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)-\left(\sqrt{\frac{(c+d)\,\mathrm{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\,\sqrt{\frac{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\right.$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\,\mathrm{Csc}[e+f\,x]\,\mathrm{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\,\mathrm{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\,\mathrm{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\right)\Big/\left((a+b)\,c\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\right)\right)-$$

$$2\,a\,d^2\left(\left(\sqrt{\frac{-a+b}{a+b}}\,(a+b)\,\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]\,\sqrt{d+c\,\mathrm{Cos}[e+f\,x]}\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Sin}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}}\right],\,\frac{2\,(b\,c-a\,d)}{(-a+b)\,(c+d)}\right]\right)\Big/\right.$$

$$\left(a\,c\,\sqrt{\frac{(a+b)\,\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2}{b+a\,\mathrm{Cos}[e+f\,x]}}\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\sqrt{\frac{(a+b)\,(d+c\,\mathrm{Cos}[e+f\,x])}{(c+d)\,(b+a\,\mathrm{Cos}[e+f\,x])}}\right)-$$

$$\frac{1}{a\,c}2\,(b\,c-a\,d)\Bigg(\Bigg((b\,c+(a+b)\,d)\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\;\text{Csc}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\right.$$

$$\left.\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\Bigg)\Bigg/\left((a+b)\,(c+d)\sqrt{b+a\,\text{Cos}[e+f\,x]}\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)-\Bigg((b\,c+a\,d)$$

$$\sqrt{\frac{(c+d)\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2}{c-d}}\sqrt{\frac{(c+d)\,(b+a\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}$$

$$\text{Csc}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,c-a\,d}{(a+b)\,c},\text{ArcSin}\left[\frac{\sqrt{-\frac{(a+b)\,(d+c\,\text{Cos}[e+f\,x])\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^2}{b\,c-a\,d}}}{\sqrt{2}}\right],\frac{2\,(b\,c-a\,d)}{(a+b)\,(c-d)}\right]\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,c\sqrt{b+a\,\text{Cos}[e+f\,x]}\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)\Bigg)+\frac{\sqrt{d+c\,\text{Cos}[e+f\,x]}\;\text{Sin}[e+f\,x]}{c\sqrt{b+a\,\text{Cos}[e+f\,x]}}\Bigg)\Bigg)+$$

$$\frac{2\,d^2\,(b+a\,\text{Cos}[e+f\,x])\,(d+c\,\text{Cos}[e+f\,x])\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{(-b\,c+a\,d)\left(-c^2+d^2\right)f\sqrt{a+b\,\text{Sec}[e+f\,x]}\,(c+d\,\text{Sec}[e+f\,x])^{3/2}}$$

- **Problem 222: Attempted integration timed out after 120 seconds.**

$$\int\frac{(a+b\,\text{Sec}[e+f\,x])^{1/3}}{(c+d\,\text{Sec}[e+f\,x])^{4/3}}\,dx$$

Optimal (type 9, 31 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{(a+b\,\text{Sec}[e+f\,x])^{1/3}}{(c+d\,\text{Sec}[e+f\,x])^{4/3}},x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 223: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b\,\mathrm{Sec}[e+f\,x])^{1/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{7/3}}\,dx$$

Optimal (type 9, 31 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[e+f\,x])^{1/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{7/3}},\ x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 225: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b\,\mathrm{Sec}[e+f\,x])^{2/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{5/3}}\,dx$$

Optimal (type 9, 31 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[e+f\,x])^{2/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{5/3}},\ x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 226: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b\,\mathrm{Sec}[e+f\,x])^{2/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{8/3}}\,dx$$

Optimal (type 9, 31 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{(a+b\,\mathrm{Sec}[e+f\,x])^{2/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{8/3}},\ x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 227: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b\,\mathrm{Sec}[e+f\,x])^{4/3}}{(c+d\,\mathrm{Sec}[e+f\,x])^{4/3}}\,dx$$

Optimal (type 9, 88 leaves, 1 step) :

$$\frac{(d+c\,\text{Cos}[e+f\,x])^{4/3}\,(a+b\,\text{Sec}[e+f\,x])^{4/3}\,\text{Unintegrable}\left[\frac{(b+a\,\text{Cos}[e+f\,x])^{4/3}}{(d+c\,\text{Cos}[e+f\,x])^{4/3}},\,x\right]}{(b+a\,\text{Cos}[e+f\,x])^{4/3}\,(c+d\,\text{Sec}[e+f\,x])^{4/3}}$$

Result (type 1, 1 leaves):

???

Problem 228: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\text{Sec}[e+f\,x])^{4/3}}{(c+d\,\text{Sec}[e+f\,x])^{7/3}}\,dx$$

Optimal (type 9, 31 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{(a+b\,\text{Sec}[e+f\,x])^{4/3}}{(c+d\,\text{Sec}[e+f\,x])^{7/3}},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 229: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\text{Sec}[e+f\,x])^{4/3}}{(c+d\,\text{Sec}[e+f\,x])^{10/3}}\,dx$$

Optimal (type 9, 31 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{(a+b\,\text{Sec}[e+f\,x])^{4/3}}{(c+d\,\text{Sec}[e+f\,x])^{10/3}},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 230: Result more than twice size of optimal antiderivative.

$$\int (c\,(d\,\text{Sec}[e+f\,x])^p)^n\,(a+a\,\text{Sec}[e+f\,x])^m\,dx$$

Optimal (type 6, 106 leaves, 4 steps):

$$-\frac{1}{f\,n\,p\,\sqrt{1-\text{Sec}[e+f\,x]}}$$

$$\text{AppellF1}\left[n\,p,\,\frac{1}{2},\,\frac{1}{2}-m,\,1+n\,p,\,\text{Sec}[e+f\,x],\,-\text{Sec}[e+f\,x]\right]\,(c\,(d\,\text{Sec}[e+f\,x])^p)^n\,(1+\text{Sec}[e+f\,x])^{-\frac{1}{2}-m}\,(a+a\,\text{Sec}[e+f\,x])^m\,\text{Tan}[e+f\,x]$$

Result (type 6, 2425 leaves):

$$\left(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},\,m+n\,p,\,1-n\,p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\left(\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right)^{-1+n\,p}\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n p} (c (d \text{Sec}[e+f x])^p)^n (a (1+\text{Sec}[e+f x]))^m \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg) \Big/$$

$$\Bigg(f \Bigg(3 \text{AppellF1}\left[\frac{1}{2}, m+n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Bigg((-1+n p) \text{AppellF1}\left[\frac{3}{2}, m+n p, 2-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n p) \text{AppellF1}\left[\frac{3}{2}, 1+m+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$

$$\Bigg(\Bigg(3 \times 2^m \text{AppellF1}\left[\frac{1}{2}, m+n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{n p} \left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n p}\Bigg) \Big/$$

$$\Bigg(3 \text{AppellF1}\left[\frac{1}{2}, m+n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Bigg((-1+n p) \text{AppellF1}\left[\frac{3}{2}, m+n p, 2-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n p) \text{AppellF1}\left[\frac{3}{2}, 1+m+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) +$$

$$\Bigg(3 \times 2^{1+m} (-1+n p) \text{AppellF1}\left[\frac{1}{2}, m+n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n p}$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n p} \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) \Big/ \Bigg(3 \text{AppellF1}\left[\frac{1}{2}, m+n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Bigg((-1+n p) \text{AppellF1}\left[\frac{3}{2}, m+n p, 2-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n p) \text{AppellF1}\left[\frac{3}{2}, 1+m+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) +$$

$$\Bigg(3 \times 2^{1+m} \left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-1+n p} \left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]\right)^{m+n p} \text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\Bigg(-\frac{1}{3}(1-n p) \text{AppellF1}\left[\frac{3}{2}, m+n p, 2-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3}(m+n p) \text{AppellF1}\left[\frac{3}{2}, 1+m+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg) \Big/$$

$$\Bigg(3 \text{AppellF1}\left[\frac{1}{2}, m+n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Bigg((-1+n p) \text{AppellF1}\left[\frac{3}{2}, m+n p, 2-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$(m+n p) \text{AppellF1}\left[\frac{3}{2}, 1+m+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg) -$$

$$\left(3\times 2^{1+m}\,\text{AppellF1}\left[\frac{1}{2},m+np,1-np,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1+np}\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{m+np}\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(2\left((-1+np)\,\text{AppellF1}\left[\frac{3}{2},m+np,2-np,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$

$$\left.(m+np)\,\text{AppellF1}\left[\frac{3}{2},1+m+np,1-np,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$3\left(-\frac{1}{3}(1-np)\,\text{AppellF1}\left[\frac{3}{2},m+np,2-np,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\left.\frac{1}{3}(m+np)\,\text{AppellF1}\left[\frac{3}{2},1+m+np,1-np,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\left((-1+np)\left(-\frac{3}{5}(2-np)\,\text{AppellF1}\left[\frac{5}{2},m+np,3-np,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{3}{5}(m+np)\,\text{AppellF1}\left[\frac{5}{2},1+m+np,2-np,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+(m+np)\left(-\frac{3}{5}(1-np)\,\text{AppellF1}\left[\frac{5}{2},1+m+np,2-np,\right.\right.$$

$$\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{3}{5}(1+m+np)$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{5}{2},2+m+np,1-np,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m+np,1-np,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+np)\,\text{AppellF1}\left[\frac{3}{2},m+np,2-\right.\right.\right.$$

$$np,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$\left.\left.(m+np)\,\text{AppellF1}\left[\frac{3}{2},1+m+np,1-np,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2+$$

$$\left(3\times 2^{1+m}(m+np)\,\text{AppellF1}\left[\frac{1}{2},m+np,1-np,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-1+np}\right.$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\right)^{-1+m+np}\text{Tan}\left[\frac{1}{2}(e+fx)\right]$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+fx)\right]\text{Sec}[e+fx]\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]+\text{Cos}\left[\frac{1}{2}(e+fx)\right]^2\text{Sec}[e+fx]\,\text{Tan}[e+fx]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m+np,1-np,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$

$$2\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},\,m+n p,\,2-n p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n p)\,\text{AppellF1}\left[\frac{3}{2},\,1+m+n p,\,1-n p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)$$

Problem 231: Unable to integrate problem.

$$\int (c\,(d\,\text{Sec}[e+f x])^p)^n\,(a+a\,\text{Sec}[e+f x])^3\,dx$$

Optimal (type 5, 275 leaves, 8 steps):

$$\frac{a^3\,(7+4 n p)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-\frac{n p}{2},\,\frac{1}{2}(2-n p),\,\text{Cos}[e+f x]^2\right]\,(c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Sin}[e+f x]}{f\,n\,p\,(2+n p)\,\sqrt{\text{Sin}[e+f x]^2}}-\left(a^3\,(1+4 n p)\,\text{Cos}[e+f x]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}(1-n p),\,\frac{1}{2}(3-n p),\,\text{Cos}[e+f x]^2\right]\,(c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Sin}[e+f x]\right)\Big/\left(f\,(1-n^2 p^2)\,\sqrt{\text{Sin}[e+f x]^2}\right)+\frac{a^3\,(5+2 n p)\,(c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Tan}[e+f x]}{f\,(1+n p)\,(2+n p)}+\frac{(c\,(d\,\text{Sec}[e+f x])^p)^n\,(a^3+a^3\,\text{Sec}[e+f x])\,\text{Tan}[e+f x]}{f\,(2+n p)}$$

Result (type 8, 29 leaves):

$$\int (c\,(d\,\text{Sec}[e+f x])^p)^n\,(a+a\,\text{Sec}[e+f x])^3\,dx$$

Problem 232: Unable to integrate problem.

$$\int (c\,(d\,\text{Sec}[e+f x])^p)^n\,(a+a\,\text{Sec}[e+f x])^2\,dx$$

Optimal (type 5, 205 leaves, 7 steps):

$$\frac{2\,a^2\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-\frac{n p}{2},\,\frac{1}{2}(2-n p),\,\text{Cos}[e+f x]^2\right]\,(c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Sin}[e+f x]}{f\,n\,p\,\sqrt{\text{Sin}[e+f x]^2}}-\left(a^2\,(1+2 n p)\,\text{Cos}[e+f x]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}(1-n p),\,\frac{1}{2}(3-n p),\,\text{Cos}[e+f x]^2\right]\,(c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Sin}[e+f x]\right)\Big/\left(f\,(1-n^2 p^2)\,\sqrt{\text{Sin}[e+f x]^2}\right)+\frac{a^2\,(c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Tan}[e+f x]}{f\,(1+n p)}$$

Result (type 8, 29 leaves):

$$\int (c\,(d\,\text{Sec}[e+f x])^p)^n\,(a+a\,\text{Sec}[e+f x])^2\,dx$$

Problem 233: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (c\,(d\,\text{Sec}[e+f x])^p)^n\,(a+a\,\text{Sec}[e+f x])\,dx$$

Optimal (type 5, 156 leaves, 6 steps):

$$\frac{a\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{n p}{2},\frac{1}{2}(2-n p),\text{Cos}[e+f x]^2\right](c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Sin}[e+f x]}{f\,n\,p\,\sqrt{\text{Sin}[e+f x]^2}}-\left(a\,\text{Cos}[e+f x]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(1-n p),\frac{1}{2}(3-n p),\text{Cos}[e+f x]^2\right](c\,(d\,\text{Sec}[e+f x])^p)^n\,\text{Sin}[e+f x]\right)\Big/\left(f\,(1-n p)\sqrt{\text{Sin}[e+f x]^2}\right)$$

Result (type 6, 4295 leaves):

$$-\Bigg(\Bigg(a\,\text{Sec}[e+f x]^{n p}(c\,(d\,\text{Sec}[e+f x])^p)^n(1+\text{Sec}[e+f x])$$
$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg(\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\Bigg)\Big/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$
$$\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\Bigg(\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\Bigg(n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$(1+n p)\,\text{AppellF1}\left[\frac{3}{2},2+n p,-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)\Big/$$
$$\Bigg(f\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg(\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2}\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]^{n p}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$
$$\Bigg(\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\Bigg)\Big/\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$
$$\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\Bigg(\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\Bigg(n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+n p)$$

$$\text{AppellF1}\left[\frac{3}{2},2+n p,-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)-\frac{1}{2\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)}$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]^{n p}\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$2\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\left(\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+\frac{2}{3}\left(n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(1+n p)\,\text{AppellF1}\left[\frac{3}{2},2+n p,-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)-$$

$$\frac{1}{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}n p\,\text{Sec}[e+f x]^{1+n p}\text{Sin}[e+f x]\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\left(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\Big)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$2\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/\left(\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+\frac{2}{3}\left(n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(1+n p)\,\text{AppellF1}\left[\frac{3}{2},2+n p,-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)-\frac{1}{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}$$

$$\text{Sec}[e+f x]^{n p}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sin}[e+f x]\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\right.$$

$$\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$

$$\Bigg(3\,\text{Cos}[e+f x]\left(-\frac{1}{3}(1-n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Bigg)\Bigg/\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)+$$

$$\Bigg(\frac{1}{3}n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{1}{3}(1+n p)\,\text{AppellF1}\left[\frac{3}{2},2+n p,-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg/$$

$$\Bigg(\text{AppellF1}\left[\frac{1}{2},1+n p,-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\left(n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+n p)\,\text{AppellF1}\left[\frac{3}{2},2+n p,-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n p,1-n p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]$$

$$\Bigg(2\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$3\left(-\frac{1}{3}(1-n p)\,\text{AppellF1}\left[\frac{3}{2},n p,2-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\frac{1}{3}n p\,\text{AppellF1}\left[\frac{3}{2},1+n p,1-n p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left((-1+n p)\left(-\frac{3}{5}(2-n p)\,\text{AppellF1}\left[\frac{5}{2},n p,3-n p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{3}{5}n p\,\text{AppellF1}\left[\frac{5}{2},1+n p,2-n p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg) + n p \left(-\frac{3}{5}(1-n p)\,\text{AppellF1}\left[\frac{5}{2}, 1+n p, 2-n p, \frac{7}{2},\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{3}{5}(1+n p)$$

$$\left.\left.\text{AppellF1}\left[\frac{5}{2}, 2+n p, 1-n p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Bigg)\Bigg)\Bigg) \Big/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2}, n p, 1-n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+n p)\,\text{AppellF1}\left[\frac{3}{2}, n p, 2-n p, \frac{5}{2},\right.\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + n p\,\text{AppellF1}\left[\frac{3}{2}, 1+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2 - \Bigg(\text{AppellF1}\left[\frac{1}{2}, 1+n p, -n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\Bigg(\frac{1}{3} n p\,\text{AppellF1}\left[\frac{3}{2}, 1+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3}(1+n p)\,\text{AppellF1}\left[\frac{3}{2}, 2+n p, -n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{2}{3}\left(n p\,\text{AppellF1}\left[\frac{3}{2}, 1+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (1+n p)\,\text{AppellF1}\left[\frac{3}{2}, 2+n p,\right.\right.$$

$$\left.\left.-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{2}{3} \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Bigg(n p\left(-\frac{3}{5}(1-n p)\,\text{AppellF1}\left[\frac{5}{2}, 1+n p, 2-n p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\Big[\right.$$

$$\frac{1}{2}(e+f x)\Big] + \frac{3}{5}(1+n p)\,\text{AppellF1}\left[\frac{5}{2}, 2+n p, 1-n p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) + (1+n p)\left(\frac{3}{5} n p\,\text{AppellF1}\left[\frac{5}{2}, 2+n p, 1-n p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{3}{5}(2+n p)\,\text{AppellF1}\left[\frac{5}{2}, 3+n p, -n p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ \Bigg(\text{AppellF1}\left[\frac{1}{2}, 1+n p, -n p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \frac{2}{3}\Bigg(n p\,\text{AppellF1}\left[\frac{3}{2}, 1+n p, 1-n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$\left.(1+n p)\,\text{AppellF1}\left[\frac{3}{2}, 2+n p, -n p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 234: Unable to integrate problem.**

$$\int \frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 5, 208 leaves, 7 steps):

$$\frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Sin}[e+f\,x]}{f\,(a+a\,\text{Sec}[e+f\,x])}-\frac{1}{a\,f\,\sqrt{\text{Sin}[e+f\,x]^2}}\text{Cos}[e+f\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(1-n\,p),\frac{1}{2}(3-n\,p),\text{Cos}[e+f\,x]^2\right](c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Sin}[e+f\,x]+\left((1-n\,p)\,\text{Cos}[e+f\,x]^2\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(2-n\,p),\frac{1}{2}(4-n\,p),\text{Cos}[e+f\,x]^2\right](c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Sin}[e+f\,x]\right)\Big/\left(a\,f\,(2-n\,p)\,\sqrt{\text{Sin}[e+f\,x]^2}\right)$$

Result (type 8, 29 leaves):

$$\int \frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Problem 235: Unable to integrate problem.

$$\int \frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n}{(a+a\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 5, 248 leaves, 8 steps):

$$\frac{2\,(2-n\,p)\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{n\,p}{2},\frac{1}{2}(2-n\,p),\text{Cos}[e+f\,x]^2\right](c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Sin}[e+f\,x]}{3\,a^2\,f\,\sqrt{\text{Sin}[e+f\,x]^2}}-\frac{1}{3\,a^2\,f\,\sqrt{\text{Sin}[e+f\,x]^2}}(3-2\,n\,p)\,\text{Cos}[e+f\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(1-n\,p),\frac{1}{2}(3-n\,p),\text{Cos}[e+f\,x]^2\right](c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Sin}[e+f\,x]-\frac{2\,(2-n\,p)\,(c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Tan}[e+f\,x]}{3\,a^2\,f\,(1+\text{Sec}[e+f\,x])}-\frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n\,\text{Tan}[e+f\,x]}{3\,f\,(a+a\,\text{Sec}[e+f\,x])^2}$$

Result (type 8, 29 leaves):

$$\int \frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n}{(a+a\,\text{Sec}[e+f\,x])^2}\,dx$$

Problem 240: Result more than twice size of optimal antiderivative.

$$\int \frac{(c\,(d\,\text{Sec}[e+f\,x])^p)^n}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 6, 206 leaves, 7 steps):

$$-\frac{1}{\left(a^2-b^2\right) f} b \,\text{AppellF1}\left[\frac{1}{2},\frac{n p}{2},1,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \left(\text{Cos}[e+f x]^2\right)^{\frac{n p}{2}} \left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n \text{Sin}[e+f x]+\frac{1}{\left(a^2-b^2\right) f} a \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-1+n p),1,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2} (-1+n p)} \left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n \text{Sin}[e+f x]$$

Result (type 6, 5411 leaves): Display of huge result suppressed!

Problem 241: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n}{\left(a+b \,\text{Sec}[e+f x]\right)^2} \, dx$$

Optimal (type 6, 322 leaves, 10 steps):

$$-\frac{1}{\left(a^2-b^2\right)^2 f} 2 a b \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-2+n p),2,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \left(\text{Cos}[e+f x]^2\right)^{\frac{n p}{2}} \left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n \text{Sin}[e+f x]+\frac{1}{\left(a^2-b^2\right)^2 f} a^2 \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-3+n p),2,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2} (-1+n p)} \left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n \text{Sin}[e+f x]+\frac{1}{\left(a^2-b^2\right)^2 f} b^2 \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-1+n p),2,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a^2 \text{Sin}[e+f x]^2}{a^2-b^2}\right] \text{Cos}[e+f x] \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2} (-1+n p)} \left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n \text{Sin}[e+f x]$$

Result (type 6, 10 678 leaves):

$$\Bigg(\left(c \left(d \,\text{Sec}[e+f x]\right)^p\right)^n \Bigg(-\frac{2 b \,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-\frac{n p}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right] \text{Tan}[e+f x]}{a^3}+\frac{\text{Hypergeometric2F1}\left[\frac{1}{2},1-\frac{n p}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right] \text{Tan}[e+f x]}{a^2}-\left(6 b^3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Tan}[e+f x] \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2} (1+n p)}\right) \Big/ \left(a \left(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(4 b^2 \,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right) (1+n p) \,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right) \left(a^2-b^2 \left(1+\text{Tan}[e+f x]^2\right)\right)^2+\right.$$

$$\left(6\, b^2 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{n\,p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] \text{Tan}[e+f\,x] \left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{n\,p}{2}}\right) \Big/$$

$$\left(\left(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{n\,p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \left(4\, b^2\, \text{AppellF1}\left[\frac{3}{2}, -\frac{n\,p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) n\,p\, \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n\,p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f\,x]^2\right) \left(a^2-b^2 \left(1+\text{Tan}[e+f\,x]^2\right)\right)^2\right) +$$

$$\left(6\, b^3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n\,p}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] \text{Tan}[e+f\,x] \left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{1}{2}(1+n\,p)}\right) \Big/$$

$$\left(a^3 \left(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n\,p}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \left(2\, b^2\, \text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}-\frac{n\,p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) (1+n\,p)\, \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}-\frac{n\,p}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f\,x]^2\right) \left(-a^2+b^2 \left(1+\text{Tan}[e+f\,x]^2\right)\right)\right) -$$

$$\left(3\, b^2 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{n\,p}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] \text{Tan}[e+f\,x] \left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{n\,p}{2}}\right) \Big/$$

$$\left(a^2 \left(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{n\,p}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \left(2\, b^2\, \text{AppellF1}\left[\frac{3}{2}, -\frac{n\,p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) n\,p\, \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n\,p}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f\,x]^2\right) \left(-a^2+b^2 \left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)\right)\right) \Big/$$

$$\left(f\, (a+b\,\text{Sec}[e+f\,x])^2 \left(-\frac{2\, b\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}-\frac{n\,p}{2}, \frac{3}{2}, -\text{Tan}[e+f\,x]^2\right] \text{Sec}[e+f\,x]^2}{a^3} + \right.\right.$$

$$\frac{\text{Hypergeometric2F1}\left[\frac{1}{2}, 1-\frac{n\,p}{2}, \frac{3}{2}, -\text{Tan}[e+f\,x]^2\right] \text{Sec}[e+f\,x]^2}{a^2} -$$

$$\left(24\, b^5 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n\,p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] \text{Sec}[e+f\,x]^2\, \text{Tan}[e+f\,x]^2 \left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{1}{2}(1+n\,p)}\right) \Big/$$

$$\left(a \left(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n\,p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f\,x]^2, \frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right] + \right.\right.$$

$$\left(4 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}-\frac{n p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.(a^2-b^2)(1+n p) \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}-\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right) \left(a^2-b^2 \left(1+\text{Tan}[e+f x]^2\right)\right)^3\Bigg) +$$

$$\left(24 b^4 (a^2-b^2) \text{AppellF1}\left[\frac{1}{2}, -\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]^2 \left(1+\text{Tan}[e+f x]^2\right)^{\frac{n p}{2}}\right) \Big/$$

$$\left(\left(3 (a^2-b^2) \text{AppellF1}\left[\frac{1}{2}, -\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(4 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{n p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.(a^2-b^2) n p \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right) \left(a^2-b^2 \left(1+\text{Tan}[e+f x]^2\right)\right)^3\Bigg) -$$

$$\left(6 b^3 (a^2-b^2) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}(1+n p)}\right) \Big/$$

$$\left(a \left(3 (a^2-b^2) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(4 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}-\frac{n p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.(a^2-b^2)(1+n p) \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}-\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right) \left(a^2-b^2 \left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg) -$$

$$\left(6 b^3 (a^2-b^2) \text{Tan}[e+f x] \left(\frac{4 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}-\frac{n p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 (a^2-b^2)} -\right.\right.$$

$$\left.\left.\frac{2}{3}\left(-\frac{1}{2}-\frac{n p}{2}\right) \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}-\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right) \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}(1+n p)}\right) \Big/$$

$$\left(a \left(3 (a^2-b^2) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(4 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{1}{2}-\frac{n p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.(a^2-b^2)(1+n p) \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}-\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right) \left(a^2-b^2 \left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg) -$$

$$\left(6 b^3 (a^2-b^2)(1+n p) \text{AppellF1}\left[\frac{1}{2}, -\frac{1}{2}-\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]^2\right.$$

$$\left(1+\text{Tan}[e+f x]^2\right)^{-1+\frac{1}{2}(1+n p)}\Bigg/\Bigg(a\Bigg(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)(1+n p)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)\left(a^2-b^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(6 b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\left(1+\text{Tan}[e+f x]^2\right)^{\frac{n p}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)n p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)\left(a^2-b^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(6 b^2\left(a^2-b^2\right)\text{Tan}[e+f x]\Bigg(\frac{4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]}{3\left(a^2-b^2\right)}+$$

$$\frac{1}{3}n p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]\Bigg)\left(1+\text{Tan}[e+f x]^2\right)^{\frac{n p}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)n p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)\left(a^2-b^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(6 b^2\left(a^2-b^2\right)n p\,\text{AppellF1}\left[\frac{1}{2},-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]^2\left(1+\text{Tan}[e+f x]^2\right)^{-1+\frac{n p}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)n p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)\left(a^2-b^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg)-$$

$$\left(12\,b^5\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]^2\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{1}{2}(1+n\,p)}\right)\Big/$$

$$\left(a^3\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)(1+n\,p)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)^2\right)+$$

$$\left(6\,b^4\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]^2\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{n\,p}{2}}\right)\Big/$$

$$\left(a^2\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)n\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)^2\right)+$$

$$\left(6\,b^3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{1}{2}(1+n\,p)}\right)\Big/$$

$$\left(a^3\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)(1+n\,p)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)+$$

$$\left(6\,b^3\left(a^2-b^2\right)\text{Tan}[e+f\,x]\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\left(a^2-b^2\right)}-\right.\right.$$

$$\left.\left.\frac{2}{3}\left(-\frac{1}{2}-\frac{n\,p}{2}\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{1}{2}(1+n\,p)}\right)\Big/$$

$$\left(a^3\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.(a^2-b^2)\,(1+n\,p)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)+$$

$$\left(6\,b^3\,(a^2-b^2)\,(1+n\,p)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]^2\right.$$

$$\left.\left(1+\text{Tan}[e+f\,x]^2\right)^{-1+\frac{1}{2}(1+n\,p)}\right)\Big/\left(a^3\left(3\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.(a^2-b^2)\,(1+n\,p)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)-$$

$$\left(3\,b^2\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{n\,p}{2}}\right)\Big/$$

$$\left(a^2\left(3\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.(a^2-b^2)\,n\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)-$$

$$\left(3\,b^2\,(a^2-b^2)\,\text{Tan}[e+f\,x]\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a^2-b^2)}+\right.\right.$$

$$\left.\left.\frac{1}{3}\,n\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{n\,p}{2}}\right)\Big/$$

$$\left(a^2\left(3\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left.(a^2-b^2)\,n\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)-$$

$$\left(3\,b^2\,(a^2-b^2)\,n\,p\,\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]^2\left(1+\text{Tan}[e+f\,x]^2\right)^{-1+\frac{n\,p}{2}}\right)\Big/$$

$$\left(a^2\left(3\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\left(a^2-b^2\right)n\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)\left(-a^2+b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)\Bigg)+$$

$$\frac{\text{Sec}[e+f\,x]^2\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},1-\frac{n\,p}{2},\frac{3}{2},-\text{Tan}[e+f\,x]^2\right]+\left(1+\text{Tan}[e+f\,x]^2\right)^{-1+\frac{n\,p}{2}}\right)}{a^2}-$$

$$\frac{2\,b\,\text{Sec}[e+f\,x]^2\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-\frac{n\,p}{2},\frac{3}{2},-\text{Tan}[e+f\,x]^2\right]+\left(1+\text{Tan}[e+f\,x]^2\right)^{-\frac{1}{2}+\frac{n\,p}{2}}\right)}{a^3}-$$

$$\left(6\,b^3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n\,p}{2},1,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Tan}[e+f\,x]\right.$$

$$\left(1+\text{Tan}[e+f\,x]^2\right)^{\frac{1}{2}(1+n\,p)}\left(2\left(2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left.\left(a^2-b^2\right)(1+n\,p)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+$$

$$3\left(a^2-b^2\right)\left(\frac{2\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\left(a^2-b^2\right)}-\right.$$

$$\left.\frac{2}{3}\left(-\frac{1}{2}-\frac{n\,p}{2}\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n\,p}{2},1,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\text{Tan}[e+f\,x]^2\left(2\,b^2\left(\frac{1}{5\left(a^2-b^2\right)}12\,b^2\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}-\frac{n\,p}{2},3,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.\right.$$

$$\left.\frac{6}{5}\left(-\frac{1}{2}-\frac{n\,p}{2}\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}-\frac{n\,p}{2},2,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\left(a^2-b^2\right)(1+n\,p)\left(\frac{6\,b^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}-\frac{n\,p}{2},2,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{5\left(a^2-b^2\right)}-\right.$$

$$\left.\left.\left.\left.\frac{6}{5}\left(\frac{1}{2}-\frac{n\,p}{2}\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}-\frac{n\,p}{2},1,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\Bigg/$$

$$\left(a^3\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n p}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(2 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)(1+n p)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n p}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)^2\left(-a^2+b^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)+\left(6 b^3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right.$$

$$\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}(1+n p)}\left(2\left(4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)(1+n p)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Sec}[e+f x]^2\text{Tan}[e+f x]+\right.$$

$$3\left(a^2-b^2\right)\left(\frac{4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]}{3\left(a^2-b^2\right)}-\frac{2}{3}\left(-\frac{1}{2}-\frac{n p}{2}\right)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]\right)+$$

$$\text{Tan}[e+f x]^2\left(4 b^2\left(\frac{1}{5\left(a^2-b^2\right)}18 b^2\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2}-\frac{n p}{2},4,\frac{7}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]-\frac{6}{5}\left(-\frac{1}{2}-\frac{n p}{2}\right)\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}-\frac{n p}{2},3,\frac{7}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]\right)+\right.$$

$$\left.\left.\left.\left(a^2-b^2\right)(1+n p)\left(\frac{1}{5\left(a^2-b^2\right)}12 b^2\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}-\frac{n p}{2},3,\frac{7}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]-\frac{6}{5}\left(\frac{1}{2}-\frac{n p}{2}\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}-\frac{n p}{2},2,\frac{7}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]\right)\right)\right)\right)\Big/$$

$$\left(a\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2}-\frac{n p}{2},2,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(4 b^2\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2}-\frac{n p}{2},3,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)(1+n p)\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}-\frac{n p}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)^2\left(a^2-b^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)+\left(3 b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n p}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{b^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Tan}[e+f x]\right.$$

$$\left(1+\text{Tan}[e+f x]^2\right)^{\frac{n p}{2}} \left(2 \left(2 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) n p \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n p}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Sec}[e+f x]^2 \text{Tan}[e+f x] + 3 \left(a^2-b^2\right) \left(\frac{2 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 \left(a^2-b^2\right)} + \frac{1}{3} n p \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n p}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right) + \text{Tan}[e+f x]^2 \left(2 b^2 \left(\frac{12 b^2 \text{AppellF1}\left[\frac{5}{2}, -\frac{n p}{2}, 3, \frac{7}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{5 \left(a^2-b^2\right)} + \frac{3}{5} n p \text{AppellF1}\left[\frac{5}{2}, 1-\frac{n p}{2}, 2, \frac{7}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right) + \left(a^2-b^2\right) n p \left(\frac{6 b^2 \text{AppellF1}\left[\frac{5}{2}, 1-\frac{n p}{2}, 2, \frac{7}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{5 \left(a^2-b^2\right)} - \frac{6}{5} \left(1-\frac{n p}{2}\right) \text{AppellF1}\left[\frac{5}{2}, 2-\frac{n p}{2}, 1, \frac{7}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right)\right)\right)\Bigg) \Bigg/$$

$$\left(a^2 \left(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{n p}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(2 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) n p \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n p}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right)^2 \left(-a^2+b^2 \left(1+\text{Tan}[e+f x]^2\right)\right)\right) - \left(6 b^2 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{n p}{2}, 2, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Tan}[e+f x]\right.$$

$$\left(1+\text{Tan}[e+f x]^2\right)^{\frac{n p}{2}} \left(2 \left(4 b^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{n p}{2}, 3, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) n p \text{AppellF1}\left[\frac{3}{2}, 1-\frac{n p}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{b^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Sec}[e+f x]^2 \text{Tan}[e+f x] +\right.$$

$$3\left(a^2-b^2\right)\left(\frac{4\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},3,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\left(a^2-b^2\right)}+\right.$$

$$\left.\frac{1}{3}\,n\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{n\,p}{2},2,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\text{Tan}[e+f\,x]^2\left(4\,b^2\left(\frac{18\,b^2\,\text{AppellF1}\left[\frac{5}{2},-\frac{n\,p}{2},4,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{5\left(a^2-b^2\right)}+\right.\right.$$

$$\left.\frac{3}{5}\,n\,p\,\text{AppellF1}\left[\frac{5}{2},1-\frac{n\,p}{2},3,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\left(a^2-b^2\right)n\,p\left(\frac{1}{5\left(a^2-b^2\right)}12\,b^2\,\text{AppellF1}\left[\frac{5}{2},1-\frac{n\,p}{2},3,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.$$

$$\left.\left.\left.\left.\frac{6}{5}\left(1-\frac{n\,p}{2}\right)\text{AppellF1}\left[\frac{5}{2},2-\frac{n\,p}{2},2,\frac{7}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\Big/$$

$$\left(\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{n\,p}{2},2,\frac{3}{2},-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\left(4\,b^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{n\,p}{2},3,\frac{5}{2},\right.\right.\right.\right.$$

$$-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right)n\,p\,\text{AppellF1}\Big[\frac{3}{2},1-\frac{n\,p}{2},2,\frac{5}{2},$$

$$\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2,\frac{b^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f\,x]^2\right)^2\left(a^2-b^2\left(1+\text{Tan}[e+f\,x]^2\right)\right)^2\right)\right)$$

Test results for the 286 problems in "4.5.2.3 (g sec)^p (a+b sec)^m (c+d sec)^n.m"

- **Problem 1: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])\,(c-c\,\text{Sec}[e+f\,x])^4\,dx$$

Optimal (type 3, 105 leaves, 12 steps) :

$$\frac{7\,a\,c^4\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{8\,f}-\frac{a\,c^4\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{8\,f}-\frac{3\,a\,c^4\,\text{Sec}[e+f\,x]^3\,\text{Tan}[e+f\,x]}{4\,f}+\frac{4\,a\,c^4\,\text{Tan}[e+f\,x]^3}{3\,f}+\frac{a\,c^4\,\text{Tan}[e+f\,x]^5}{5\,f}$$

Result (type 3, 499 leaves) :

$$-\frac{1}{3840\,f}\,a\,c^4\,\text{Sec}[e]\,\text{Sec}[e+f\,x]^5$$
$$\Big(525\,\text{Cos}[2\,e+3\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]+525\,\text{Cos}[4\,e+3\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]+$$
$$105\,\text{Cos}[4\,e+5\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]+105\,\text{Cos}[6\,e+5\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]+$$
$$1050\,\text{Cos}[f\,x]\,\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\Big)+$$
$$1050\,\text{Cos}[2\,e+f\,x]\,\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\Big)-$$
$$525\,\text{Cos}[2\,e+3\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-525\,\text{Cos}[4\,e+3\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-$$
$$105\,\text{Cos}[4\,e+5\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-105\,\text{Cos}[6\,e+5\,f\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]+$$
$$800\,\text{Sin}[f\,x]-1920\,\text{Sin}[2\,e+f\,x]+780\,\text{Sin}[e+2\,f\,x]+780\,\text{Sin}[3\,e+2\,f\,x]+640\,\text{Sin}[2\,e+3\,f\,x]-$$
$$720\,\text{Sin}[4\,e+3\,f\,x]+30\,\text{Sin}[3\,e+4\,f\,x]+30\,\text{Sin}[5\,e+4\,f\,x]+272\,\text{Sin}[4\,e+5\,f\,x]\Big)$$

- **Problem 2: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])\,(c-c\,\text{Sec}[e+f\,x])^3\,dx$$

Optimal (type 3, 86 leaves, 9 steps):

$$\frac{5\,a\,c^3\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{8\,f}-\frac{3\,a\,c^3\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{8\,f}-\frac{a\,c^3\,\text{Sec}[e+f\,x]^3\,\text{Tan}[e+f\,x]}{4\,f}+\frac{2\,a\,c^3\,\text{Tan}[e+f\,x]^3}{3\,f}$$

Result (type 3, 887 leaves):

$$a\left(\frac{5\,\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\,(c-c\,\text{Sec}[e+f x])^3}{64\,f}-\right.$$

$$\frac{5\,\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\,(c-c\,\text{Sec}[e+f x])^3}{64\,f}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3}{128\,f\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^4}-\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{24\,f\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3\left(\text{Cos}\left[\frac{e}{2}\right]-17\,\text{Sin}\left[\frac{e}{2}\right]\right)}{384\,f\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^2}+\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{12\,f\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}-$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3}{128\,f\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^4}-\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{24\,f\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^3}+$$

$$\left.\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3\left(-\text{Cos}\left[\frac{e}{2}\right]-17\,\text{Sin}\left[\frac{e}{2}\right]\right)}{384\,f\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^2}+\frac{\text{Cos}[e+f x]^3\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{12\,f\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}\right)$$

Problem 3: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])\,(c-c\,\text{Sec}[e+f x])^2\,dx$$

Optimal (type 3, 61 leaves, 6 steps):

$$\frac{a\,c^2\,\text{ArcTanh}[\text{Sin}[e+f x]]}{2\,f}-\frac{a\,c^2\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]}{2\,f}+\frac{a\,c^2\,\text{Tan}[e+f x]^3}{3\,f}$$

Result (type 3, 313 leaves):

$$-\frac{1}{48\,f}\,a\,c^2\,\text{Sec}[e]\,\text{Sec}[e+f x]^3$$

$$\left(3\,\text{Cos}[2\,e+3\,f x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+3\,\text{Cos}[4\,e+3\,f x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+\right.$$

$$9\,\text{Cos}[f x]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)+$$

$$9\,\text{Cos}[2\,e+f x]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)-$$

$$3\,\text{Cos}[2\,e+3\,f x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-3\,\text{Cos}[4\,e+3\,f x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-$$

$$\left.12\,\text{Sin}[2\,e+f x]+6\,\text{Sin}[e+2\,f x]+6\,\text{Sin}[3\,e+2\,f x]+4\,\text{Sin}[2\,e+3\,f x]\right)$$

- **Problem 14: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[e+f x]\,(a+a\,\mathrm{Sec}[e+f x])^2\,(c-c\,\mathrm{Sec}[e+f x])\,dx$$

Optimal (type 3, 61 leaves, 6 steps):

$$\frac{a^2 c\,\mathrm{ArcTanh}[\mathrm{Sin}[e+f x]]}{2 f}-\frac{a^2 c\,\mathrm{Sec}[e+f x]\,\mathrm{Tan}[e+f x]}{2 f}-\frac{a^2 c\,\mathrm{Tan}[e+f x]^3}{3 f}$$

Result (type 3, 124 leaves):

$$\frac{1}{12 f}a^2 c\left(-6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]-\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]+\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\frac{3}{\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]-\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+\frac{3}{\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]+\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-4\,\mathrm{Tan}[e+f x]^3\right)$$

- **Problem 15: Result more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[e+f x]\,(a+a\,\mathrm{Sec}[e+f x])^2}{c-c\,\mathrm{Sec}[e+f x]}\,dx$$

Optimal (type 3, 74 leaves, 5 steps):

$$-\frac{3 a^2\,\mathrm{ArcTanh}[\mathrm{Sin}[e+f x]]}{c f}-\frac{3 a^2\,\mathrm{Tan}[e+f x]}{c f}-\frac{2\left(a^2+a^2\,\mathrm{Sec}[e+f x]\right)\mathrm{Tan}[e+f x]}{f\,(c-c\,\mathrm{Sec}[e+f x])}$$

Result (type 3, 220 leaves):

$$\frac{1}{f\,(c-c\,\mathrm{Sec}[e+f x])}2 a^2\,\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]\mathrm{Sec}[e+f x]\,\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\left(4\,\mathrm{Csc}\left[\frac{e}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]\mathrm{Sin}\left[\frac{f x}{2}\right]+\left(-3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]-\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]+\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+\mathrm{Sin}[f x]\Big/\left(\left(\mathrm{Cos}\left[\frac{e}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{e}{2}\right]+\mathrm{Sin}\left[\frac{e}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]-\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]+\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)$$

- **Problem 21: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[e+f x]\,(a+a\,\mathrm{Sec}[e+f x])^3\,(c-c\,\mathrm{Sec}[e+f x])^6\,dx$$

Optimal (type 3, 227 leaves, 16 steps):

$$\frac{55 a^3 c^6\,\mathrm{ArcTanh}[\mathrm{Sin}[e+f x]]}{128 f}-\frac{25 a^3 c^6\,\mathrm{Sec}[e+f x]\,\mathrm{Tan}[e+f x]}{128 f}-\frac{15 a^3 c^6\,\mathrm{Sec}[e+f x]^3\,\mathrm{Tan}[e+f x]}{64 f}+\frac{5 a^3 c^6\,\mathrm{Sec}[e+f x]\,\mathrm{Tan}[e+f x]^3}{24 f}+\frac{5 a^3 c^6\,\mathrm{Sec}[e+f x]^3\,\mathrm{Tan}[e+f x]^3}{16 f}-\frac{a^3 c^6\,\mathrm{Sec}[e+f x]\,\mathrm{Tan}[e+f x]^5}{6 f}-\frac{3 a^3 c^6\,\mathrm{Sec}[e+f x]^3\,\mathrm{Tan}[e+f x]^5}{8 f}+\frac{4 a^3 c^6\,\mathrm{Tan}[e+f x]^7}{7 f}+\frac{a^3 c^6\,\mathrm{Tan}[e+f x]^9}{9 f}$$

Result (type 3, 1686 leaves):

$$\frac{1}{33\,554\,432\,f} 9 \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6 \left(-1430 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right]+1430 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right]-\frac{1}{32} \sec[e+f x]^8 (4601 \sin[e+f x]+3589 \sin[3(e+f x)]+5441 \sin[5(e+f x)]-715 \sin[7(e+f x)])\right)-$$

$$\frac{1}{16\,777\,216\,f} 11 \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6 \left(-210 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right]+210 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right]+\frac{1}{32} \sec[e+f x]^8 (5053 \sin[e+f x]+2681 \sin[3(e+f x)]+805 \sin[5(e+f x)]+105 \sin[7(e+f x)])\right)+$$

$$\frac{1}{25\,165\,824\,f} 29 \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6 \left(-330 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right]+330 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right]+\frac{1}{32} \sec[e+f x]^8 (-6103 \sin[e+f x]+4213 \sin[3(e+f x)]+1265 \sin[5(e+f x)]+165 \sin[7(e+f x)])\right)-$$

$$\frac{1}{8\,388\,608\,f} 5 \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6 \left(-858 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right]+858 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right]+\frac{1}{32} \sec[e+f x]^8 (3793 \sin[e+f x]-8707 \sin[3(e+f x)]+3289 \sin[5(e+f x)]+429 \sin[7(e+f x)])\right)+$$

$$\frac{1}{33\,554\,432\,f} \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6 \left(-24\,310 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right]+24\,310 \log\left[\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right]-\frac{1}{32} \sec[e+f x]^8 (45\,449 \sin[e+f x]+93\,781 \sin[3(e+f x)]+59\,729 \sin[5(e+f x)]+20\,613 \sin[7(e+f x)])\right)-$$

$$\frac{1}{8192} 9 \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6 \left(\frac{32 \tan[e+f x]}{63 f}+\frac{16 \sec[e+f x]^2 \tan[e+f x]}{63 f}+\frac{4 \sec[e+f x]^4 \tan[e+f x]}{21 f}+\frac{10 \sec[e+f x]^6 \tan[e+f x]}{63 f}-\frac{\sec[e+f x]^8 \tan[e+f x]}{9 f}\right)+$$

$$\frac{1}{8192} \cos[e+f x]^9 \csc\left[\frac{e}{2}+\frac{f x}{2}\right]^{12} \sec\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \sec[e+f x])^3 (c-c \sec[e+f x])^6$$

$$\left(\frac{32\,\text{Tan}[e+f\,x]}{9\,f}+\frac{16\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{9\,f}-\frac{20\,\text{Sec}[e+f\,x]^4\,\text{Tan}[e+f\,x]}{3\,f}+\frac{22\,\text{Sec}[e+f\,x]^6\,\text{Tan}[e+f\,x]}{9\,f}-\frac{\text{Sec}[e+f\,x]^8\,\text{Tan}[e+f\,x]}{9\,f}\right)-$$

$$\frac{1}{65\,536}3\,\text{Cos}[e+f\,x]^9\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^{12}\,\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(a+a\,\text{Sec}[e+f\,x])^3\,(c-c\,\text{Sec}[e+f\,x])^6$$

$$\left(\frac{256\,\text{Tan}[e+f\,x]}{9\,f}-\frac{448\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{9\,f}+\frac{80\,\text{Sec}[e+f\,x]^4\,\text{Tan}[e+f\,x]}{3\,f}-\frac{40\,\text{Sec}[e+f\,x]^6\,\text{Tan}[e+f\,x]}{9\,f}+\frac{\text{Sec}[e+f\,x]^8\,\text{Tan}[e+f\,x]}{9\,f}\right)+$$

$$\frac{1}{16\,384}3\,\text{Cos}[e+f\,x]^9\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^{12}\,\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(a+a\,\text{Sec}[e+f\,x])^3\,(c-c\,\text{Sec}[e+f\,x])^6$$

$$\left(\frac{64\,\text{Tan}[e+f\,x]}{63\,f}+\frac{32\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{63\,f}+\frac{8\,\text{Sec}[e+f\,x]^4\,\text{Tan}[e+f\,x]}{21\,f}-\frac{64\,\text{Sec}[e+f\,x]^6\,\text{Tan}[e+f\,x]}{63\,f}+\frac{\text{Sec}[e+f\,x]^8\,\text{Tan}[e+f\,x]}{9\,f}\right)+$$

$$\frac{1}{65\,536}55\,\text{Cos}[e+f\,x]^9\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^{12}\,\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(a+a\,\text{Sec}[e+f\,x])^3\,(c-c\,\text{Sec}[e+f\,x])^6$$

$$\left(\frac{128\,\text{Tan}[e+f\,x]}{315\,f}+\frac{64\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{315\,f}+\frac{16\,\text{Sec}[e+f\,x]^4\,\text{Tan}[e+f\,x]}{105\,f}+\frac{8\,\text{Sec}[e+f\,x]^6\,\text{Tan}[e+f\,x]}{63\,f}+\frac{\text{Sec}[e+f\,x]^8\,\text{Tan}[e+f\,x]}{9\,f}\right)$$

- **Problem 27: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^3}{c-c\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 100 leaves, 6 steps):

$$-\frac{15\,a^3\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,c\,f}-\frac{10\,a^3\,\text{Tan}[e+f\,x]}{c\,f}-\frac{5\,a^3\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{2\,c\,f}-\frac{2\,a\,(a+a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{f\,(c-c\,\text{Sec}[e+f\,x])}$$

Result (type 3, 287 leaves):

$$\frac{1}{16\,f\,(c-c\,\text{Sec}[e+f\,x])}\,a^3\,\text{Cos}[e+f\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\,(1+\text{Sec}[e+f\,x])^3\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]$$

$$\left(32\,\text{Csc}\left[\frac{e}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\,\text{Sin}\left[\frac{f\,x}{2}\right]+\left(-30\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+30\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+\right.\right.$$

$$\left.\frac{1}{\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)^2}-\frac{1}{\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)^2}+(16\,\text{Sin}[f\,x])\right/$$

$$\left.\left.\left(\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)\right)\right)\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right)$$

- **Problem 28: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^3}{(c-c\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 119 leaves, 6 steps):

$$\frac{5 a^3 \text{ArcTanh}[\text{Sin}[e+f x]]}{c^2 f}+\frac{5 a^3 \text{Tan}[e+f x]}{c^2 f}-\frac{2 a (a+a \text{Sec}[e+f x])^2 \text{Tan}[e+f x]}{3 f (c-c \text{Sec}[e+f x])^2}+\frac{10 \left(a^3+a^3 \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{3 f \left(c^2-c^2 \text{Sec}[e+f x]\right)}$$

Result (type 3, 402 leaves):

$$\left(a^3 (1+\text{Cos}[e+f x])^3 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^2 \text{Tan}\left[\frac{1}{2} (e+f x)\right] \left(\frac{1}{16} (-74+42 \text{Cos}[e]-76 \text{Cos}[f x]+120 \text{Cos}[e+f x]-46 \text{Cos}[2 (e+f x)]-76 \text{Cos}[2 e+f x]+23 \text{Cos}[e+2 f x]+23 \text{Cos}[3 e+2 f x]) \text{Csc}\left[\frac{e}{2}\right]^3 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^5 \text{Sin}\left[\frac{f x}{2}\right]-48 \text{Csc}\left[\frac{e}{2}\right]^3 \text{Csc}[e+f x]^4 \text{Sin}[e] \text{Sin}\left[\frac{f x}{2}\right] \text{Sin}\left[\frac{1}{2} (e+f x)\right]^7+\text{Cos}[e] \text{Cos}[e+f x] \text{Csc}\left[\frac{e}{2}\right]^2 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^4 \left(4 \text{Cot}\left[\frac{e}{2}\right]+15 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right) \text{Sin}\left[\frac{1}{2} (e+f x)\right]^2\right) \text{Tan}\left[\frac{1}{2} (e+f x)\right]-4 (-1+5 \text{Cos}[e+f x]) \text{Cot}\left[\frac{e}{2}\right]^2 \text{Csc}\left[\frac{e}{2}\right] \text{Sec}\left[\frac{1}{2} (e+f x)\right]^3 \text{Sin}\left[\frac{f x}{2}\right] \text{Tan}\left[\frac{1}{2} (e+f x)\right]^2\right)\right) \Big/ \left(6 c^2 f (-1+\text{Cos}[e+f x])^2 \left(-1+\text{Cot}\left[\frac{e}{2}\right]\right) \left(1+\text{Cot}\left[\frac{e}{2}\right]\right) \left(-1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right) \left(1+\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)\right)$$

Problem 34: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x] (c-c \text{Sec}[e+f x])^4}{a+a \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 121 leaves, 10 steps):

$$-\frac{35 c^4 \text{ArcTanh}[\text{Sin}[e+f x]]}{2 a f}+\frac{28 c^4 \text{Tan}[e+f x]}{a f}-\frac{21 c^4 \text{Sec}[e+f x] \text{Tan}[e+f x]}{2 a f}+\frac{2 c (c-c \text{Sec}[e+f x])^3 \text{Tan}[e+f x]}{f (a+a \text{Sec}[e+f x])}+\frac{7 c^4 \text{Tan}[e+f x]^3}{3 a f}$$

Result (type 3, 1036 leaves):

$$\frac{35\,\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\,(c-c\,\text{Sec}[e+f x])^4}{16\,f\,(a+a\,\text{Sec}[e+f x])}-$$

$$\frac{35\,\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\,(c-c\,\text{Sec}[e+f x])^4}{16\,f\,(a+a\,\text{Sec}[e+f x])}+$$

$$\frac{2\,\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^7\,\text{Sec}\left[\frac{e}{2}\right]\,(c-c\,\text{Sec}[e+f x])^4\,\text{Sin}\left[\frac{f x}{2}\right]}{f\,(a+a\,\text{Sec}[e+f x])}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^4\,\text{Sin}\left[\frac{f x}{2}\right]}{48\,f\,(a+a\,\text{Sec}[e+f x])\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^4\left(-7\,\text{Cos}\left[\frac{e}{2}\right]+8\,\text{Sin}\left[\frac{e}{2}\right]\right)}{48\,f\,(a+a\,\text{Sec}[e+f x])\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^2}+$$

$$\frac{35\,\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^4\,\text{Sin}\left[\frac{f x}{2}\right]}{24\,f\,(a+a\,\text{Sec}[e+f x])\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^4\,\text{Sin}\left[\frac{f x}{2}\right]}{48\,f\,(a+a\,\text{Sec}[e+f x])\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^4\left(7\,\text{Cos}\left[\frac{e}{2}\right]+8\,\text{Sin}\left[\frac{e}{2}\right]\right)}{48\,f\,(a+a\,\text{Sec}[e+f x])\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^2}+$$

$$\frac{35\,\text{Cos}[e+f x]^3\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6\,(c-c\,\text{Sec}[e+f x])^4\,\text{Sin}\left[\frac{f x}{2}\right]}{24\,f\,(a+a\,\text{Sec}[e+f x])\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}$$

Problem 35: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]\,(c-c\,\text{Sec}[e+f x])^3}{a+a\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 3, 100 leaves, 6 steps):

$$-\frac{15\,c^3\,\text{ArcTanh}[\text{Sin}[e+f x]]}{2\,a\,f}+\frac{10\,c^3\,\text{Tan}[e+f x]}{a\,f}-\frac{5\,c^3\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]}{2\,a\,f}+\frac{2\,c\,(c-c\,\text{Sec}[e+f x])^2\,\text{Tan}[e+f x]}{f\,(a+a\,\text{Sec}[e+f x])}$$

Result (type 3, 287 leaves):

$$\frac{1}{16\,a\,f\,(1+\text{Sec}[e+f\,x])}\text{Cos}[e+f\,x]^2\,\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^4(c-c\,\text{Sec}[e+f\,x])^3$$
$$\left(-32\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}\left[\frac{e}{2}\right]\text{Sin}\left[\frac{f\,x}{2}\right]+\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]\left(-30\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]+\right.\right.$$
$$30\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]+\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)^2}-\frac{1}{\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)^2}-$$
$$\left.\left.(16\,\text{Sin}[f\,x])\Big/\left(\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\right)\right)\right)$$

- **Problem 36: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(c-c\,\text{Sec}[e+f\,x])^2}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 74 leaves, 5 steps):

$$-\frac{3\,c^2\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{a\,f}+\frac{3\,c^2\,\text{Tan}[e+f\,x]}{a\,f}+\frac{2\left(c^2-c^2\,\text{Sec}[e+f\,x]\right)\text{Tan}[e+f\,x]}{f\,(a+a\,\text{Sec}[e+f\,x])}$$

Result (type 3, 220 leaves):

$$\frac{1}{a\,f\,(1+\text{Sec}[e+f\,x])}2\,c^2\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]$$
$$\left(4\,\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}\left[\frac{e}{2}\right]\text{Sin}\left[\frac{f\,x}{2}\right]+\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]\left(3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]-3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]+\right.\right.$$
$$\left.\left.\text{Sin}[f\,x]\Big/\left(\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\right)\right)\right)$$

- **Problem 42: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(c-c\,\text{Sec}[e+f\,x])^5}{(a+a\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 164 leaves, 11 steps):

$$\frac{105\,c^5\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,a^2\,f}-\frac{84\,c^5\,\text{Tan}[e+f\,x]}{a^2\,f}+\frac{63\,c^5\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{2\,a^2\,f}-$$
$$\frac{6\,c^2\,(c-c\,\text{Sec}[e+f\,x])^3\,\text{Tan}[e+f\,x]}{f\left(a^2+a^2\,\text{Sec}[e+f\,x]\right)}+\frac{2\,c\,(c-c\,\text{Sec}[e+f\,x])^4\,\text{Tan}[e+f\,x]}{3\,f\,(a+a\,\text{Sec}[e+f\,x])^2}-\frac{7\,c^5\,\text{Tan}[e+f\,x]^3}{a^2\,f}$$

Result (type 3, 380 leaves):

$$\frac{1}{3072\, a^2 f\, (1+\operatorname{Sec}[e+f x])^2} \operatorname{Cot}\left[\frac{1}{2}(e+f x)\right] \operatorname{Csc}\left[\frac{1}{2}(e+f x)\right]^6 (c-c \operatorname{Sec}[e+f x])^5$$
$$\left(20160 \operatorname{Cos}[e+f x]^3 \operatorname{Cot}\left[\frac{1}{2}(e+f x)\right]^3 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)+\right.$$
$$\operatorname{Csc}\left[\frac{1}{2}(e+f x)\right]^3 \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sec}[e]$$
$$\left(-1323 \operatorname{Sin}\left[\frac{f x}{2}\right]+3247 \operatorname{Sin}\left[\frac{3 f x}{2}\right]-2901 \operatorname{Sin}\left[e-\frac{f x}{2}\right]+1197 \operatorname{Sin}\left[e+\frac{f x}{2}\right]-3027 \operatorname{Sin}\left[2 e+\frac{f x}{2}\right]-273 \operatorname{Sin}\left[e+\frac{3 f x}{2}\right]+1827 \operatorname{Sin}\left[2 e+\frac{3 f x}{2}\right]-\right.$$
$$1693 \operatorname{Sin}\left[3 e+\frac{3 f x}{2}\right]+1995 \operatorname{Sin}\left[e+\frac{5 f x}{2}\right]-117 \operatorname{Sin}\left[2 e+\frac{5 f x}{2}\right]+1143 \operatorname{Sin}\left[3 e+\frac{5 f x}{2}\right]-969 \operatorname{Sin}\left[4 e+\frac{5 f x}{2}\right]+1173 \operatorname{Sin}\left[2 e+\frac{7 f x}{2}\right]+$$
$$\left.\left.117 \operatorname{Sin}\left[3 e+\frac{7 f x}{2}\right]+747 \operatorname{Sin}\left[4 e+\frac{7 f x}{2}\right]-309 \operatorname{Sin}\left[5 e+\frac{7 f x}{2}\right]+494 \operatorname{Sin}\left[3 e+\frac{9 f x}{2}\right]+142 \operatorname{Sin}\left[4 e+\frac{9 f x}{2}\right]+352 \operatorname{Sin}\left[5 e+\frac{9 f x}{2}\right]\right)\right)$$

- **Problem 43: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e+f x]\, (c-c \operatorname{Sec}[e+f x])^4}{(a+a \operatorname{Sec}[e+f x])^2}\, dx$$

Optimal (type 3, 150 leaves, 7 steps):

$$\frac{35 c^4 \operatorname{ArcTanh}[\operatorname{Sin}[e+f x]]}{2 a^2 f}-\frac{70 c^4 \operatorname{Tan}[e+f x]}{3 a^2 f}+\frac{35 c^4 \operatorname{Sec}[e+f x] \operatorname{Tan}[e+f x]}{6 a^2 f}+$$
$$\frac{2 c\, (c-c \operatorname{Sec}[e+f x])^3 \operatorname{Tan}[e+f x]}{3 f\, (a+a \operatorname{Sec}[e+f x])^2}-\frac{14 \left(c^2-c^2 \operatorname{Sec}[e+f x]\right)^2 \operatorname{Tan}[e+f x]}{3 f \left(a^2+a^2 \operatorname{Sec}[e+f x]\right)}$$

Result (type 3, 349 leaves):

$$\frac{1}{3 a^2 f\, (1+\operatorname{Sec}[e+f x])^2} c^4 \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right] \operatorname{Sec}[e+f x]^2 \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]^3$$
$$\left(-256 \operatorname{Cot}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Csc}\left[\frac{1}{2}(e+f x)\right] \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]-32 \operatorname{Csc}\left[\frac{1}{2}(e+f x)\right]^3 \operatorname{Sec}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]+\right.$$
$$3 \operatorname{Cot}\left[\frac{1}{2}(e+f x)\right]^3 \left(-70 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+70 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+\right.$$
$$\frac{1}{\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-\frac{1}{\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-(24 \operatorname{Sin}[f x]) \Big/ \left(\left(\operatorname{Cos}\left[\frac{e}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{e}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}\right]\right)\right.$$
$$\left.\left.\left.\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)-32 \operatorname{Cot}\left[\frac{1}{2}(e+f x)\right] \operatorname{Csc}\left[\frac{1}{2}(e+f x)\right]^2 \operatorname{Tan}\left[\frac{e}{2}\right]\right)$$

Problem 44: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]\,(c-c\,\text{Sec}[e+f x])^3}{(a+a\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 119 leaves, 6 steps):

$$\frac{5\,c^3\,\text{ArcTanh}[\text{Sin}[e+f x]]}{a^2 f}-\frac{5\,c^3\,\text{Tan}[e+f x]}{a^2 f}+\frac{2\,c\,(c-c\,\text{Sec}[e+f x])^2\,\text{Tan}[e+f x]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}-\frac{10\,\left(c^3-c^3\,\text{Sec}[e+f x]\right)\,\text{Tan}[e+f x]}{3 f\,\left(a^2+a^2\,\text{Sec}[e+f x]\right)}$$

Result (type 3, 671 leaves):

$$\frac{5\,\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\,(c-c\,\text{Sec}[e+f x])^3}{2 f\,(a+a\,\text{Sec}[e+f x])^2}-$$
$$\frac{5\,\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\,(c-c\,\text{Sec}[e+f x])^3}{2 f\,(a+a\,\text{Sec}[e+f x])^2}+$$
$$\frac{10\,\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\text{Sec}\left[\frac{e}{2}\right]\,(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}+$$
$$\frac{2\,\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\text{Sec}\left[\frac{e}{2}\right]\,(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}+$$
$$\frac{\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{2 f\,(a+a\,\text{Sec}[e+f x])^2\,\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\,\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$
$$\frac{\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2(c-c\,\text{Sec}[e+f x])^3\,\text{Sin}\left[\frac{f x}{2}\right]}{2 f\,(a+a\,\text{Sec}[e+f x])^2\,\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\,\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+\frac{2\,\text{Cos}[e+f x]\,\text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4(c-c\,\text{Sec}[e+f x])^3\,\text{Tan}\left[\frac{e}{2}\right]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}$$

Problem 48: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 38 leaves, 3 steps):

$$\frac{\text{Csc}[e+f x]}{a^2 c^2 f}-\frac{\text{Csc}[e+f x]^3}{3 a^2 c^2 f}$$

Result (type 3, 100 leaves):

$$\frac{\frac{5\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]}{12 f}-\frac{\text{Cot}\left[\frac{1}{2}(e+f x)\right]\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{24 f}+\frac{5\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{12 f}-\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{24 f}}{a^2 c^2}$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x] (c-c \text{Sec}[e+f x])^4}{(a+a \text{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 164 leaves, 7 steps):

$$-\frac{7 c^4 \text{ArcTanh}[\text{Sin}[e+f x]]}{a^3 f}+\frac{7 c^4 \text{Tan}[e+f x]}{a^3 f}+\frac{2 c (c-c \text{Sec}[e+f x])^3 \text{Tan}[e+f x]}{5 f (a+a \text{Sec}[e+f x])^3}-\frac{14 \left(c^2-c^2 \text{Sec}[e+f x]\right)^2 \text{Tan}[e+f x]}{15 a f (a+a \text{Sec}[e+f x])^2}+\frac{14 \left(c^4-c^4 \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{3 f \left(a^3+a^3 \text{Sec}[e+f x]\right)}$$

Result (type 3, 826 leaves):

$$\frac{7 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c-c \text{Sec}[e+f x])^4}{2 f (a+a \text{Sec}[e+f x])^3}-$$
$$\frac{7 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c-c \text{Sec}[e+f x])^4}{2 f (a+a \text{Sec}[e+f x])^3}+$$
$$\frac{76 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \text{Sec}\left[\frac{e}{2}\right] (c-c \text{Sec}[e+f x])^4 \text{Sin}\left[\frac{f x}{2}\right]}{15 f (a+a \text{Sec}[e+f x])^3}+$$
$$\frac{8 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \text{Sec}\left[\frac{e}{2}\right] (c-c \text{Sec}[e+f x])^4 \text{Sin}\left[\frac{f x}{2}\right]}{15 f (a+a \text{Sec}[e+f x])^3}+$$
$$\frac{2 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^7 \text{Sec}\left[\frac{e}{2}\right] (c-c \text{Sec}[e+f x])^4 \text{Sin}\left[\frac{f x}{2}\right]}{5 f (a+a \text{Sec}[e+f x])^3}+$$
$$\frac{\text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 (c-c \text{Sec}[e+f x])^4 \text{Sin}\left[\frac{f x}{2}\right]}{2 f (a+a \text{Sec}[e+f x])^3 \left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$
$$\frac{\text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 (c-c \text{Sec}[e+f x])^4 \text{Sin}\left[\frac{f x}{2}\right]}{2 f (a+a \text{Sec}[e+f x])^3 \left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$
$$\frac{8 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (c-c \text{Sec}[e+f x])^4 \text{Tan}\left[\frac{e}{2}\right]}{15 f (a+a \text{Sec}[e+f x])^3}+\frac{2 \text{Cos}[e+f x] \text{Cot}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (c-c \text{Sec}[e+f x])^4 \text{Tan}\left[\frac{e}{2}\right]}{5 f (a+a \text{Sec}[e+f x])^3}$$

Problem 60: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 59 leaves, 4 steps):

$$\frac{\text{Csc}[e+f x]}{a^3 c^3 f}-\frac{2 \text{Csc}[e+f x]^3}{3 a^3 c^3 f}+\frac{\text{Csc}[e+f x]^5}{5 a^3 c^3 f}$$

Result (type 3, 159 leaves) :

$$-\frac{1}{a^3 c^3}\left(-\frac{89 \text{Cot}\left[\frac{1}{2}(e+f x)\right]}{240 f}+\frac{31 \text{Cot}\left[\frac{1}{2}(e+f x)\right] \text{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{480 f}-\frac{\text{Cot}\left[\frac{1}{2}(e+f x)\right] \text{Csc}\left[\frac{1}{2}(e+f x)\right]^4}{160 f}-\frac{89 \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{240 f}+\frac{31 \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{480 f}-\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4 \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{160 f}\right)$$

Problem 61: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^4}\, dx$$

Optimal (type 3, 99 leaves, 7 steps) :

$$-\frac{\text{Cot}[e+f x]^7}{7 a^3 c^4 f}+\frac{\text{Csc}[e+f x]}{a^3 c^4 f}-\frac{\text{Csc}[e+f x]^3}{a^3 c^4 f}+\frac{3 \text{Csc}[e+f x]^5}{5 a^3 c^4 f}-\frac{\text{Csc}[e+f x]^7}{7 a^3 c^4 f}$$

Result (type 3, 211 leaves) :

$$\frac{1}{35840 a^3 c^4 f} \text{Csc}[e] \text{Csc}\left[\frac{1}{2}(e+f x)\right]^2 \text{Csc}[e+f x]^5 (2912 \text{Sin}[e]+416 \text{Sin}[f x]-7620 \text{Sin}[e+f x]+1905 \text{Sin}[2 (e+f x)]+3810 \text{Sin}[3 (e+f x)]-1524 \text{Sin}[4 (e+f x)]-762 \text{Sin}[5 (e+f x)]+381 \text{Sin}[6 (e+f x)]-2016 \text{Sin}[2 e+f x]+2080 \text{Sin}[e+2 f x]-1680 \text{Sin}[3 e+2 f x]+240 \text{Sin}[2 e+3 f x]+560 \text{Sin}[4 e+3 f x]-880 \text{Sin}[3 e+4 f x]+560 \text{Sin}[5 e+4 f x]+400 \text{Sin}[4 e+5 f x]-560 \text{Sin}[6 e+5 f x]+80 \text{Sin}[5 e+6 f x])$$

Problem 62: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^5}\, dx$$

Optimal (type 3, 120 leaves, 10 steps) :

$$\frac{2 \text{Cot}[e+f x]^9}{9 a^3 c^5 f}+\frac{\text{Csc}[e+f x]}{a^3 c^5 f}-\frac{5 \text{Csc}[e+f x]^3}{3 a^3 c^5 f}+\frac{9 \text{Csc}[e+f x]^5}{5 a^3 c^5 f}-\frac{\text{Csc}[e+f x]^7}{a^3 c^5 f}+\frac{2 \text{Csc}[e+f x]^9}{9 a^3 c^5 f}$$

Result (type 3, 257 leaves) :

$$-\frac{1}{184320 a^3 c^5 f (-1+\text{Sec}[e+f x])^5 (1+\text{Sec}[e+f x])^3} \text{Csc}[e] \text{Sec}[e+f x]^7 (-33024 \text{Sin}[e]+6144 \text{Sin}[f x]+76455 \text{Sin}[e+f x]-33980 \text{Sin}[2 (e+f x)]-32281 \text{Sin}[3 (e+f x)]+27184 \text{Sin}[4 (e+f x)]+1699 \text{Sin}[5 (e+f x)]-6796 \text{Sin}[6 (e+f x)]+1699 \text{Sin}[7 (e+f x)]+22656 \text{Sin}[2 e+f x]-17216 \text{Sin}[e+2 f x]+4416 \text{Sin}[3 e+2 f x]+3200 \text{Sin}[2 e+3 f x]-15360 \text{Sin}[4 e+3 f x]+12160 \text{Sin}[3 e+4 f x]-1920 \text{Sin}[5 e+4 f x]-5120 \text{Sin}[4 e+5 f x]+5760 \text{Sin}[6 e+5 f x]+320 \text{Sin}[5 e+6 f x]-2880 \text{Sin}[7 e+6 f x]+640 \text{Sin}[6 e+7 f x]) \text{Tan}[e+f x]$$

Problem 68: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])}{\sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 77 leaves, 3 steps):

$$-\frac{2 \sqrt{2}\, a \text{ArcTan}\left[\frac{\sqrt{c}\, \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{\sqrt{c}\, f}+\frac{2 a \text{Tan}[e+f x]}{f \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 167 leaves):

$$-\left(i \sqrt{2}\, a \left(-1+e^{i (e+f x)}\right) \left(\sqrt{2} \left(1+e^{i (e+f x)}\right)+2 \sqrt{1+e^{2 i (e+f x)}} \text{Log}\left[1-e^{i (e+f x)}\right]-2 \sqrt{1+e^{2 i (e+f x)}} \text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)\right) \Big/ \left(\left(1+e^{2 i (e+f x)}\right) f \sqrt{c-c \text{Sec}[e+f x]}\right)$$

Problem 69: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])}{(c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 76 leaves, 3 steps):

$$\frac{a \text{ArcTan}\left[\frac{\sqrt{c}\, \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{\sqrt{2}\, c^{3/2} f}-\frac{a \text{Tan}[e+f x]}{f (c-c \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 298 leaves):

$$a \left(\frac{1}{f (c-c \text{Sec}[e+f x])^{3/2}} 2 e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right) \text{Sec}[e+f x]^{3/2} \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3+\frac{1}{(c-c \text{Sec}[e+f x])^{3/2}} \text{Sec}[e+f x]^2 \left(\frac{4 \text{Cos}\left[\frac{e}{2}\right] \text{Cos}\left[\frac{f x}{2}\right]}{f}-\frac{2 \text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{f}+\frac{2 \text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sin}\left[\frac{f x}{2}\right]}{f}-\frac{4 \text{Sin}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{f}\right) \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\right)$$

Problem 70: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])}{(c-c \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 113 leaves, 4 steps):

$$\frac{a\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{8\sqrt{2}\,c^{5/2}\,f}-\frac{a\,\text{Tan}[e+f x]}{2 f\,(c-c\,\text{Sec}[e+f x])^{5/2}}+\frac{a\,\text{Tan}[e+f x]}{8 c f\,(c-c\,\text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 362 leaves):

$$a\left(\frac{1}{2 f\,(c-c\,\text{Sec}[e+f x])^{5/2}}\,e^{-\frac{1}{2} i (e+f x)}\sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}}\sqrt{1+e^{2 i (e+f x)}}\left(-\text{Log}\left[1-e^{i (e+f x)}\right]+\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2}\sqrt{1+e^{2 i (e+f x)}}\right]\right)\text{Sec}[e+f x]^{5/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5+\right.$$
$$\frac{1}{(c-c\,\text{Sec}[e+f x])^{5/2}}\text{Sec}[e+f x]^3\left(-\frac{3\,\text{Cos}\left[\frac{e}{2}\right]\text{Cos}\left[\frac{f x}{2}\right]}{f}+\frac{7\,\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{2 f}-\frac{\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{f}-\frac{7\,\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Sin}\left[\frac{f x}{2}\right]}{2 f}+\right.$$
$$\left.\left.\frac{\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Sin}\left[\frac{f x}{2}\right]}{f}+\frac{3\,\text{Sin}\left[\frac{e}{2}\right]\text{Sin}\left[\frac{f x}{2}\right]}{f}\right)\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right)$$

- **Problem 75: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])^2}{\sqrt{c-c\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 3, 117 leaves, 4 steps):

$$-\frac{4\sqrt{2}\,a^2\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{\sqrt{c}\,f}+\frac{16\,a^2\,\text{Tan}[e+f x]}{3 f\sqrt{c-c\,\text{Sec}[e+f x]}}-\frac{2\,a^2\sqrt{c-c\,\text{Sec}[e+f x]}\,\text{Tan}[e+f x]}{3 c f}$$

Result (type 3, 292 leaves):

$$\frac{1}{3 f\sqrt{c-c\,\text{Sec}[e+f x]}}4\,a^2\,e^{-\frac{1}{2} i (e+f x)}\,\text{Sec}[e+f x]\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+i\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\text{Sin}\left[\frac{1}{2}(e+f x)\right]$$
$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]\left(7+3\sqrt{2}\sqrt{1+e^{2 i (e+f x)}}\,\text{Log}\left[1-e^{i (e+f x)}\right]-3\sqrt{2}\sqrt{1+e^{2 i (e+f x)}}\,\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2}\sqrt{1+e^{2 i (e+f x)}}\right]+\text{Sec}[e+f x]\right)-\right.$$
$$\left.3 i\sqrt{2}\sqrt{1+e^{2 i (e+f x)}}\left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2}\sqrt{1+e^{2 i (e+f x)}}\right]\right)\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)$$

- **Problem 76: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])^2}{(c-c\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 3, 113 leaves, 4 steps):

$$\frac{3\sqrt{2}\,a^2\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{c^{3/2}\,f}-\frac{2\,a^2\,\text{Tan}[e+f x]}{f\,(c-c\,\text{Sec}[e+f x])^{3/2}}-\frac{2\,a^2\,\text{Tan}[e+f x]}{c\,f\,\sqrt{c-c\,\text{Sec}[e+f x]}}$$

Result (type 3, 337 leaves) :

$$\left(3\,e^{-\frac{1}{2}\,i\,(e+f x)}\,\sqrt{\frac{e^{i\,(e+f x)}}{1+e^{2\,i\,(e+f x)}}}\,\sqrt{1+e^{2\,i\,(e+f x)}}\,\left(\text{Log}\left[1-e^{i\,(e+f x)}\right]-\text{Log}\left[1+e^{i\,(e+f x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(e+f x)}}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]\,(a+a\,\text{Sec}[e+f x])^2\,\text{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\right)\Big/\left(f\,\sqrt{\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{3/2}\right)+\frac{1}{(c-c\,\text{Sec}[e+f x])^{3/2}}$$
$$\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]\,(a+a\,\text{Sec}[e+f x])^2\left(\frac{4\,\text{Cos}\left[\frac{e}{2}\right]\,\text{Cos}\left[\frac{f x}{2}\right]}{f}-\frac{\text{Cot}\left[\frac{e}{2}\right]\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{f}+\frac{\text{Csc}\left[\frac{e}{2}\right]\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\,\text{Sin}\left[\frac{f x}{2}\right]}{f}-\frac{4\,\text{Sin}\left[\frac{e}{2}\right]\,\text{Sin}\left[\frac{f x}{2}\right]}{f}\right)\text{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]^3$$

- **Problem 77: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])^2}{(c-c\,\text{Sec}[e+f x])^{5/2}}\,dx$$

Optimal (type 3, 117 leaves, 4 steps) :

$$-\frac{3\,a^2\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{4\sqrt{2}\,c^{5/2}\,f}-\frac{a^2\,\text{Tan}[e+f x]}{f\,(c-c\,\text{Sec}[e+f x])^{5/2}}+\frac{5\,a^2\,\text{Tan}[e+f x]}{4\,c\,f\,(c-c\,\text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 378 leaves) :

$$-\frac{1}{4\,c^2\,f\,(-1+\text{Sec}[e+f x])^2\,\sqrt{c-c\,\text{Sec}[e+f x]}}$$
$$a^2\,e^{-\frac{1}{2}\,i\,(e+f x)}\,\text{Csc}\left[\frac{e}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f x)\right]^3\,\sqrt{\text{Sec}[e+f x]}\,(1+\text{Sec}[e+f x])^2\left(\frac{1}{16\,\sqrt{\text{Sec}[e+f x]}}e^{-\frac{3\,i\,e}{2}}\,\left(-1+e^{i\,e}\right)\,\left(\text{Cos}\left[\frac{f x}{2}\right]+i\,\text{Sin}\left[\frac{f x}{2}\right]\right)\right.$$
$$\left(-9\,i\,e^{i\,e}\,\left(1+e^{i\,e}\right)\,\text{Cos}\left[\frac{f x}{2}\right]+i\,\left(1+e^{3\,i\,e}\right)\,\text{Cos}\left[\frac{3\,f x}{2}\right]-9\,e^{i\,e}\,\text{Sin}\left[\frac{f x}{2}\right]+9\,e^{2\,i\,e}\,\text{Sin}\left[\frac{f x}{2}\right]+\text{Sin}\left[\frac{3\,f x}{2}\right]-e^{3\,i\,e}\,\text{Sin}\left[\frac{3\,f x}{2}\right]\right)+$$
$$\left.3\,\sqrt{\frac{e^{i\,(e+f x)}}{1+e^{2\,i\,(e+f x)}}}\,\sqrt{1+e^{2\,i\,(e+f x)}}\,\left(-\text{Log}\left[1-e^{i\,(e+f x)}\right]+\text{Log}\left[1+e^{i\,(e+f x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(e+f x)}}\right]\right)\text{Sin}\left[\frac{e}{2}\right]\,\text{Sin}\left[\frac{1}{2}\,(e+f x)\right]^4\right)\text{Tan}\left[\frac{1}{2}\,(e+f x)\right]$$

- **Problem 78: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^2}{(c-c \text{Sec}[e+f x])^{7/2}} \, dx$$

Optimal (type 3, 164 leaves, 5 steps):

$$-\frac{a^2 \text{ArcTan}\left[\frac{\sqrt{c} \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{16 \sqrt{2} c^{7/2} f}-\frac{\left(a^2+a^2 \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{3 f (c-c \text{Sec}[e+f x])^{7/2}}+\frac{a^2 \text{Tan}[e+f x]}{4 c f (c-c \text{Sec}[e+f x])^{5/2}}-\frac{a^2 \text{Tan}[e+f x]}{16 c^2 f (c-c \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 486 leaves):

$$\frac{1}{8 f (c-c \text{Sec}[e+f x])^{7/2}} e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \left(-\text{Log}\left[1-e^{i (e+f x)}\right]+\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)$$
$$\text{Sec}[e+f x]^{3/2} (a+a \text{Sec}[e+f x])^2 \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \text{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]^4+\frac{1}{(c-c \text{Sec}[e+f x])^{7/2}} \text{Sec}[e+f x]^2 (a+a \text{Sec}[e+f x])^2$$
$$\left(\frac{7 \text{Cos}\left[\frac{e}{2}\right] \text{Cos}\left[\frac{f x}{2}\right]}{12 f}-\frac{43 \text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{24 f}+\frac{17 \text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{12 f}-\frac{\text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^5}{3 f}+\frac{43 \text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sin}\left[\frac{f x}{2}\right]}{24 f}-\right.$$
$$\left.\frac{17 \text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Sin}\left[\frac{f x}{2}\right]}{12 f}+\frac{\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Sin}\left[\frac{f x}{2}\right]}{3 f}-\frac{7 \text{Sin}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{12 f}\right) \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \text{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]^4$$

- **Problem 83: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^3}{\sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 164 leaves, 5 steps):

$$-\frac{8 \sqrt{2} a^3 \text{ArcTan}\left[\frac{\sqrt{c} \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{\sqrt{c} f}+\frac{8 a^3 \text{Tan}[e+f x]}{f \sqrt{c-c \text{Sec}[e+f x]}}+\frac{2 a (a+a \text{Sec}[e+f x])^2 \text{Tan}[e+f x]}{5 f \sqrt{c-c \text{Sec}[e+f x]}}+\frac{4 \left(a^3+a^3 \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{3 f \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 223 leaves):

$$-\left(2 i a^3 \left(-1+e^{i (e+f x)}\right) \left(73+105 e^{i (e+f x)}+190 e^{2 i (e+f x)}+190 e^{3 i (e+f x)}+105 e^{4 i (e+f x)}+73 e^{5 i (e+f x)}+60 \sqrt{2} \left(1+e^{2 i (e+f x)}\right)^{5/2} \text{Log}\left[1-e^{i (e+f x)}\right]-\right.\right.$$
$$\left.\left.60 \sqrt{2} \left(1+e^{2 i (e+f x)}\right)^{5/2} \text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)\right) \Big/ \left(15 \left(1+e^{2 i (e+f x)}\right)^3 f \sqrt{c-c \text{Sec}[e+f x]}\right)$$

- **Problem 84: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^3}{(c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 168 leaves, 5 steps) :

$$\frac{10\sqrt{2}\,a^3\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f\,x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}\right]}{c^{3/2}\,f}-\frac{a\,(a+a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{f\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}-\frac{10\,a^3\,\text{Tan}[e+f\,x]}{c\,f\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{5\,\left(a^3+a^3\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{3\,c\,f\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 377 leaves) :

$$\left(5\,e^{-\frac{1}{2}\,i\,(e+f\,x)}\,\sqrt{\frac{e^{i\,(e+f\,x)}}{1+e^{2\,i\,(e+f\,x)}}}\,\sqrt{1+e^{2\,i\,(e+f\,x)}}\right.$$
$$\left.\left(\text{Log}\left[1-e^{i\,(e+f\,x)}\right]-\text{Log}\left[1+e^{i\,(e+f\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(e+f\,x)}}\right]\right)\,\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^3\,(a+a\,\text{Sec}[e+f\,x])^3\,\text{Tan}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^3\right)\Big/$$
$$\left(f\,\text{Sec}[e+f\,x]^{3/2}\,(c-c\,\text{Sec}[e+f\,x])^{3/2}\right)+\frac{1}{(c-c\,\text{Sec}[e+f\,x])^{3/2}}\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^3\,(a+a\,\text{Sec}[e+f\,x])^3$$
$$\left(\frac{19\,\text{Cos}\left[\frac{e}{2}\right]\,\text{Cos}\left[\frac{f\,x}{2}\right]}{3\,f}-\frac{\text{Cot}\left[\frac{e}{2}\right]\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]}{f}+\frac{\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\,\text{Sec}[e+f\,x]}{3\,f}+\frac{\text{Csc}\left[\frac{e}{2}\right]\,\text{Csc}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\,\text{Sin}\left[\frac{f\,x}{2}\right]}{f}-\frac{19\,\text{Sin}\left[\frac{e}{2}\right]\,\text{Sin}\left[\frac{f\,x}{2}\right]}{3\,f}\right)\,\text{Tan}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^3$$

■ Problem 85: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^3}{(c-c\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 174 leaves, 5 steps) :

$$-\frac{15\,a^3\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f\,x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}\right]}{2\,\sqrt{2}\,c^{5/2}\,f}-\frac{a\,(a+a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{2\,f\,(c-c\,\text{Sec}[e+f\,x])^{5/2}}+\frac{5\,\left(a^3+a^3\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{4\,c\,f\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}+\frac{15\,a^3\,\text{Tan}[e+f\,x]}{4\,c^2\,f\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 411 leaves) :

$$\left(15\, e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right] (a+a\,\text{Sec}[e+f x])^3\, \text{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right) \Big/ \left(4 f \sqrt{\text{Sec}[e+f x]}\, (c-c\,\text{Sec}[e+f x])^{5/2}\right)+$$
$$\frac{1}{(c-c\,\text{Sec}[e+f x])^{5/2}} \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right] (a+a\,\text{Sec}[e+f x])^3 \left(\frac{9\,\text{Cos}\left[\frac{e}{2}\right] \text{Cos}\left[\frac{f x}{2}\right]}{2 f}-\frac{\text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{4 f}-\frac{\text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{2 f}+\right.$$
$$\left.\frac{\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sin}\left[\frac{f x}{2}\right]}{4 f}+\frac{\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Sin}\left[\frac{f x}{2}\right]}{2 f}-\frac{9\,\text{Sin}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{2 f}\right) \text{Tan}\left[\frac{e}{2}+\frac{f x}{2}\right]^5$$

Problem 90: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x]) \sqrt{c-c\,\text{Sec}[e+f x]}}\, dx$$

Optimal (type 3, 89 leaves, 3 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{\sqrt{2}\, a \sqrt{c}\, f}+\frac{\text{Tan}[e+f x]}{f (a+a\,\text{Sec}[e+f x]) \sqrt{c-c\,\text{Sec}[e+f x]}}$$

Result (type 3, 204 leaves):

$$-\left(i \left(-1+e^{2 i (e+f x)}\right)\right.$$
$$\left.\left(\sqrt{2} \left(1+e^{2 i (e+f x)}\right)+\left(1+e^{i (e+f x)}\right) \sqrt{1+e^{2 i (e+f x)}}\, \text{Log}\left[1-e^{i (e+f x)}\right]-\left(1+e^{i (e+f x)}\right) \sqrt{1+e^{2 i (e+f x)}}\, \text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)\right) \Big/$$
$$\left(\sqrt{2}\, a \left(1+e^{2 i (e+f x)}\right)^2 f\, (1+\text{Sec}[e+f x]) \sqrt{c-c\,\text{Sec}[e+f x]}\right)$$

Problem 91: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])\, (c-c\,\text{Sec}[e+f x])^{3/2}}\, dx$$

Optimal (type 3, 122 leaves, 4 steps):

$$-\frac{3\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{4 \sqrt{2}\, a\, c^{3/2} f}-\frac{3\,\text{Tan}[e+f x]}{4 a f\, (c-c\,\text{Sec}[e+f x])^{3/2}}+\frac{\text{Tan}[e+f x]}{f (a+a\,\text{Sec}[e+f x])\, (c-c\,\text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 220 leaves):

$$-\left(e^{-2 i (e+f x)} \operatorname{Csc}[2 (e+f x)] \left(3-8 e^{i (e+f x)}-4 e^{3 i (e+f x)}+e^{4 i (e+f x)}-2 e^{\frac{3}{2} i (e+f x)} \left(-4+3 \sqrt{2} \sqrt{1+e^{2 i (e+f x)}} \operatorname{Log}\left[1-e^{i (e+f x)}\right]-3 \sqrt{2} \sqrt{1+e^{2 i (e+f x)}} \operatorname{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right) \operatorname{Sin}\left[\frac{1}{2} (e+f x)\right] \operatorname{Sin}[e+f x]\right)\right) \Big/ \left(8 a c f \sqrt{c-c \operatorname{Sec}[e+f x]}\right)$$

- **Problem 92: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e+f x]}{(a+a \operatorname{Sec}[e+f x]) (c-c \operatorname{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 156 leaves, 5 steps):

$$-\frac{15 \operatorname{ArcTan}\left[\frac{\sqrt{c} \operatorname{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \operatorname{Sec}[e+f x]}}\right]}{32 \sqrt{2} a c^{5/2} f}-\frac{5 \operatorname{Tan}[e+f x]}{8 a f (c-c \operatorname{Sec}[e+f x])^{5/2}}+\frac{\operatorname{Tan}[e+f x]}{f (a+a \operatorname{Sec}[e+f x]) (c-c \operatorname{Sec}[e+f x])^{5/2}}-\frac{15 \operatorname{Tan}[e+f x]}{32 a c f (c-c \operatorname{Sec}[e+f x])^{3/2}}$$

Result (type 3, 441 leaves):

$$\left(15 e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \left(\operatorname{Log}\left[1-e^{i (e+f x)}\right]-\operatorname{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right) \operatorname{Sec}[e+f x]^{7/2} \operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right) \Big/ \left(4 f (a+a \operatorname{Sec}[e+f x]) (c-c \operatorname{Sec}[e+f x])^{5/2}\right)+\left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \operatorname{Sec}[e+f x]^4 \left(-\frac{3 \operatorname{Cos}\left[\frac{e}{2}\right] \operatorname{Cos}\left[\frac{f x}{2}\right]}{2 f}+\frac{15 \operatorname{Cot}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{4 f}-\frac{\operatorname{Cot}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{2 f}-\frac{2 \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]}{f}-\frac{15 \operatorname{Csc}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \operatorname{Sin}\left[\frac{f x}{2}\right]}{4 f}+\frac{\operatorname{Csc}\left[\frac{e}{2}\right] \operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \operatorname{Sin}\left[\frac{f x}{2}\right]}{2 f}+\frac{3 \operatorname{Sin}\left[\frac{e}{2}\right] \operatorname{Sin}\left[\frac{f x}{2}\right]}{2 f}\right) \operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right) \Big/ \left((a+a \operatorname{Sec}[e+f x]) (c-c \operatorname{Sec}[e+f x])^{5/2}\right)$$

- **Problem 97: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e+f x]}{(a+a \operatorname{Sec}[e+f x])^2 \sqrt{c-c \operatorname{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 138 leaves, 4 steps):

$$-\frac{\operatorname{ArcTan}\left[\frac{\sqrt{c} \operatorname{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \operatorname{Sec}[e+f x]}}\right]}{2 \sqrt{2} a^2 \sqrt{c} f}+\frac{\operatorname{Tan}[e+f x]}{3 f (a+a \operatorname{Sec}[e+f x])^2 \sqrt{c-c \operatorname{Sec}[e+f x]}}+\frac{\operatorname{Tan}[e+f x]}{2 f \left(a^2+a^2 \operatorname{Sec}[e+f x]\right) \sqrt{c-c \operatorname{Sec}[e+f x]}}$$

Result (type 3, 296 leaves):

$$\left(2 e^{-\frac{1}{2} i (e+f x)} \text{Cos}\left[\frac{1}{2} (e+f x)\right] \left(\sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \text{Cos}\left[\frac{1}{2} (e+f x)\right]^3\right.\right.$$
$$\left(5 \sqrt{2} \left(1+e^{i (e+f x)}\right)+3 \sqrt{1+e^{2 i (e+f x)}} \text{Log}\left[1-e^{i (e+f x)}\right]-3 \sqrt{1+e^{2 i (e+f x)}} \text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)+$$
$$\left.e^{\frac{1}{2} i (e+f x)} \sqrt{\text{Sec}[e+f x]}-7 e^{\frac{1}{2} i (e+f x)} \text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \sqrt{\text{Sec}[e+f x]}\right)$$
$$\left.\text{Sec}[e+f x]^{5/2} \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right) \Big/ \left(3 a^2 f (1+\text{Sec}[e+f x])^2 \sqrt{c-c \text{Sec}[e+f x]}\right)$$

■ Problem 98: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 169 leaves, 5 steps):

$$-\frac{5 \text{ArcTan}\left[\frac{\sqrt{c} \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{8 \sqrt{2} a^2 c^{3/2} f}-\frac{5 \text{Tan}[e+f x]}{8 a^2 f (c-c \text{Sec}[e+f x])^{3/2}}+$$
$$\frac{\text{Tan}[e+f x]}{3 f (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x])^{3/2}}+\frac{5 \text{Tan}[e+f x]}{6 f \left(a^2+a^2 \text{Sec}[e+f x]\right) (c-c \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 395 leaves):

$$-\left(5 e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\right.$$
$$\left.\left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right) \text{Sec}[e+f x]^{7/2} \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\right) \Big/ \left(f (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x])^{3/2}\right)+$$
$$\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Sec}[e+f x]^4 \left(-\frac{26 \text{Cos}\left[\frac{e}{2}\right] \text{Cos}\left[\frac{f x}{2}\right]}{3 f}-\frac{\text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{f}+\frac{20 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 f}-\frac{2 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{3 f}+\right.\right.$$
$$\left.\left.\frac{\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sin}\left[\frac{f x}{2}\right]}{f}+\frac{26 \text{Sin}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{3 f}\right) \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\right) \Big/ \left((a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x])^{3/2}\right)$$

- **Problem 99: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^{5/2}}\,dx$$

Optimal (type 3, 203 leaves, 6 steps):

$$-\frac{35\,\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{64\sqrt{2}\,a^2\,c^{5/2}\,f}-\frac{35\,\text{Tan}[e+f x]}{48\,a^2\,f\,(c-c\,\text{Sec}[e+f x])^{5/2}}+\frac{\text{Tan}[e+f x]}{3\,f\,(a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^{5/2}}+\frac{7\,\text{Tan}[e+f x]}{6\,f\,\left(a^2+a^2\,\text{Sec}[e+f x]\right)\,(c-c\,\text{Sec}[e+f x])^{5/2}}-\frac{35\,\text{Tan}[e+f x]}{64\,a^2\,c\,f\,(c-c\,\text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 465 leaves):

$$\left(35\,e^{-\frac{1}{2}i(e+f x)}\sqrt{\frac{e^{i(e+f x)}}{1+e^{2 i(e+f x)}}}\,\sqrt{1+e^{2 i(e+f x)}}\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\left(\text{Log}\left[1-e^{i(e+f x)}\right]-\text{Log}\left[1+e^{i(e+f x)}+\sqrt{2}\,\sqrt{1+e^{2 i(e+f x)}}\right]\right)\text{Sec}[e+f x]^{9/2}\,\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right)\Big/\left(4\,f\,(a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^{5/2}\right)+$$
$$\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Sec}[e+f x]^5\left(\frac{43\,\text{Cos}\left[\frac{e}{2}\right]\text{Cos}\left[\frac{f x}{2}\right]}{6 f}+\frac{19\,\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{4 f}-\frac{\text{Cot}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{2 f}-\frac{26\,\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]}{3 f}+\frac{2\,\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{3 f}-\frac{19\,\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Sin}\left[\frac{f x}{2}\right]}{4 f}+\frac{\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Sin}\left[\frac{f x}{2}\right]}{2 f}-\frac{43\,\text{Sin}\left[\frac{e}{2}\right]\text{Sin}\left[\frac{f x}{2}\right]}{6 f}\right)\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right)\Big/\left((a+a\,\text{Sec}[e+f x])^2\,(c-c\,\text{Sec}[e+f x])^{5/2}\right)$$

- **Problem 104: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])^3\,\sqrt{c-c\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 3, 181 leaves, 5 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{c}\,\text{Tan}[e+f x]}{\sqrt{2}\,\sqrt{c-c\,\text{Sec}[e+f x]}}\right]}{4\sqrt{2}\,a^3\,\sqrt{c}\,f}+\frac{\text{Tan}[e+f x]}{5\,f\,(a+a\,\text{Sec}[e+f x])^3\,\sqrt{c-c\,\text{Sec}[e+f x]}}+\frac{\text{Tan}[e+f x]}{6\,a\,f\,(a+a\,\text{Sec}[e+f x])^2\,\sqrt{c-c\,\text{Sec}[e+f x]}}+\frac{\text{Tan}[e+f x]}{4\,f\,\left(a^3+a^3\,\text{Sec}[e+f x]\right)\sqrt{c-c\,\text{Sec}[e+f x]}}$$

Result (type 3, 334 leaves):

$$\frac{1}{15 a^3 f (1+\text{Sec}[e+f x])^3 \sqrt{c-c \text{Sec}[e+f x]}}$$
$$2 e^{-\frac{1}{2} i (e+f x)} \text{Cos}\left[\frac{1}{2} (e+f x)\right] \left(\sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \text{Cos}\left[\frac{1}{2} (e+f x)\right]^5 \left(37 \sqrt{2} \left(1+e^{i (e+f x)}\right)+15 \sqrt{1+e^{2 i (e+f x)}} \text{Log}\left[1-e^{i (e+f x)}\right]-15 \sqrt{1+e^{2 i (e+f x)}} \text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right)-3 e^{\frac{1}{2} i (e+f x)} \sqrt{\text{Sec}[e+f x]}+23 e^{\frac{1}{2} i (e+f x)} \text{Cos}\left[\frac{1}{2} (e+f x)\right]^2 \sqrt{\text{Sec}[e+f x]}-71 e^{\frac{1}{2} i (e+f x)} \text{Cos}\left[\frac{1}{2} (e+f x)\right]^4 \sqrt{\text{Sec}[e+f x]}\right) \text{Sec}[e+f x]^{7/2} \text{Sin}\left[\frac{1}{2} (e+f x)\right]$$

- **Problem 105: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 212 leaves, 6 steps):

$$-\frac{7 \text{ArcTan}\left[\frac{\sqrt{c} \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{16 \sqrt{2} a^3 c^{3/2} f}-\frac{7 \text{Tan}[e+f x]}{16 a^3 f (c-c \text{Sec}[e+f x])^{3/2}}+\frac{\text{Tan}[e+f x]}{5 f (a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{3/2}}+\frac{7 \text{Tan}[e+f x]}{30 a f (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x])^{3/2}}+\frac{7 \text{Tan}[e+f x]}{12 f \left(a^3+a^3 \text{Sec}[e+f x]\right) (c-c \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 417 leaves):

$$-\left(7 e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right) \text{Sec}[e+f x]^{9/2} \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\right) \Big/ \left(f (a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{3/2}\right)+$$
$$\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Sec}[e+f x]^5 \left(-\frac{278 \text{Cos}\left[\frac{e}{2}\right] \text{Cos}\left[\frac{f x}{2}\right]}{15 f}-\frac{\text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{f}+\frac{242 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]}{15 f}-\frac{56 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{15 f}+\frac{2 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^5}{5 f}+\frac{\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sin}\left[\frac{f x}{2}\right]}{f}+\frac{278 \text{Sin}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{15 f}\right) \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^3\right) \Big/ \left((a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{3/2}\right)$$

■ Problem 106: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 246 leaves, 7 steps):

$$-\frac{63 \text{ArcTan}\left[\frac{\sqrt{c} \text{Tan}[e+f x]}{\sqrt{2} \sqrt{c-c \text{Sec}[e+f x]}}\right]}{128 \sqrt{2} a^3 c^{5/2} f}-\frac{21 \text{Tan}[e+f x]}{32 a^3 f (c-c \text{Sec}[e+f x])^{5/2}}+\frac{\text{Tan}[e+f x]}{5 f (a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{5/2}}+\frac{3 \text{Tan}[e+f x]}{10 a f (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x])^{5/2}}+\frac{21 \text{Tan}[e+f x]}{20 f \left(a^3+a^3 \text{Sec}[e+f x]\right) (c-c \text{Sec}[e+f x])^{5/2}}-\frac{63 \text{Tan}[e+f x]}{128 a^3 c f (c-c \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 487 leaves):

$$\left(63 e^{-\frac{1}{2} i (e+f x)} \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} \sqrt{1+e^{2 i (e+f x)}} \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}+\sqrt{2} \sqrt{1+e^{2 i (e+f x)}}\right]\right) \text{Sec}[e+f x]^{11/2} \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right) \Big/ \left(4 f (a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{5/2}\right)+$$

$$\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Sec}[e+f x]^6 \left(\frac{257 \text{Cos}\left[\frac{e}{2}\right] \text{Cos}\left[\frac{f x}{2}\right]}{10 f}+\frac{23 \text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]}{4 f}-\frac{\text{Cot}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{2 f}-\frac{124 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]}{5 f}+\frac{22 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^3}{5 f}-\frac{2 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^5}{5 f}-\frac{23 \text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sin}\left[\frac{f x}{2}\right]}{4 f}+\frac{\text{Csc}\left[\frac{e}{2}\right] \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Sin}\left[\frac{f x}{2}\right]}{2 f}-\frac{257 \text{Sin}\left[\frac{e}{2}\right] \text{Sin}\left[\frac{f x}{2}\right]}{10 f}\right) \text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^5\right) \Big/ \left((a+a \text{Sec}[e+f x])^3 (c-c \text{Sec}[e+f x])^{5/2}\right)$$

■ Problem 107: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x] \sqrt{a+a \text{Sec}[e+f x]} (c-c \text{Sec}[e+f x])^{5/2} \, dx$$

Optimal (type 3, 43 leaves, 1 step):

$$\frac{a (c-c \text{Sec}[e+f x])^{5/2} \text{Tan}[e+f x]}{3 f \sqrt{a+a \text{Sec}[e+f x]}}$$

Result (type 3, 87 leaves):

$$\frac{1}{12 f} c^2 (5-6 \text{Cos}[e+f x]+3 \text{Cos}[2 (e+f x)]) \text{Csc}\left[\frac{1}{2} (e+f x)\right] \text{Sec}\left[\frac{1}{2} (e+f x)\right] \text{Sec}[e+f x]^2 \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}$$

Problem 110: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x] \sqrt{a+a \text{Sec}[e+f x]}}{\sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 51 leaves, 1 step):

$$\frac{a \text{Log}[1-\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 99 leaves):

$$-\frac{i \left(-1+e^{i (e+f x)}\right) \left(2 \text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \sqrt{a (1+\text{Sec}[e+f x])}}{\left(1+e^{i (e+f x)}\right) f \sqrt{c-c \text{Sec}[e+f x]}}$$

Problem 117: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^{3/2}}{\sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 95 leaves, 2 steps):

$$\frac{2 a^2 \text{Log}[1-\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{a \sqrt{a+a \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 174 leaves):

$$\left(\sqrt{2} a \left(1+\text{Cos}[e+f x]\right) \left(4 \text{Log}\left[1-e^{i (e+f x)}\right]-2 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \text{Sec}[e+f x]^{3/2} \sqrt{a (1+\text{Sec}[e+f x])}\right.$$
$$\left.\left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+i \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right) \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right) \Big/ \left(\left(1+e^{i (e+f x)}\right) \sqrt{\frac{e^{i (e+f x)}}{1+e^{2 i (e+f x)}}} f \sqrt{c-c \text{Sec}[e+f x]}\right)$$

Problem 118: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^{3/2}}{(c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 99 leaves, 2 steps):

$$-\frac{a \sqrt{a+a \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f (c-c \text{Sec}[e+f x])^{3/2}}-\frac{a^2 \text{Log}[1-\text{Sec}[e+f x]] \text{Tan}[e+f x]}{c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 134 leaves):

$$-\left(a\left(2-2\,\text{Log}\left[1-e^{i(e+fx)}\right]+\text{Cos}[e+fx]\left(2\,\text{Log}\left[1-e^{i(e+fx)}\right]-\text{Log}\left[1+e^{2i(e+fx)}\right]\right)+\text{Log}\left[1+e^{2i(e+fx)}\right]\right)\sqrt{a(1+\text{Sec}[e+fx])}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/\left(c\,f\,(-1+\text{Cos}[e+fx])\sqrt{c-c\,\text{Sec}[e+fx]}\right)$$

Problem 126: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+fx]\,(a+a\,\text{Sec}[e+fx])^{5/2}\sqrt{c-c\,\text{Sec}[e+fx]}\,dx$$

Optimal (type 3, 43 leaves, 1 step):

$$-\frac{c\,(a+a\,\text{Sec}[e+fx])^{5/2}\,\text{Tan}[e+fx]}{3\,f\sqrt{c-c\,\text{Sec}[e+fx]}}$$

Result (type 3, 88 leaves):

$$\frac{1}{6\,f}a^2\,\text{Cot}\left[\frac{1}{2}(e+fx)\right]\left(2+4\,\text{Cos}[e+fx]+\text{Cos}[e+fx]^2\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)\text{Sec}[e+fx]^2\sqrt{a(1+\text{Sec}[e+fx])}\sqrt{c-c\,\text{Sec}[e+fx]}$$

Problem 127: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+fx]\,(a+a\,\text{Sec}[e+fx])^{5/2}}{\sqrt{c-c\,\text{Sec}[e+fx]}}\,dx$$

Optimal (type 3, 141 leaves, 3 steps):

$$\frac{4\,a^3\,\text{Log}[1-\text{Sec}[e+fx]]\,\text{Tan}[e+fx]}{f\sqrt{a+a\,\text{Sec}[e+fx]}\sqrt{c-c\,\text{Sec}[e+fx]}}+\frac{2\,a^2\sqrt{a+a\,\text{Sec}[e+fx]}\,\text{Tan}[e+fx]}{f\sqrt{c-c\,\text{Sec}[e+fx]}}+\frac{a\,(a+a\,\text{Sec}[e+fx])^{3/2}\,\text{Tan}[e+fx]}{2\,f\sqrt{c-c\,\text{Sec}[e+fx]}}$$

Result (type 3, 328 leaves):

$$\left(4\sqrt{2}\,e^{\frac{1}{2}i(e+fx)}\sqrt{\frac{\left(1+e^{i(e+fx)}\right)^2}{1+e^{2i(e+fx)}}}\left(2\,\text{Log}\left[1-e^{i(e+fx)}\right]-\text{Log}\left[1+e^{2i(e+fx)}\right]\right)\sqrt{\text{Sec}[e+fx]}\,(a(1+\text{Sec}[e+fx]))^{5/2}\,\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)\Big/$$
$$\left(\left(1+e^{i(e+fx)}\right)\sqrt{\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}}}\,f\,(1+\text{Sec}[e+fx])^{5/2}\sqrt{c-c\,\text{Sec}[e+fx]}\right)+$$
$$\left(\text{Sec}[e+fx]\sqrt{(1+\text{Cos}[e+fx])\,\text{Sec}[e+fx]}\,(a(1+\text{Sec}[e+fx]))^{5/2}\left(\frac{5\,\text{Sec}\left[\frac{e}{2}+\frac{fx}{2}\right]}{2\,f}+\frac{\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]\text{Sec}[e+fx]}{f}\right)\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)\Big/$$
$$\left((1+\text{Sec}[e+fx])^{5/2}\sqrt{c-c\,\text{Sec}[e+fx]}\right)$$

Problem 128: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+fx]\,(a+a\,\text{Sec}[e+fx])^{5/2}}{(c-c\,\text{Sec}[e+fx])^{3/2}}\,dx$$

Optimal (type 3, 145 leaves, 3 steps):

$$-\frac{a\,(a+a\,\text{Sec}[e+f\,x])^{3/2}\,\text{Tan}[e+f\,x]}{f\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}-\frac{4\,a^3\,\text{Log}[1-\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{c\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{2\,a^2\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\text{Tan}[e+f\,x]}{c\,f\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 188 leaves):

$$\Big(a^2\,\Big(1-4\,\text{Log}\big[1-e^{i\,(e+f\,x)}\big]+\text{Cos}[e+f\,x]\,\Big(-5+8\,\text{Log}\big[1-e^{i\,(e+f\,x)}\big]-4\,\text{Log}\big[1+e^{2\,i\,(e+f\,x)}\big]\Big)+2\,\text{Log}\big[1+e^{2\,i\,(e+f\,x)}\big]+\text{Cos}[2\,(e+f\,x)]\,\Big(-4\,\text{Log}\big[1-e^{i\,(e+f\,x)}\big]+2\,\text{Log}\big[1+e^{2\,i\,(e+f\,x)}\big]\Big)\Big)\,\text{Sec}[e+f\,x]\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big/\Big(c\,f\,(-1+\text{Cos}[e+f\,x])\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\Big)$$

Problem 129: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{5/2}}{(c-c\,\text{Sec}[e+f\,x])^{5/2}}\,dx$$

Optimal (type 3, 145 leaves, 3 steps):

$$-\frac{a\,(a+a\,\text{Sec}[e+f\,x])^{3/2}\,\text{Tan}[e+f\,x]}{2\,f\,(c-c\,\text{Sec}[e+f\,x])^{5/2}}+\frac{a^2\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\text{Tan}[e+f\,x]}{c\,f\,(c-c\,\text{Sec}[e+f\,x])^{3/2}}+\frac{a^3\,\text{Log}[1-\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{c^2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 182 leaves):

$$-\Big(a^2\,\Big(4-6\,\text{Log}\big[1-e^{i\,(e+f\,x)}\big]+\text{Cos}[e+f\,x]\,\Big(8\,\text{Log}\big[1-e^{i\,(e+f\,x)}\big]-4\,\text{Log}\big[1+e^{2\,i\,(e+f\,x)}\big]\Big)+3\,\text{Log}\big[1+e^{2\,i\,(e+f\,x)}\big]+\text{Cos}[2\,(e+f\,x)]\,\Big(-2\,\text{Log}\big[1-e^{i\,(e+f\,x)}\big]+\text{Log}\big[1+e^{2\,i\,(e+f\,x)}\big]\Big)\Big)\,\sqrt{a\,(1+\text{Sec}[e+f\,x])}\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big/\Big(2\,c^2\,f\,(-1+\text{Cos}[e+f\,x])^2\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\Big)$$

Problem 133: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[e+f\,x]\,(c-c\,\text{Sec}[e+f\,x])^{5/2}}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\,dx$$

Optimal (type 3, 139 leaves, 3 steps):

$$-\frac{4\,c^3\,\text{Log}[1+\text{Sec}[e+f\,x]]\,\text{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}\,\sqrt{c-c\,\text{Sec}[e+f\,x]}}-\frac{2\,c^2\,\sqrt{c-c\,\text{Sec}[e+f\,x]}\,\text{Tan}[e+f\,x]}{f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}-\frac{c\,(c-c\,\text{Sec}[e+f\,x])^{3/2}\,\text{Tan}[e+f\,x]}{2\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Result (type 3, 141 leaves):

$$\frac{1}{2 f \sqrt{a (1+\text{Sec}[e+f x])}} c^2 \text{Cot}\left[\frac{1}{2} (e+f x)\right] \left(1-6 \text{Cos}[e+f x]+8 \text{Log}\left[1+e^{i (e+f x)}\right]+\text{Cos}[2 (e+f x)] \left(8 \text{Log}\left[1+e^{i (e+f x)}\right]-4 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)-4 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \text{Sec}[e+f x]^2 \sqrt{c-c \text{Sec}[e+f x]}$$

- **Problem 134: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x] (c-c \text{Sec}[e+f x])^{3/2}}{\sqrt{a+a \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 94 leaves, 2 steps):

$$-\frac{2 c^2 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{c \sqrt{c-c \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]}}$$

Result (type 3, 173 leaves):

$$\left(c e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2 \text{Cos}\left[\frac{1}{2} (e+f x)\right] \text{Cot}\left[\frac{1}{2} (e+f x)\right] \left(-1+\text{Cos}[e+f x] \left(4 \text{Log}\left[1+e^{i (e+f x)}\right]-2 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)\right) \text{Sec}[e+f x]^3 \sqrt{c-c \text{Sec}[e+f x]} \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+i \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)\right) \Big/ \left(2 \left(1+e^{i (e+f x)}\right) f \sqrt{a (1+\text{Sec}[e+f x])}\right)$$

- **Problem 135: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x] \sqrt{c-c \text{Sec}[e+f x]}}{\sqrt{a+a \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 50 leaves, 1 step):

$$-\frac{c \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 118 leaves):

$$\frac{i \left(1+e^{i (e+f x)}\right) \sqrt{\frac{c \left(-1+e^{i (e+f x)}\right)^2}{1+e^{2 i (e+f x)}}} \left(2 \text{Log}\left[1+e^{i (e+f x)}\right]-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right)}{\left(-1+e^{i (e+f x)}\right) f \sqrt{a (1+\text{Sec}[e+f x])}}$$

- **Problem 136: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]}{\sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 47 leaves, 2 steps):

$$-\frac{\text{ArcTanh}[\text{Cos}[e+f x]]\,\text{Tan}[e+f x]}{f\sqrt{a+a\,\text{Sec}[e+f x]}\,\sqrt{c-c\,\text{Sec}[e+f x]}}$$

Result (type 3, 115 leaves) :

$$-\frac{2\,i\left(-1+e^{i(e+f x)}\right)\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\left(\text{Log}\left[1-e^{i(e+f x)}\right]-\text{Log}\left[1+e^{i(e+f x)}\right]\right)\text{Sec}[e+f x]}{\left(1+e^{i(e+f x)}\right)f\sqrt{a\,(1+\text{Sec}[e+f x])}\,\sqrt{c-c\,\text{Sec}[e+f x]}}$$

Problem 137: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[e+f x]}{\sqrt{a+a\,\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 3, 95 leaves, 3 steps) :

$$-\frac{\text{Tan}[e+f x]}{2 f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{3/2}}-\frac{\text{ArcTanh}[\text{Cos}[e+f x]]\,\text{Tan}[e+f x]}{2 c f\sqrt{a+a\,\text{Sec}[e+f x]}\,\sqrt{c-c\,\text{Sec}[e+f x]}}$$

Result (type 3, 129 leaves) :

$$\left(\left(-1-\text{Log}\left[1-e^{i(e+f x)}\right]+\text{Cos}[e+f x]\left(\text{Log}\left[1-e^{i(e+f x)}\right]-\text{Log}\left[1+e^{i(e+f x)}\right]\right)+\text{Log}\left[1+e^{i(e+f x)}\right]\right)\text{Tan}[e+f x]\right)\Big/$$
$$\left(2 c f\,(-1+\text{Cos}[e+f x])\sqrt{a\,(1+\text{Sec}[e+f x])}\,\sqrt{c-c\,\text{Sec}[e+f x]}\right)$$

Problem 138: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[e+f x]}{\sqrt{a+a\,\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{5/2}}\,dx$$

Optimal (type 3, 140 leaves, 4 steps) :

$$-\frac{\text{Tan}[e+f x]}{4 f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{5/2}}-\frac{\text{Tan}[e+f x]}{4 c f\sqrt{a+a\,\text{Sec}[e+f x]}\,(c-c\,\text{Sec}[e+f x])^{3/2}}-\frac{\text{ArcTanh}[\text{Cos}[e+f x]]\,\text{Tan}[e+f x]}{4 c^2 f\sqrt{a+a\,\text{Sec}[e+f x]}\,\sqrt{c-c\,\text{Sec}[e+f x]}}$$

Result (type 3, 176 leaves) :

$$\left(\left(4+3\,\text{Log}\left[1-e^{i(e+f x)}\right]+\text{Cos}[2(e+f x)]\left(\text{Log}\left[1-e^{i(e+f x)}\right]-\text{Log}\left[1+e^{i(e+f x)}\right]\right)-\right.\right.$$
$$\left.\left.3\,\text{Log}\left[1+e^{i(e+f x)}\right]+\text{Cos}[e+f x]\left(-6-4\,\text{Log}\left[1-e^{i(e+f x)}\right]+4\,\text{Log}\left[1+e^{i(e+f x)}\right]\right)\right)\text{Tan}[e+f x]\right)\Big/$$
$$\left(8 c^2 f\,(-1+\text{Cos}[e+f x])^2\sqrt{a\,(1+\text{Sec}[e+f x])}\,\sqrt{c-c\,\text{Sec}[e+f x]}\right)$$

Problem 139: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[e+f x]\,(c-c\,\text{Sec}[e+f x])^{5/2}}{(a+a\,\text{Sec}[e+f x])^{3/2}}\,dx$$

Optimal (type 3, 142 leaves, 3 steps) :

$$\frac{4 c^3 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{a f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{2 c^2 \sqrt{c-c \text{Sec}[e+f x]} \text{Tan}[e+f x]}{a f \sqrt{a+a \text{Sec}[e+f x]}}+\frac{c (c-c \text{Sec}[e+f x])^{3/2} \text{Tan}[e+f x]}{f (a+a \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 183 leaves):

$$-\left(c^2 \text{Cot}\left[\frac{1}{2} (e+f x)\right] \left(-1+4 \text{Log}\left[1+e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(-5+8 \text{Log}\left[1+e^{i (e+f x)}\right]-4 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)+\text{Cos}[2 (e+f x)] \left(4 \text{Log}\left[1+e^{i (e+f x)}\right]-2 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)-2 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \text{Sec}[e+f x] \sqrt{c-c \text{Sec}[e+f x]}\right) \Big/ \left(a f (1+\text{Cos}[e+f x]) \sqrt{a (1+\text{Sec}[e+f x])}\right)$$

Problem 140: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x] (c-c \text{Sec}[e+f x])^{3/2}}{(a+a \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 95 leaves, 2 steps):

$$\frac{c^2 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{a f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{c \sqrt{c-c \text{Sec}[e+f x]} \text{Tan}[e+f x]}{f (a+a \text{Sec}[e+f x])^{3/2}}$$

Result (type 3, 132 leaves):

$$-\left(c \text{Cot}\left[\frac{1}{2} (e+f x)\right] \left(-2+2 \text{Log}\left[1+e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(2 \text{Log}\left[1+e^{i (e+f x)}\right]-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right)-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \sqrt{c-c \text{Sec}[e+f x]}\right) \Big/ \left(a f (1+\text{Cos}[e+f x]) \sqrt{a (1+\text{Sec}[e+f x])}\right)$$

Problem 142: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^{3/2} \sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 95 leaves, 3 steps):

$$\frac{\text{Tan}[e+f x]}{2 f (a+a \text{Sec}[e+f x])^{3/2} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{\text{ArcTanh}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{2 a f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 129 leaves):

$$\left(\left(-1+\text{Log}\left[1-e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}\right]\right)-\text{Log}\left[1+e^{i (e+f x)}\right]\right) \text{Tan}[e+f x]\right) \Big/ \left(2 a f (1+\text{Cos}[e+f x]) \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}\right)$$

Problem 143: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^{3/2} (c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 104 leaves, 3 steps):

$$\frac{\text{Csc}[e+f x]}{2 a c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{\text{ArcTanh}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{2 a c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 89 leaves) :

$$\frac{\text{Csc}[e+f x]+\left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}\right]\right) \text{Tan}[e+f x]}{2 a c f \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}}$$

- **Problem 144: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^{3/2} (c-c \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 146 leaves, 4 steps) :

$$\frac{3 \text{Csc}[e+f x]}{8 a c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{\text{Tan}[e+f x]}{4 f (a+a \text{Sec}[e+f x])^{3/2} (c-c \text{Sec}[e+f x])^{5/2}}-\frac{3 \text{ArcTanh}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{8 a c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 243 leaves) :

$$\left(\left(-2+6 \text{Log}\left[1-e^{i (e+f x)}\right]+3 \text{Cos}[3 (e+f x)] \text{Log}\left[1-e^{i (e+f x)}\right]-2 \text{Cos}[2 (e+f x)] \left(5+3 \text{Log}\left[1-e^{i (e+f x)}\right]-3 \text{Log}\left[1+e^{i (e+f x)}\right]\right)-6 \text{Log}\left[1+e^{i (e+f x)}\right]-3 \text{Cos}[3 (e+f x)] \text{Log}\left[1+e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(4-3 \text{Log}\left[1-e^{i (e+f x)}\right]+3 \text{Log}\left[1+e^{i (e+f x)}\right]\right)\right) \text{Tan}[e+f x]\right) \Big/ \left(32 a c^2 f (-1+\text{Cos}[e+f x])^2 (1+\text{Cos}[e+f x]) \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}\right)$$

- **Problem 145: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x] (c-c \text{Sec}[e+f x])^{5/2}}{(a+a \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 145 leaves, 3 steps) :

$$-\frac{c^3 \text{Log}[1+\text{Sec}[e+f x]] \text{Tan}[e+f x]}{a^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{c^2 \sqrt{c-c \text{Sec}[e+f x]} \text{Tan}[e+f x]}{a f (a+a \text{Sec}[e+f x])^{3/2}}+\frac{c (c-c \text{Sec}[e+f x])^{3/2} \text{Tan}[e+f x]}{2 f (a+a \text{Sec}[e+f x])^{5/2}}$$

Result (type 3, 178 leaves) :

$$\left(c^2 \text{Cot}\left[\frac{1}{2} (e+f x)\right] \left(-4+6 \text{Log}\left[1+e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(8 \text{Log}\left[1+e^{i (e+f x)}\right]-4 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right)+\text{Cos}[2 (e+f x)] \left(2 \text{Log}\left[1+e^{i (e+f x)}\right]-\text{Log}\left[1+e^{2 i (e+f x)}\right]\right)-3 \text{Log}\left[1+e^{2 i (e+f x)}\right]\right) \sqrt{c-c \text{Sec}[e+f x]}\right) \Big/ \left(2 a^2 f (1+\text{Cos}[e+f x])^2 \sqrt{a (1+\text{Sec}[e+f x])}\right)$$

- **Problem 148: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^{5/2} \sqrt{c-c \text{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 140 leaves, 4 steps) :

$$\frac{\text{Tan}[e+f x]}{4 f (a+a \text{Sec}[e+f x])^{5/2} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{\text{Tan}[e+f x]}{4 a f (a+a \text{Sec}[e+f x])^{3/2} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{\text{ArcTanh}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{4 a^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 176 leaves):

$$\left(\left(-4+3 \text{Log}\left[1-e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(-6+4 \text{Log}\left[1-e^{i (e+f x)}\right]-4 \text{Log}\left[1+e^{i (e+f x)}\right]\right)+\text{Cos}[2 (e+f x)] \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}\right]\right)-3 \text{Log}\left[1+e^{i (e+f x)}\right]\right) \text{Tan}[e+f x]\right) \Big/ \left(8 a^2 f (1+\text{Cos}[e+f x])^2 \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}\right)$$

■ **Problem 149: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^{5/2} (c-c \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 3, 146 leaves, 4 steps):

$$\frac{3 \text{Csc}[e+f x]}{8 a^2 c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}+\frac{\text{Tan}[e+f x]}{4 f (a+a \text{Sec}[e+f x])^{5/2} (c-c \text{Sec}[e+f x])^{3/2}}-\frac{3 \text{ArcTanh}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{8 a^2 c f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 242 leaves):

$$-\left(\left(2+6 \text{Log}\left[1-e^{i (e+f x)}\right]-3 \text{Cos}[3 (e+f x)] \text{Log}\left[1-e^{i (e+f x)}\right]+\text{Cos}[e+f x] \left(4+3 \text{Log}\left[1-e^{i (e+f x)}\right]-3 \text{Log}\left[1+e^{i (e+f x)}\right]\right)-6 \text{Log}\left[1+e^{i (e+f x)}\right]+3 \text{Cos}[3 (e+f x)] \text{Log}\left[1+e^{i (e+f x)}\right]+\text{Cos}[2 (e+f x)] \left(10-6 \text{Log}\left[1-e^{i (e+f x)}\right]+6 \text{Log}\left[1+e^{i (e+f x)}\right]\right)\right) \text{Tan}[e+f x]\right) \Big/ \left(32 a^2 c f (-1+\text{Cos}[e+f x]) (1+\text{Cos}[e+f x])^2 \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}\right)$$

■ **Problem 150: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^{5/2} (c-c \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 3, 160 leaves, 4 steps):

$$\frac{3 \text{Csc}[e+f x]}{8 a^2 c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{\text{Cot}[e+f x]^2 \text{Csc}[e+f x]}{4 a^2 c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}-\frac{3 \text{ArcTanh}[\text{Cos}[e+f x]] \text{Tan}[e+f x]}{8 a^2 c^2 f \sqrt{a+a \text{Sec}[e+f x]} \sqrt{c-c \text{Sec}[e+f x]}}$$

Result (type 3, 105 leaves):

$$\frac{(1-5 \text{Cos}[2 (e+f x)]) \text{Csc}[e+f x]^3+6 \left(\text{Log}\left[1-e^{i (e+f x)}\right]-\text{Log}\left[1+e^{i (e+f x)}\right]\right) \text{Tan}[e+f x]}{16 a^2 c^2 f \sqrt{a (1+\text{Sec}[e+f x])} \sqrt{c-c \text{Sec}[e+f x]}}$$

■ **Problem 151: Unable to integrate problem.**

$$\int \text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^m (c-c \text{Sec}[e+f x])^n \, dx$$

Optimal (type 5, 101 leaves, 3 steps):

$$-\frac{1}{f\,(1+2\,m)}\,2^{\frac{1}{2}+n}\,c\,\text{Hypergeometric2F1}\left[\frac{1}{2}+m,\ \frac{1}{2}-n,\ \frac{3}{2}+m,\ \frac{1}{2}\,(1+\text{Sec}[e+f\,x])\right]\,(1-\text{Sec}[e+f\,x])^{\frac{1}{2}-n}\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{-1+n}\,\text{Tan}[e+f\,x]$$

Result (type 8, 34 leaves):

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{n}\,dx$$

- **Problem 154: Unable to integrate problem.**

$$\int \frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}}{c-c\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 5, 90 leaves, 3 steps):

$$-\frac{1}{f\,(c-c\,\text{Sec}[e+f\,x])}\,2^{\frac{1}{2}+m}\,a\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\ \frac{1}{2}-m,\ \frac{1}{2},\ \frac{1}{2}\,(1-\text{Sec}[e+f\,x])\right]\,(1+\text{Sec}[e+f\,x])^{\frac{1}{2}-m}\,(a+a\,\text{Sec}[e+f\,x])^{-1+m}\,\text{Tan}[e+f\,x]$$

Result (type 8, 34 leaves):

$$\int \frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}}{c-c\,\text{Sec}[e+f\,x]}\,dx$$

- **Problem 155: Unable to integrate problem.**

$$\int \frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}}{(c-c\,\text{Sec}[e+f\,x])^{2}}\,dx$$

Optimal (type 5, 92 leaves, 3 steps):

$$-\frac{1}{3\,f\,(c-c\,\text{Sec}[e+f\,x])^{2}}\,2^{\frac{1}{2}+m}\,a\,\text{Hypergeometric2F1}\left[-\frac{3}{2},\ \frac{1}{2}-m,\ -\frac{1}{2},\ \frac{1}{2}\,(1-\text{Sec}[e+f\,x])\right]\,(1+\text{Sec}[e+f\,x])^{\frac{1}{2}-m}\,(a+a\,\text{Sec}[e+f\,x])^{-1+m}\,\text{Tan}[e+f\,x]$$

Result (type 8, 34 leaves):

$$\int \frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}}{(c-c\,\text{Sec}[e+f\,x])^{2}}\,dx$$

- **Problem 156: Unable to integrate problem.**

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{5/2}\,dx$$

Optimal (type 3, 160 leaves, 3 steps):

$$-\frac{64\, c^3\, (a + a\, \text{Sec}[e + f\, x])^m\, \text{Tan}[e + f\, x]}{f\, (5 + 2\, m)\, \left(3 + 8\, m + 4\, m^2\right) \sqrt{c - c\, \text{Sec}[e + f\, x]}} - \frac{16\, c^2\, (a + a\, \text{Sec}[e + f\, x])^m \sqrt{c - c\, \text{Sec}[e + f\, x]}\ \text{Tan}[e + f\, x]}{f\, \left(15 + 16\, m + 4\, m^2\right)} - \frac{2\, c\, (a + a\, \text{Sec}[e + f\, x])^m\, (c - c\, \text{Sec}[e + f\, x])^{3/2}\, \text{Tan}[e + f\, x]}{f\, (5 + 2\, m)}$$

Result (type 8, 36 leaves) :

$$\int \text{Sec}[e + f\, x]\, (a + a\, \text{Sec}[e + f\, x])^m\, (c - c\, \text{Sec}[e + f\, x])^{5/2}\, dx$$

- **Problem 157: Unable to integrate problem.**

$$\int \text{Sec}[e + f\, x]\, (a + a\, \text{Sec}[e + f\, x])^m\, (c - c\, \text{Sec}[e + f\, x])^{3/2}\, dx$$

Optimal (type 3, 100 leaves, 2 steps) :

$$-\frac{8\, c^2\, (a + a\, \text{Sec}[e + f\, x])^m\, \text{Tan}[e + f\, x]}{f\, \left(3 + 8\, m + 4\, m^2\right) \sqrt{c - c\, \text{Sec}[e + f\, x]}} - \frac{2\, c\, (a + a\, \text{Sec}[e + f\, x])^m \sqrt{c - c\, \text{Sec}[e + f\, x]}\ \text{Tan}[e + f\, x]}{f\, (3 + 2\, m)}$$

Result (type 8, 36 leaves) :

$$\int \text{Sec}[e + f\, x]\, (a + a\, \text{Sec}[e + f\, x])^m\, (c - c\, \text{Sec}[e + f\, x])^{3/2}\, dx$$

- **Problem 158: Unable to integrate problem.**

$$\int \text{Sec}[e + f\, x]\, (a + a\, \text{Sec}[e + f\, x])^m \sqrt{c - c\, \text{Sec}[e + f\, x]}\ dx$$

Optimal (type 3, 46 leaves, 1 step) :

$$-\frac{2\, c\, (a + a\, \text{Sec}[e + f\, x])^m\, \text{Tan}[e + f\, x]}{f\, (1 + 2\, m) \sqrt{c - c\, \text{Sec}[e + f\, x]}}$$

Result (type 8, 36 leaves) :

$$\int \text{Sec}[e + f\, x]\, (a + a\, \text{Sec}[e + f\, x])^m \sqrt{c - c\, \text{Sec}[e + f\, x]}\ dx$$

- **Problem 159: Unable to integrate problem.**

$$\int \frac{\text{Sec}[e + f\, x]\, (a + a\, \text{Sec}[e + f\, x])^m}{\sqrt{c - c\, \text{Sec}[e + f\, x]}}\, dx$$

Optimal (type 5, 69 leaves, 2 steps) :

$$-\frac{\text{Hypergeometric2F1}\left[1,\ \frac{1}{2} + m,\ \frac{3}{2} + m,\ \frac{1}{2}\, (1 + \text{Sec}[e + f\, x])\right]\, (a + a\, \text{Sec}[e + f\, x])^m\, \text{Tan}[e + f\, x]}{f\, (1 + 2\, m) \sqrt{c - c\, \text{Sec}[e + f\, x]}}$$

Result (type 8, 36 leaves) :

$$\int \frac{\text{Sec}[e+f x] \, (a+a \, \text{Sec}[e+f x])^m}{\sqrt{c-c \, \text{Sec}[e+f x]}} \, dx$$

Problem 160: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x] \, (a+a \, \text{Sec}[e+f x])^m}{(c-c \, \text{Sec}[e+f x])^{3/2}} \, dx$$

Optimal (type 5, 74 leaves, 2 steps):

$$-\frac{\text{Hypergeometric2F1}\left[2, \frac{1}{2}+m, \frac{3}{2}+m, \frac{1}{2} (1+\text{Sec}[e+f x])\right] (a+a \, \text{Sec}[e+f x])^m \, \text{Tan}[e+f x]}{2 \, c \, f \, (1+2 m) \sqrt{c-c \, \text{Sec}[e+f x]}}$$

Result (type 8, 36 leaves):

$$\int \frac{\text{Sec}[e+f x] \, (a+a \, \text{Sec}[e+f x])^m}{(c-c \, \text{Sec}[e+f x])^{3/2}} \, dx$$

Problem 161: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x] \, (a+a \, \text{Sec}[e+f x])^m}{(c-c \, \text{Sec}[e+f x])^{5/2}} \, dx$$

Optimal (type 5, 74 leaves, 2 steps):

$$-\frac{\text{Hypergeometric2F1}\left[3, \frac{1}{2}+m, \frac{3}{2}+m, \frac{1}{2} (1+\text{Sec}[e+f x])\right] (a+a \, \text{Sec}[e+f x])^m \, \text{Tan}[e+f x]}{4 \, c^2 \, f \, (1+2 m) \sqrt{c-c \, \text{Sec}[e+f x]}}$$

Result (type 8, 36 leaves):

$$\int \frac{\text{Sec}[e+f x] \, (a+a \, \text{Sec}[e+f x])^m}{(c-c \, \text{Sec}[e+f x])^{5/2}} \, dx$$

Problem 162: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Sec}[e+f x] \, (a+a \, \text{Sec}[e+f x])^m \, (c-c \, \text{Sec}[e+f x])^{-3-m} \, dx$$

Optimal (type 3, 169 leaves, 3 steps):

$$-\frac{(a+a \, \text{Sec}[e+f x])^m \, (c-c \, \text{Sec}[e+f x])^{-3-m} \, \text{Tan}[e+f x]}{f \, (1+2 m)} + \frac{2 \, (a+a \, \text{Sec}[e+f x])^{1+m} \, (c-c \, \text{Sec}[e+f x])^{-3-m} \, \text{Tan}[e+f x]}{a \, f \, \left(3+8 m+4 m^2\right)} - \frac{2 \, (a+a \, \text{Sec}[e+f x])^{2+m} \, (c-c \, \text{Sec}[e+f x])^{-3-m} \, \text{Tan}[e+f x]}{a^2 \, f \, (1+2 m) \, \left(15+16 m+4 m^2\right)}$$

Result (type 3, 321 leaves):

$$-\frac{1}{\left(-1+e^{i(e+fx)}\right)^5 f(1+2m)(3+2m)(5+2m)}\, i\, 2^{3+m}\left(-i e^{-\frac{1}{2}i(e+fx)}\left(-1+e^{i(e+fx)}\right)\right)^{-2m}\left(1+e^{i(e+fx)}\right)\left(\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}}\right)^{-m}$$
$$\left(\frac{\left(1+e^{i(e+fx)}\right)^2}{1+e^{2i(e+fx)}}\right)^m\left(7+12m+4m^2-4e^{i(e+fx)}(3+2m)-4e^{3i(e+fx)}(3+2m)+e^{4i(e+fx)}\left(7+12m+4m^2\right)+e^{2i(e+fx)}\left(22+24m+8m^2\right)\right)$$
$$\mathrm{Sec}[e+fx]^{3+m}(1+\mathrm{Sec}[e+fx])^{-m}(a(1+\mathrm{Sec}[e+fx]))^m(c-c\,\mathrm{Sec}[e+fx])^{-3-m}\mathrm{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]^{-2(-3-m)}$$

- **Problem 163: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[e+fx](a+a\,\mathrm{Sec}[e+fx])^m(c-c\,\mathrm{Sec}[e+fx])^{-2-m}\,dx$$

Optimal (type 3, 104 leaves, 2 steps):

$$-\frac{(a+a\,\mathrm{Sec}[e+fx])^m(c-c\,\mathrm{Sec}[e+fx])^{-2-m}\mathrm{Tan}[e+fx]}{f(1+2m)}+\frac{(a+a\,\mathrm{Sec}[e+fx])^{1+m}(c-c\,\mathrm{Sec}[e+fx])^{-2-m}\mathrm{Tan}[e+fx]}{af\left(3+8m+4m^2\right)}$$

Result (type 3, 250 leaves):

$$\left(i\,2^{3+m}\left(-i e^{-\frac{1}{2}i(e+fx)}\left(-1+e^{i(e+fx)}\right)\right)^{-2m}\left(1+e^{i(e+fx)}\right)\left(\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}}\right)^{-m}\left(\frac{\left(1+e^{i(e+fx)}\right)^2}{1+e^{2i(e+fx)}}\right)^m\left(1-e^{i(e+fx)}+m+e^{2i(e+fx)}(1+m)\right)\mathrm{Sec}[e+fx]^{2+m}\right.$$
$$\left.(1+\mathrm{Sec}[e+fx])^{-m}(a(1+\mathrm{Sec}[e+fx]))^m(c-c\,\mathrm{Sec}[e+fx])^{-2-m}\mathrm{Sin}\left[\frac{1}{2}(e+fx)\right]^{2(2+m)}\right)\Big/\left(\left(-1+e^{i(e+fx)}\right)^3 f(1+2m)(3+2m)\right)$$

- **Problem 164: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[e+fx](a+a\,\mathrm{Sec}[e+fx])^m(c-c\,\mathrm{Sec}[e+fx])^{-1-m}\,dx$$

Optimal (type 3, 47 leaves, 1 step):

$$-\frac{(a+a\,\mathrm{Sec}[e+fx])^m(c-c\,\mathrm{Sec}[e+fx])^{-1-m}\mathrm{Tan}[e+fx]}{f(1+2m)}$$

Result (type 3, 208 leaves):

$$-\frac{1}{f+2fm}2^{1+m}e^{-\frac{1}{2}i(e+fx)}\left(-i e^{-\frac{1}{2}i(e+fx)}\left(-1+e^{i(e+fx)}\right)\right)^{-1-2m}\left(1+e^{i(e+fx)}\right)\left(\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}}\right)^{-m}$$
$$\left(\frac{\left(1+e^{i(e+fx)}\right)^2}{1+e^{2i(e+fx)}}\right)^m\mathrm{Sec}[e+fx]^{1+m}(1+\mathrm{Sec}[e+fx])^{-m}(a(1+\mathrm{Sec}[e+fx]))^m(c-c\,\mathrm{Sec}[e+fx])^{-1-m}\mathrm{Sin}\left[\frac{1}{2}(e+fx)\right]^{2(1+m)}$$

- **Problem 165: Unable to integrate problem.**

$$\int \mathrm{Sec}[e+fx](a+a\,\mathrm{Sec}[e+fx])^m(c-c\,\mathrm{Sec}[e+fx])^{-m}\,dx$$

Optimal (type 5, 101 leaves, 3 steps):

$$-\frac{1}{f\,(1+2\,m)}2^{\frac{1}{2}-m}\,c\,\text{Hypergeometric2F1}\left[\frac{1}{2}+m,\,\frac{1}{2}+m,\,\frac{3}{2}+m,\,\frac{1}{2}\,(1+\text{Sec}[e+f\,x])\right]\,(1-\text{Sec}[e+f\,x])^{\frac{1}{2}+m}\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{-1-m}\,\text{Tan}[e+f\,x]$$

Result (type 8, 36 leaves):

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{-m}\,dx$$

Problem 166: Unable to integrate problem.

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{1-m}\,dx$$

Optimal (type 5, 99 leaves, 3 steps):

$$-\frac{1}{f\,(1+2\,m)}2^{\frac{3}{2}-m}\,c\,\text{Hypergeometric2F1}\left[-\frac{1}{2}+m,\,\frac{1}{2}+m,\,\frac{3}{2}+m,\,\frac{1}{2}\,(1+\text{Sec}[e+f\,x])\right]\,(1-\text{Sec}[e+f\,x])^{-\frac{1}{2}+m}\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{-m}\,\text{Tan}[e+f\,x]$$

Result (type 8, 38 leaves):

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{1-m}\,dx$$

Problem 167: Unable to integrate problem.

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{2-m}\,dx$$

Optimal (type 5, 101 leaves, 3 steps):

$$-\frac{1}{f\,(1+2\,m)}2^{\frac{5}{2}-m}\,c^{2}\,\text{Hypergeometric2F1}\left[-\frac{3}{2}+m,\,\frac{1}{2}+m,\,\frac{3}{2}+m,\,\frac{1}{2}\,(1+\text{Sec}[e+f\,x])\right]\,(1-\text{Sec}[e+f\,x])^{-\frac{1}{2}+m}\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{-m}\,\text{Tan}[e+f\,x]$$

Result (type 8, 38 leaves):

$$\int \text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^{m}\,(c-c\,\text{Sec}[e+f\,x])^{2-m}\,dx$$

Problem 168: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f\,x]^{2}\,(a+a\,\text{Sec}[e+f\,x])^{3}\,(c-c\,\text{Sec}[e+f\,x])\,dx$$

Optimal (type 3, 105 leaves, 10 steps):

$$\frac{a^3 c \operatorname{ArcTanh}[\operatorname{Sin}[e+f x]]}{4 f}+\frac{a^3 c \operatorname{Sec}[e+f x] \operatorname{Tan}[e+f x]}{4 f}-\frac{a^3 c \operatorname{Sec}[e+f x]^3 \operatorname{Tan}[e+f x]}{2 f}-\frac{2 a^3 c \operatorname{Tan}[e+f x]^3}{3 f}-\frac{a^3 c \operatorname{Tan}[e+f x]^5}{5 f}$$

Result (type 3, 276 leaves):

$$-\frac{a^3 c \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{4 f}+\frac{a^3 c \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{4 f}-\frac{a^3 c}{8 f\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^4}+\frac{a^3 c}{8 f\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+\frac{a^3 c}{8 f\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^4}-\frac{a^3 c}{8 f\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+\frac{7 a^3 c \operatorname{Tan}[e+f x]}{15 f}-\frac{4 a^3 c \operatorname{Sec}[e+f x]^2 \operatorname{Tan}[e+f x]}{15 f}-\frac{a^3 c \operatorname{Sec}[e+f x]^4 \operatorname{Tan}[e+f x]}{5 f}$$

Problem 171: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[e+f x]^2 (c-c \operatorname{Sec}[e+f x])}{a+a \operatorname{Sec}[e+f x]} \, dx$$

Optimal (type 3, 56 leaves, 5 steps):

$$\frac{2 c \operatorname{ArcTanh}[\operatorname{Sin}[e+f x]]}{a f}-\frac{c \operatorname{Tan}[e+f x]}{a f}-\frac{2 c \operatorname{Tan}[e+f x]}{f (a+a \operatorname{Sec}[e+f x])}$$

Result (type 3, 154 leaves):

$$-\frac{1}{a} c \left(\frac{2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{f}-\frac{2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{f}+\frac{\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]}{f\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)}+\frac{\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]}{f\left(\operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right)}+\frac{2 \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]}{f}\right)$$

Problem 172: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[e+f x]^2 (c-c \operatorname{Sec}[e+f x])}{(a+a \operatorname{Sec}[e+f x])^2} \, dx$$

Optimal (type 3, 70 leaves, 4 steps):

$$-\frac{c \operatorname{ArcTanh}[\operatorname{Sin}[e+f x]]}{a^2 f}+\frac{7 c \operatorname{Tan}[e+f x]}{3 a^2 f (1+\operatorname{Sec}[e+f x])}-\frac{2 c \operatorname{Tan}[e+f x]}{3 f (a+a \operatorname{Sec}[e+f x])^2}$$

Result (type 3, 335 leaves):

$$\frac{1}{6 a^2 f (1+\text{Sec}[e+f x])^2} c \text{Cos}\left[\frac{1}{2}(e+f x)\right] \text{Sec}\left[\frac{e}{2}\right] \text{Sec}[e+f x]^2 \left(3 \text{Cos}\left[e+\frac{3 f x}{2}\right] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+3 \text{Cos}\left[2 e+\frac{3 f x}{2}\right] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+ 9 \text{Cos}\left[\frac{f x}{2}\right] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)+ 9 \text{Cos}\left[e+\frac{f x}{2}\right] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)- 3 \text{Cos}\left[e+\frac{3 f x}{2}\right] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]- 3 \text{Cos}\left[2 e+\frac{3 f x}{2}\right] \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+24 \text{Sin}\left[\frac{f x}{2}\right]-6 \text{Sin}\left[e+\frac{f x}{2}\right]+10 \text{Sin}\left[e+\frac{3 f x}{2}\right]\right)$$

- **Problem 174: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (g \text{Sec}[e+f x])^p (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x]) \, dx$$

Optimal (type 5, 140 leaves, 5 steps):

$$-\frac{a^2 c \left(\text{Cos}[e+f x]^2\right)^{\frac{3+p}{2}} \text{Hypergeometric2F1}\left[\frac{3}{2}, \frac{3+p}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2\right] (g \text{Sec}[e+f x])^p \text{Tan}[e+f x]^3}{3 f} - \frac{a^2 c \left(\text{Cos}[e+f x]^2\right)^{\frac{4+p}{2}} \text{Hypergeometric2F1}\left[\frac{3}{2}, \frac{4+p}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2\right] (g \text{Sec}[e+f x])^{1+p} \text{Tan}[e+f x]^3}{3 f g}$$

Result (type 6, 13 496 leaves):

$$\frac{1}{32 f} \text{Cos}[e+f x]^4 \left(\text{Cos}[e+f x]^2\right)^{\frac{1}{2}(-1+p)} \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+p}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2\right] \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (g \text{Sec}[e+f x])^p (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x]) \text{Sin}[e+f x]+\frac{1}{16 f} \text{Cos}[e+f x]^3 \left(\text{Cos}[e+f x]^2\right)^{p/2} \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{4+p}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2\right] \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (g \text{Sec}[e+f x])^p (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x]) \text{Sin}[e+f x] - \left(3 \text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Sec}[e+f x]^{-3-p} (g \text{Sec}[e+f x])^p (a+a \text{Sec}[e+f x])^2 (c-c \text{Sec}[e+f x]) \left(-\text{Sec}[e+f x]^{2+p}+2 \text{Cos}[2 (e+f x)] \text{Sec}[e+f x]^{2+p}\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right] \left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p \left(\left(4 \text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right) \Big/ \left(\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right.\right.\right.$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,p,\,1-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\,\Big((-1+p)\,\text{AppellF1}\left[\frac{3}{2},\,p,\,2-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},\,1+p,\,1-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)-$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,1+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\,\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,1+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\,\Big(p\,\text{AppellF1}\left[\frac{3}{2},\,1+p,\,1-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},\,2+p,\,-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-$$

$$\Big(2\,\text{AppellF1}\left[\frac{1}{2},\,2+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\Big/\Big(\text{AppellF1}\left[\frac{1}{2},\,2+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\,\Big(p\,\text{AppellF1}\left[\frac{3}{2},\,2+p,\,1-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(2+p)\,\text{AppellF1}\left[\frac{3}{2},\,3+p,\,-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)\Big)\Big/$$

$$\Bigg(16\,f\,\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\,\Bigg(-\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^3}\,12\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\,\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p$$

$$\Big(\Big(4\,\text{AppellF1}\left[\frac{1}{2},\,p,\,1-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\,\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big)\Big/\Big(\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,p,\,1-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\,\Big((-1+p)\,\text{AppellF1}\left[\frac{3}{2},\,p,\,2-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},\,1+p,\,1-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)-$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,1+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\,\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\,1+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\,\Big(p\,\text{AppellF1}\left[\frac{3}{2},\,1+p,\,1-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},\,2+p,\,-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-$$

$$\Big(2\,\text{AppellF1}\left[\frac{1}{2},\,2+p,\,-p,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\Big/\Big(\text{AppellF1}\left[\frac{1}{2},\,2+p,\,-p,\,\frac{3}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\,\Big(p\,\text{AppellF1}\left[\frac{3}{2},\,2+p,\,1-p,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)+$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2}\,3\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p\Bigg(\Bigg(\Bigg(4\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Big/\Bigg(\Bigg(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)-$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)\Big/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)-$$

$$\Bigg(2\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\Big/\Bigg(\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\Bigg(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)+$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2}\,6\,p\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^{-1+p}\left(\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}+\right.$$

$$\left.\frac{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)}{\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2}\right)$$

$$\Bigg(\Bigg(4\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Bigg)\Big/\Bigg(\Bigg(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)-$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(2\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\Big/\left(\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2}\,6\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p\left(-\left(4\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/\left(\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(8\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$

$$\left(\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\right.\right.$$

$$\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(4\left(-\frac{1}{3}(1-p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}p\,\text{AppellF1}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$

$$\left(\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\right.\right.$$

$$\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$\left.\left.p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)-$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$
$$\left(3\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}(1+p)\,\text{AppellF1}\left[\right.\right.\right.$$
$$\left.\left.\left.\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$
$$\left(2\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}\right.\right.$$
$$\left.\left.(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\Big/$$
$$\left(\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\frac{2}{3}\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$
$$\left(4\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right.$$
$$\left(2\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left.p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+3\left(-\frac{1}{3}(1-p)\right.$$
$$\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},\right.$$
$$\left.\left.1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\left((-1+p)\left(-\frac{3}{5}(2-p)\,\text{AppellF1}\left[\frac{5}{2},p,3-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\frac{3}{5}p\,\text{AppellF1}\left[\frac{5}{2},1+p,2-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$p\left(-\frac{3}{5}(1-p)\,\text{AppellF1}\left[\frac{5}{2},1+p,2-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\frac{3}{5}(1+p)\,\text{AppellF1}\left[\frac{5}{2},2+p,1-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\left(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.\right.$$

$$2\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$

$$\left.\left.\left.p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)+$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)$$

$$\left(2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\right.\right.\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+3\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\right.\right.$$

$$\left.\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,\right.$$

$$\left.\left.-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(p\left(-\frac{3}{5}(1-p)\,\text{AppellF1}\left[\frac{5}{2},1+p,2-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\frac{3}{5}(1+p)\,\text{AppellF1}\left[\frac{5}{2},2+p,1-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$(1+p)\left(\frac{3}{5}p\,\text{AppellF1}\left[\frac{5}{2},2+p,1-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\left.\frac{3}{5}(2+p)\,\text{AppellF1}\left[\frac{5}{2},3+p,-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\Bigg)\Bigg/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2+$$

$$\left(2\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\right.\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}(2+p)$$

$$\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{2}{3}$$

$$\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\right.\right.$$

$$\left.\left.\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{2}{3}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(p\left(-\frac{3}{5}(1-p)\,\text{AppellF1}\left[\frac{5}{2},2+p,2-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\frac{3}{5}(2+p)\,\text{AppellF1}\left[\frac{5}{2},3+p,1-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$(2+p)\left(\frac{3}{5}p\,\text{AppellF1}\left[\frac{5}{2},3+p,1-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{3}{5}(3+p)\,\text{AppellF1}\left[\frac{5}{2},4+p,-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\right)+$$

$$\left(\text{Cos}[2(e+f x)]\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4(g\,\text{Sec}[e+f x])^p(a+a\,\text{Sec}[e+f x])^2\right.$$

$$(c-c\,\text{Sec}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p$$

$$\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$
$$\left(12\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$
$$\left(4\,\text{AppellF1}\left[\frac{1}{2},3+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\Big/$$
$$\left(\text{AppellF1}\left[\frac{1}{2},3+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\frac{2}{3}\left(p\,\text{AppellF1}\left[\frac{3}{2},3+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.\left.\left.(3+p)\,\text{AppellF1}\left[\frac{3}{2},4+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$
$$\left(8 f\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^3\left(-\frac{1}{\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^4}6\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p\right.\right.$$
$$\left(-\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$
$$\left(12\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$-\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + (2+p)\,\mathrm{AppellF1}[\tfrac{3}{2}, 3+p, -p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2])\,\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2) +$$

$$(4\,\mathrm{AppellF1}[\tfrac{1}{2}, 3+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2]) \Big/ (\mathrm{AppellF1}[\tfrac{1}{2}, 3+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2,$$

$$-\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + \tfrac{2}{3}(p\,\mathrm{AppellF1}[\tfrac{3}{2}, 3+p, 1-p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + (3+p)\,\mathrm{AppellF1}[\tfrac{3}{2},$$

$$4+p, -p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2])\,\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2))) - \frac{1}{(1-\mathrm{Tan}[\frac{1}{2}(e+f x)]^2)^3}\,\mathrm{Sec}[\tfrac{1}{2}(e+f x)]^2$$

$$\left(\frac{1+\mathrm{Tan}[\frac{1}{2}(e+f x)]^2}{1-\mathrm{Tan}[\frac{1}{2}(e+f x)]^2}\right)^p (-(3\,\mathrm{AppellF1}[\tfrac{1}{2}, 1+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2]\,(-1+\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2)^2) \Big/$$

$$(3\,\mathrm{AppellF1}[\tfrac{1}{2}, 1+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + 2\,(p\,\mathrm{AppellF1}[\tfrac{3}{2}, 1+p, 1-p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2,$$

$$-\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + (1+p)\,\mathrm{AppellF1}[\tfrac{3}{2}, 2+p, -p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2])\,\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2) +$$

$$(12\,\mathrm{AppellF1}[\tfrac{1}{2}, 2+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2]\,(-1+\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2)) \Big/$$

$$(3\,\mathrm{AppellF1}[\tfrac{1}{2}, 2+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + 2\,(p\,\mathrm{AppellF1}[\tfrac{3}{2}, 2+p, 1-p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2,$$

$$-\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + (2+p)\,\mathrm{AppellF1}[\tfrac{3}{2}, 3+p, -p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2])\,\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2) +$$

$$(4\,\mathrm{AppellF1}[\tfrac{1}{2}, 3+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2]) \Big/ (\mathrm{AppellF1}[\tfrac{1}{2}, 3+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2,$$

$$-\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] + \tfrac{2}{3}(p\,\mathrm{AppellF1}[\tfrac{3}{2}, 3+p, 1-p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2] +$$

$$(3+p)\,\mathrm{AppellF1}[\tfrac{3}{2}, 4+p, -p, \tfrac{5}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2])\,\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2)) -$$

$$\frac{1}{(1-\mathrm{Tan}[\frac{1}{2}(e+f x)]^2)^3}\,2\,p\,\mathrm{Tan}[\tfrac{1}{2}(e+f x)]\left(\frac{1+\mathrm{Tan}[\frac{1}{2}(e+f x)]^2}{1-\mathrm{Tan}[\frac{1}{2}(e+f x)]^2}\right)^{-1+p}\left(\frac{\mathrm{Sec}[\frac{1}{2}(e+f x)]^2\,\mathrm{Tan}[\frac{1}{2}(e+f x)]}{1-\mathrm{Tan}[\frac{1}{2}(e+f x)]^2} +\right.$$

$$\left.\frac{\mathrm{Sec}[\frac{1}{2}(e+f x)]^2\,\mathrm{Tan}[\frac{1}{2}(e+f x)]\,(1+\mathrm{Tan}[\frac{1}{2}(e+f x)]^2)}{(1-\mathrm{Tan}[\frac{1}{2}(e+f x)]^2)^2}\right)$$

$$(-(3\,\mathrm{AppellF1}[\tfrac{1}{2}, 1+p, -p, \tfrac{3}{2}, \mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2, -\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2]\,(-1+\mathrm{Tan}[\tfrac{1}{2}(e+f x)]^2)^2) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(12\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(2+p)\,\text{AppellF1}\left[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(4\,\text{AppellF1}\left[\frac{1}{2},3+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\Big/\left(\text{AppellF1}\left[\frac{1}{2},3+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\left(p\,\text{AppellF1}\left[\frac{3}{2},3+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(3+p)\,\text{AppellF1}\left[\frac{3}{2},4+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)-$$

$$\frac{1}{\left(1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^3}\,2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\frac{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^p\Bigg(-\Bigg(6\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(3\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left(p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(1+p)\,\text{AppellF1}\left[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(12\,\text{AppellF1}\left[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, 2+p, -p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + 2\,\Big(p\,\text{AppellF1}\Big[\frac{3}{2}, 2+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + (2+p)\,\text{AppellF1}\Big[\frac{3}{2}, 3+p, -p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big) +$$

$$\Big(12\,\Big(\frac{1}{3}\,p\,\text{AppellF1}\Big[\frac{3}{2}, 2+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + \frac{1}{3}\,(2+p)\,\text{AppellF1}\Big[$$

$$\frac{3}{2}, 3+p, -p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\,\Big(-1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, 2+p, -p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + 2\,\Big(p\,\text{AppellF1}\Big[\frac{3}{2}, 2+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + (2+p)\,\text{AppellF1}\Big[\frac{3}{2}, 3+p, -p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big) +$$

$$\Big(4\,\Big(\frac{1}{3}\,p\,\text{AppellF1}\Big[\frac{3}{2}, 3+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + \frac{1}{3}$$

$$(3+p)\,\text{AppellF1}\Big[\frac{3}{2}, 4+p, -p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big/$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2}, 3+p, -p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + \frac{2}{3}\,\Big(p\,\text{AppellF1}\Big[\frac{3}{2}, 3+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + (3+p)\,\text{AppellF1}\Big[\frac{3}{2}, 4+p, -p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big) +$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, 1+p, -p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\Big(-1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2$$

$$\Big(2\,\Big(p\,\text{AppellF1}\Big[\frac{3}{2}, 1+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + (1+p)\,\text{AppellF1}\Big[\frac{3}{2}, 2+p, -p, \frac{5}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + 3\,\Big(\frac{1}{3}\,p\,\text{AppellF1}\Big[\frac{3}{2}, 1+p, 1-p,$$

$$\frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + \frac{1}{3}\,(1+p)\,\text{AppellF1}\Big[\frac{3}{2}, 2+p,$$

$$-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big) + 2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big(p\,\Big(-\frac{3}{5}\,(1-p)\,\text{AppellF1}\Big[\frac{5}{2}, 1+p, 2-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] +$$

$$\frac{3}{5}\,(1+p)\,\text{AppellF1}\Big[\frac{5}{2}, 2+p, 1-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big) +$$

$$(1+p)\,\Big(\frac{3}{5}\,p\,\text{AppellF1}\Big[\frac{5}{2}, 2+p, 1-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] +$$

$$\frac{3}{5}(2+p)\,\text{AppellF1}\Big[\frac{5}{2},3+p,-p,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2\Big(p\,\text{AppellF1}\Big[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(1+p)\,\text{AppellF1}\Big[\frac{3}{2},2+p,-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2-$$

$$\Big(12\,\text{AppellF1}\Big[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big(-1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)$$

$$\Big(2\Big(p\,\text{AppellF1}\Big[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(2+p)\,\text{AppellF1}\Big[\frac{3}{2},3+p,-p,\frac{5}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+3\Big(\frac{1}{3}p\,\text{AppellF1}\Big[\frac{3}{2},2+p,1-p,$$

$$\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{3}(2+p)\,\text{AppellF1}\Big[\frac{3}{2},3+p,$$

$$-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)+2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big(p\Big(-\frac{3}{5}(1-p)\,\text{AppellF1}\Big[\frac{5}{2},2+p,2-p,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}(2+p)\,\text{AppellF1}\Big[\frac{5}{2},3+p,1-p,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)+$$

$$(2+p)\Big(\frac{3}{5}p\,\text{AppellF1}\Big[\frac{5}{2},3+p,1-p,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+$$

$$\frac{3}{5}(3+p)\,\text{AppellF1}\Big[\frac{5}{2},4+p,-p,\frac{7}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},2+p,-p,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2\Big(p\,\text{AppellF1}\Big[\frac{3}{2},2+p,1-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(2+p)\,\text{AppellF1}\Big[\frac{3}{2},3+p,-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2-$$

$$\Big(4\,\text{AppellF1}\Big[\frac{1}{2},3+p,-p,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big(\frac{1}{3}p\,\text{AppellF1}\Big[\frac{3}{2},3+p,1-p,\frac{5}{2},$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{1}{3}(3+p)$$

$$\text{AppellF1}\Big[\frac{3}{2},4+p,-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]+\frac{2}{3}$$

$$\Big(p\,\text{AppellF1}\Big[\frac{3}{2},3+p,1-p,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(3+p)\,\text{AppellF1}\Big[\frac{3}{2},4+p,-p,$$

$$\frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{2}{3} \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Bigg(p\left(-\frac{3}{5}(1-p)\,\text{AppellF1}\left[\frac{5}{2}, 3+p, 2-p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \right.$$

$$\left.\frac{3}{5}(3+p)\,\text{AppellF1}\left[\frac{5}{2}, 4+p, 1-p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) +$$

$$(3+p)\left(\frac{3}{5}\,p\,\text{AppellF1}\left[\frac{5}{2}, 4+p, 1-p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \right.$$

$$\left.\frac{3}{5}(4+p)\,\text{AppellF1}\left[\frac{5}{2}, 5+p, -p, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Bigg)\Bigg)\Bigg) \Big/$$

$$\Bigg(\text{AppellF1}\left[\frac{1}{2}, 3+p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \frac{2}{3}\Big(p\,\text{AppellF1}\left[\frac{3}{2}, 3+p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (3+p)\,\text{AppellF1}\left[\frac{3}{2}, 4+p, -p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2\Bigg)\Bigg)$$

- **Problem 175: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (g\,\text{Sec}[e+f x])^p\,(a+a\,\text{Sec}[e+f x])\,(c-c\,\text{Sec}[e+f x])\,dx$$

Optimal (type 5, 65 leaves, 2 steps):

$$-\frac{a\,c\,\left(\text{Cos}[e+f x]^2\right)^{\frac{3+p}{2}}\,\text{Hypergeometric2F1}\left[\frac{3}{2}, \frac{3+p}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2\right]\,(g\,\text{Sec}[e+f x])^p\,\text{Tan}[e+f x]^3}{3 f}$$

Result (type 6, 6864 leaves): Display of huge result suppressed!

- **Problem 176: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(g\,\text{Sec}[e+f x])^p\,(c-c\,\text{Sec}[e+f x])}{a+a\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 5, 180 leaves, 6 steps):

$$-\frac{c\,g\,(1-2 p)\,\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1-p}{2}, \frac{3-p}{2}, \text{Cos}[e+f x]^2\right]\,(g\,\text{Sec}[e+f x])^{-1+p}\,\text{Sin}[e+f x]}{a\,f\,(1-p)\,\sqrt{\text{Sin}[e+f x]^2}} +$$

$$\frac{2\,c\,\text{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{p}{2}, \frac{2-p}{2}, \text{Cos}[e+f x]^2\right]\,(g\,\text{Sec}[e+f x])^p\,\text{Sin}[e+f x]}{a\,f\,\sqrt{\text{Sin}[e+f x]^2}} - \frac{2\,c\,(g\,\text{Sec}[e+f x])^p\,\text{Tan}[e+f x]}{f\,(a+a\,\text{Sec}[e+f x])}$$

Result (type 6, 3396 leaves):

$$-\left(\left(6\, c\, \text{Sec}[e+f x]^p\, (g\, \text{Sec}[e+f x])^p\, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^3 \left(-\left(\text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right)\right/\right.\right.$$

$$\left(3\, \text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+p)\, \text{AppellF1}\left[\frac{3}{2}, p, 2-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left. -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + p\, \text{AppellF1}\left[\frac{3}{2}, 1+p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) +$$

$$\text{AppellF1}\left[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \Big/ \left(3\, \text{AppellF1}\left[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$2\, p\left(\text{AppellF1}\left[\frac{3}{2}, p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{3}{2}, 1+p, -p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right) \Big/$$

$$\left(a\, f \left(3\, \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]^p \left(-\left(\text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right)\right/\right.\right.$$

$$\left(3\, \text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+p)\, \text{AppellF1}\left[\frac{3}{2}, p, 2-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left. -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + p\, \text{AppellF1}\left[\frac{3}{2}, 1+p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) +$$

$$\text{AppellF1}\left[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \Big/ \left(3\, \text{AppellF1}\left[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\, p\left(\text{AppellF1}\left[\frac{3}{2}, p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{3}{2}, 1+p, -p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right) + 6\, p\, \text{Sec}[e+f x]^{1+p}$$

$$\text{Sin}[e+f x]\, \text{Tan}\left[\frac{1}{2}(e+f x)\right] \left(-\left(\text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\right)\right/$$

$$\left(3\, \text{AppellF1}\left[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+p)\, \text{AppellF1}\left[\frac{3}{2}, p, 2-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left. -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + p\, \text{AppellF1}\left[\frac{3}{2}, 1+p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) +$$

$$\text{AppellF1}\left[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \Big/ \left(3\, \text{AppellF1}\left[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\, p\left(\text{AppellF1}\left[\frac{3}{2}, p, 1-p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{3}{2}, 1+p, -p, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right) +$$

$$6\,\text{Sec}[e+f x]^p\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\left(\left(\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\left(-\frac{1}{3}(1-p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},p,1-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-1+p)\,\text{AppellF1}\left[\frac{3}{2},p,2-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+p\,\text{AppellF1}\left[\frac{3}{2},1+p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+$$

$$\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},1+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2p\left(\text{AppellF1}\left[\frac{3}{2},p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},1+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$

$$\left(\text{AppellF1}\left[\frac{1}{2},p,-p,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(2p\left(\text{AppellF1}\left[\frac{3}{2},p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\text{AppellF1}\left[\frac{3}{2},1+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\right.$$

$$\left.\frac{1}{2}(e+f x)\right]+3\left(\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},p,1-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\left.\frac{1}{3}p\,\text{AppellF1}\left[\frac{3}{2},1+p,-p,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+2p$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(-\frac{3}{5}(1-p)\,\text{AppellF1}\left[\frac{5}{2},p,2-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}\right.\right.$$

$$\left.(e+f x)\right]+\frac{6}{5}p\,\text{AppellF1}\left[\frac{5}{2},1+p,1-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\left.\left.\left.\left.\frac{3}{5}(1+p)\,\text{AppellF1}\left[\frac{5}{2},2+p,-p,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, p, -p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + 2\,p\,\Big(\text{AppellF1}\Big[\frac{3}{2}, p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + \text{AppellF1}\Big[\frac{3}{2}, 1+p, -p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2 +$$

$$\Big(\text{AppellF1}\Big[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Cos}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big(2\,\Big((-1+p)\,\text{AppellF1}\Big[\frac{3}{2}, p, 2-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] +$$

$$p\,\text{AppellF1}\Big[\frac{3}{2}, 1+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + 3\,\Big(-\frac{1}{3}(1-p)$$

$$\text{AppellF1}\Big[\frac{3}{2}, p, 2-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] + \frac{1}{3}\,p\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big]\Big) + 2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

$$\Big((-1+p)\,\Big(-\frac{3}{5}(2-p)\,\text{AppellF1}\Big[\frac{5}{2}, p, 3-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] +$$

$$\frac{3}{5}\,p\,\text{AppellF1}\Big[\frac{5}{2}, 1+p, 2-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big) +$$

$$p\,\Big(-\frac{3}{5}(1-p)\,\text{AppellF1}\Big[\frac{5}{2}, 1+p, 2-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big] +$$

$$\frac{3}{5}(1+p)\,\text{AppellF1}\Big[\frac{5}{2}, 2+p, 1-p, \frac{7}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big]\Big)\Big)\Big)\Big)\Big) \Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, p, 1-p, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + 2\,\Big((-1+p)\,\text{AppellF1}\Big[\frac{3}{2}, p, 2-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big] + p\,\text{AppellF1}\Big[\frac{3}{2}, 1+p, 1-p, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2\Big)\Big)\Big)\Big)$$

- **Problem 177: Unable to integrate problem.**

$$\int \frac{(g\,\text{Sec}[e+f x])^p\,(c - c\,\text{Sec}[e+f x])}{(a + a\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 5, 226 leaves, 7 steps):

$$-\frac{c\,g\,(3-4\,p)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-p}{2},\frac{3-p}{2},\text{Cos}[e+f\,x]^2\right]\,(g\,\text{Sec}[e+f\,x])^{-1+p}\,\text{Sin}[e+f\,x]}{3\,a^2\,f\,\sqrt{\text{Sin}[e+f\,x]^2}}+$$

$$\frac{c\,(5-4\,p)\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{p}{2},\frac{2-p}{2},\text{Cos}[e+f\,x]^2\right]\,(g\,\text{Sec}[e+f\,x])^{p}\,\text{Sin}[e+f\,x]}{3\,a^2\,f\,\sqrt{\text{Sin}[e+f\,x]^2}}-$$

$$\frac{c\,(5-4\,p)\,(g\,\text{Sec}[e+f\,x])^{p}\,\text{Tan}[e+f\,x]}{3\,a^2\,f\,(1+\text{Sec}[e+f\,x])}-\frac{2\,c\,(g\,\text{Sec}[e+f\,x])^{p}\,\text{Tan}[e+f\,x]}{3\,f\,(a+a\,\text{Sec}[e+f\,x])^2}$$

Result (type 8, 36 leaves) :

$$\int\frac{(g\,\text{Sec}[e+f\,x])^{p}\,(c-c\,\text{Sec}[e+f\,x])}{(a+a\,\text{Sec}[e+f\,x])^2}\,dx$$

- **Problem 180: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]^{5/2}}{\sqrt{a+a\,\text{Sec}[e+f\,x]}\,(c-c\,\text{Sec}[e+f\,x])}\,dx$$

Optimal (type 3, 140 leaves, 8 steps) :

$$-\frac{2\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{\sqrt{a}\,c\,f}+\frac{\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[e+f\,x]}\,\text{Sin}[e+f\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{\sqrt{2}\,\sqrt{a}\,c\,f}+\frac{\text{Csc}[e+f\,x]\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}{a\,c\,f\,\sqrt{\text{Sec}[e+f\,x]}}$$

Result (type 3, 724 leaves) :

$$\Big(\operatorname{Sec}[e+f x]^{3/2}\sqrt{(1+\operatorname{Cos}[e+f x])\operatorname{Sec}[e+f x]}\ \sqrt{1+\operatorname{Sec}[e+f x]}$$

$$\left(-\frac{2\operatorname{Cot}[e]}{f}+\frac{\operatorname{Csc}\left[\frac{e}{2}\right]\operatorname{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]\operatorname{Sin}\left[\frac{f x}{2}\right]}{f}+\frac{\operatorname{Sec}\left[\frac{e}{2}\right]\operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]\operatorname{Sin}\left[\frac{f x}{2}\right]}{f}\right)\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\Big)\Big/\left(\sqrt{a(1+\operatorname{Sec}[e+f x])}\ (c-c\operatorname{Sec}[e+f x])\right)+$$

$$\Big(\operatorname{Cos}[e+f x]\ \Big(\operatorname{Log}\left[1-2\operatorname{Sec}[e+f x]-3\operatorname{Sec}[e+f x]^2-2\sqrt{2}\sqrt{\operatorname{Sec}[e+f x]}\ \sqrt{1+\operatorname{Sec}[e+f x]}\ \sqrt{-1+\operatorname{Sec}[e+f x]^2}\right]-$$

$$\operatorname{Log}\left[1-2\operatorname{Sec}[e+f x]-3\operatorname{Sec}[e+f x]^2+2\sqrt{2}\sqrt{\operatorname{Sec}[e+f x]}\ \sqrt{1+\operatorname{Sec}[e+f x]}\ \sqrt{-1+\operatorname{Sec}[e+f x]^2}\right]\Big)$$

$$(1+\operatorname{Sec}[e+f x])^{3/2}\sqrt{-1+\operatorname{Sec}[e+f x]^2}\ \operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\operatorname{Sin}[e+f x]\Big)\Big/$$

$$\left(2 f(1+\operatorname{Cos}[e+f x])\sqrt{2-2\operatorname{Cos}[e+f x]^2}\ \sqrt{1-\operatorname{Cos}[e+f x]^2}\ \sqrt{a(1+\operatorname{Sec}[e+f x])}\ (c-c\operatorname{Sec}[e+f x])\right)+$$

$$\Big(\operatorname{Cos}[e+f x]\ \Big(-8\operatorname{Log}[1+\operatorname{Sec}[e+f x]]+8\operatorname{Log}\left[\sqrt{\operatorname{Sec}[e+f x]}+\operatorname{Sec}[e+f x]^{3/2}+\sqrt{1+\operatorname{Sec}[e+f x]}\ \sqrt{-1+\operatorname{Sec}[e+f x]^2}\right]+$$

$$\sqrt{2}\ \Big(-\operatorname{Log}\left[1-2\operatorname{Sec}[e+f x]-3\operatorname{Sec}[e+f x]^2-2\sqrt{2}\sqrt{\operatorname{Sec}[e+f x]}\ \sqrt{1+\operatorname{Sec}[e+f x]}\ \sqrt{-1+\operatorname{Sec}[e+f x]^2}\right]+$$

$$\operatorname{Log}\left[1-2\operatorname{Sec}[e+f x]-3\operatorname{Sec}[e+f x]^2+2\sqrt{2}\sqrt{\operatorname{Sec}[e+f x]}\ \sqrt{1+\operatorname{Sec}[e+f x]}\ \sqrt{-1+\operatorname{Sec}[e+f x]^2}\right]\Big)\Big)\ (1+\operatorname{Sec}[e+f x])^{3/2}$$

$$\sqrt{-1+\operatorname{Sec}[e+f x]^2}\ \operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\operatorname{Sin}[e+f x]\Big)\Big/\left(2 f(1+\operatorname{Cos}[e+f x])\left(1-\operatorname{Cos}[e+f x]^2\right)\sqrt{a(1+\operatorname{Sec}[e+f x])}\ (c-c\operatorname{Sec}[e+f x])\right)$$

- **Problem 181: Result more than twice size of optimal antiderivative.**

$$\int\frac{(g\operatorname{Sec}[e+f x])^{3/2}}{\sqrt{a+a\operatorname{Sec}[e+f x]}\ (c-c\operatorname{Sec}[e+f x])}\,dx$$

Optimal (type 3, 116 leaves, 4 steps):

$$-\frac{g^{3/2}\operatorname{ArcTanh}\left[\frac{\sqrt{a}\ \sqrt{g}\ \operatorname{Tan}[e+f x]}{\sqrt{2}\ \sqrt{g\operatorname{Sec}[e+f x]}\ \sqrt{a+a\operatorname{Sec}[e+f x]}}\right]}{\sqrt{2}\ \sqrt{a}\ c f}+\frac{g\operatorname{Cot}[e+f x]\sqrt{g\operatorname{Sec}[e+f x]}\ \sqrt{a+a\operatorname{Sec}[e+f x]}}{a c f}$$

Result (type 3, 236 leaves):

$$-\left(a \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right] (g \operatorname{Sec}[e+f x])^{5/2} \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]^3 \left(-4-4 \operatorname{Sec}[e+f x]+ 1\Big/\left(\sqrt{\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\right)\left(\operatorname{Log}\left[1-2 \operatorname{Sec}[e+f x]-3 \operatorname{Sec}[e+f x]^2-2 \sqrt{2} \sqrt{\operatorname{Sec}[e+f x]} \sqrt{1+\operatorname{Sec}[e+f x]} \sqrt{\operatorname{Tan}[e+f x]^2}\right]-\operatorname{Log}\left[1-2 \operatorname{Sec}[e+f x]-3 \operatorname{Sec}[e+f x]^2+2 \sqrt{2} \sqrt{\operatorname{Sec}[e+f x]} \sqrt{1+\operatorname{Sec}[e+f x]} \sqrt{\operatorname{Tan}[e+f x]^2}\right]\right) \sqrt{\operatorname{Tan}[e+f x]^2}\right)\right)\Big/\left(c f g (-1+\operatorname{Sec}[e+f x])^2 (a (1+\operatorname{Sec}[e+f x]))^{3/2}\right)$$

- **Problem 183: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e+f x]^2}{\sqrt{a+a \operatorname{Sec}[e+f x]} \sqrt{c-c \operatorname{Sec}[e+f x]}} \, dx$$

Optimal (type 3, 46 leaves, 3 steps):

$$\frac{\operatorname{Log}[\operatorname{Tan}[e+f x]] \operatorname{Tan}[e+f x]}{f \sqrt{a+a \operatorname{Sec}[e+f x]} \sqrt{c-c \operatorname{Sec}[e+f x]}}$$

Result (type 3, 129 leaves):

$$-\left(2 i \left(-1+e^{i (e+f x)}\right) \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \left(\operatorname{Log}\left[1-e^{i (e+f x)}\right]+\operatorname{Log}\left[1+e^{i (e+f x)}\right]-\operatorname{Log}\left[1+e^{2 i (e+f x)}\right]\right) \operatorname{Sec}[e+f x]\right)\Big/ \left(\left(1+e^{i (e+f x)}\right) f \sqrt{a (1+\operatorname{Sec}[e+f x])} \sqrt{c-c \operatorname{Sec}[e+f x]}\right)$$

- **Problem 186: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[e+f x] (a+a \operatorname{Sec}[e+f x]) (c+d \operatorname{Sec}[e+f x])^3 \, dx$$

Optimal (type 3, 171 leaves, 7 steps):

$$\frac{a \left(8 c^3+12 c^2 d+12 c d^2+3 d^3\right) \operatorname{ArcTanh}[\operatorname{Sin}[e+f x]]}{8 f}+\frac{a \left(3 c^3+16 c^2 d+12 c d^2+4 d^3\right) \operatorname{Tan}[e+f x]}{6 f}+\frac{a d \left(6 c^2+20 c d+9 d^2\right) \operatorname{Sec}[e+f x] \operatorname{Tan}[e+f x]}{24 f}+\frac{a (3 c+4 d) (c+d \operatorname{Sec}[e+f x])^2 \operatorname{Tan}[e+f x]}{12 f}+\frac{a (c+d \operatorname{Sec}[e+f x])^3 \operatorname{Tan}[e+f x]}{4 f}$$

Result (type 3, 1107 leaves):

$$a\Bigg(\frac{1}{16 f (d+c\cos[e+f x])^3}\left(-8 c^3-12 c^2 d-12 c d^2-3 d^3\right)\cos[e+f x]^4 \operatorname{Log}\left[\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right]\sec\left[\frac{1}{2}(e+f x)\right]^2 (1+\sec[e+f x])(c+d\sec[e+f x])^3+\frac{1}{16 f (d+c\cos[e+f x])^3}\left(8 c^3+12 c^2 d+12 c d^2+3 d^3\right)\cos[e+f x]^4 \operatorname{Log}\left[\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right]\sec\left[\frac{1}{2}(e+f x)\right]^2 (1+\sec[e+f x])(c+d\sec[e+f x])^3+\frac{d^3\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3}{32 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right)^4}+\frac{\left(36 c^2 d+48 c d^2+13 d^3\right)\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3}{96 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right)^2}-\frac{d^3\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3}{32 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right)^4}+\frac{\left(-36 c^2 d-48 c d^2-13 d^3\right)\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3}{96 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right)^2}+\left(\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3\left(3 c d^2\sin\left[\frac{1}{2}(e+f x)\right]+d^3\sin\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/\left(12 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right)^3\right)+\left(\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3\left(3 c d^2\sin\left[\frac{1}{2}(e+f x)\right]+d^3\sin\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/\left(12 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right)^3\right)+\left(\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3\left(3 c^3\sin\left[\frac{1}{2}(e+f x)\right]+9 c^2 d\sin\left[\frac{1}{2}(e+f x)\right]+6 c d^2\sin\left[\frac{1}{2}(e+f x)\right]+2 d^3\sin\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/\left(6 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]-\sin\left[\frac{1}{2}(e+f x)\right]\right)\right)+\left(\cos[e+f x]^4\sec\left[\frac{1}{2}(e+f x)\right]^2(1+\sec[e+f x])(c+d\sec[e+f x])^3\left(3 c^3\sin\left[\frac{1}{2}(e+f x)\right]+9 c^2 d\sin\left[\frac{1}{2}(e+f x)\right]+6 c d^2\sin\left[\frac{1}{2}(e+f x)\right]+2 d^3\sin\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/\left(6 f (d+c\cos[e+f x])^3\left(\cos\left[\frac{1}{2}(e+f x)\right]+\sin\left[\frac{1}{2}(e+f x)\right]\right)\right)\Bigg)$$

Problem 187: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])^2\,dx$$

Optimal (type 3, 108 leaves, 6 steps):

$$\frac{a\left(2 c^2+2 c d+d^2\right) \text{ArcTanh}[\text{Sin}[e+f x]]}{2 f}+\frac{2 a\left(c^2+3 c d+d^2\right) \text{Tan}[e+f x]}{3 f}+\frac{a d\,(2 c+3 d)\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]}{6 f}+\frac{a\,(c+d\,\text{Sec}[e+f x])^2\,\text{Tan}[e+f x]}{3 f}$$

Result (type 3, 240 leaves):

$$\frac{1}{24 f\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^3} a\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^6\left(9\left(2 c^2+2 c d+d^2\right)\text{Cos}[e+f x]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)+3\left(2 c^2+2 c d+d^2\right)\text{Cos}[3(e+f x)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)-4\left(3 c^2+6 c d+4 d^2+3 d\,(2 c+d)\,\text{Cos}[e+f x]+\left(3 c^2+6 c d+2 d^2\right)\text{Cos}[2(e+f x)]\right)\text{Sin}[e+f x]\right)$$

Problem 188: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])\,dx$$

Optimal (type 3, 56 leaves, 5 steps):

$$\frac{a\,(2 c+d)\,\text{ArcTanh}[\text{Sin}[e+f x]]}{2 f}+\frac{a\,(c+d)\,\text{Tan}[e+f x]}{f}+\frac{a d\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]}{2 f}$$

Result (type 3, 154 leaves):

$$\frac{1}{4 f}a\left(-2\,(2 c+d)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+4 c\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+2 d\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+\frac{d}{\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-\frac{d}{\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+4\,(c+d)\,\text{Tan}[e+f x]\right)$$

Problem 195: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]\,(a+a\,\text{Sec}[e+f x])^2\,(c+d\,\text{Sec}[e+f x])^2\,dx$$

Optimal (type 3, 176 leaves, 8 steps):

$$\frac{a^2\left(12c^2+16cd+7d^2\right)\text{ArcTanh}[\text{Sin}[e+fx]]}{8f}-\frac{a^2\left(c^3-8c^2d-20cd^2-8d^3\right)\text{Tan}[e+fx]}{6df}-\frac{a^2\left(2c(c-8d)-21d^2\right)\text{Sec}[e+fx]\,\text{Tan}[e+fx]}{24f}-\frac{a^2(c-8d)(c+d\,\text{Sec}[e+fx])^2\,\text{Tan}[e+fx]}{12df}+\frac{a^2(c+d\,\text{Sec}[e+fx])^3\,\text{Tan}[e+fx]}{4df}$$

Result (type 3, 479 leaves):

$$-\frac{1}{192f}a^2\,\text{Sec}[e+fx]^4\left(108c^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]-\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]+144cd\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]-\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]+63d^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]-\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]+12\left(12c^2+16cd+7d^2\right)\text{Cos}[2(e+fx)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]-\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]+\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]\right)+3\left(12c^2+16cd+7d^2\right)\text{Cos}[4(e+fx)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]-\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]+\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]\right)-108c^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]+\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]-144cd\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]+\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]-63d^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+fx)\right]+\text{Sin}\left[\frac{1}{2}(e+fx)\right]\right]-24c^2\,\text{Sin}[e+fx]-96cd\,\text{Sin}[e+fx]-90d^2\,\text{Sin}[e+fx]-96c^2\,\text{Sin}[2(e+fx)]-224cd\,\text{Sin}[2(e+fx)]-128d^2\,\text{Sin}[2(e+fx)]-24c^2\,\text{Sin}[3(e+fx)]-96cd\,\text{Sin}[3(e+fx)]-42d^2\,\text{Sin}[3(e+fx)]-48c^2\,\text{Sin}[4(e+fx)]-80cd\,\text{Sin}[4(e+fx)]-32d^2\,\text{Sin}[4(e+fx)]\right)$$

- **Problem 196: Result more than twice size of optimal antiderivative.**

$$\int\text{Sec}[e+fx]\,(a+a\,\text{Sec}[e+fx])^2\,(c+d\,\text{Sec}[e+fx])\,dx$$

Optimal (type 3, 103 leaves, 6 steps):

$$\frac{a^2(3c+2d)\,\text{ArcTanh}[\text{Sin}[e+fx]]}{2f}+\frac{2a^2(3c+2d)\,\text{Tan}[e+fx]}{3f}+\frac{a^2(3c+2d)\,\text{Sec}[e+fx]\,\text{Tan}[e+fx]}{6f}+\frac{d\,(a+a\,\text{Sec}[e+fx])^2\,\text{Tan}[e+fx]}{3f}$$

Result (type 3, 993 leaves):

$$\frac{1}{8 f (d + c \operatorname{Cos}[e + f x])} (-3 c - 2 d) \operatorname{Cos}[e + f x]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] - \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right] \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) +$$

$$\frac{1}{8 f (d + c \operatorname{Cos}[e + f x])} (3 c + 2 d) \operatorname{Cos}[e + f x]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] + \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right] \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) +$$

$$\frac{d \operatorname{Cos}[e + f x]^3 \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) \operatorname{Sin}\left[\frac{f x}{2}\right]}{24 f (d + c \operatorname{Cos}[e + f x]) \left(\operatorname{Cos}\left[\frac{e}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] - \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)^3} +$$

$$\left(\operatorname{Cos}[e + f x]^3 \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) \left(3 c \operatorname{Cos}\left[\frac{e}{2}\right] + 7 d \operatorname{Cos}\left[\frac{e}{2}\right] - 3 c \operatorname{Sin}\left[\frac{e}{2}\right] - 5 d \operatorname{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/$$
$$\left(48 f (d + c \operatorname{Cos}[e + f x]) \left(\operatorname{Cos}\left[\frac{e}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] - \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)^2\right) +$$

$$\frac{\operatorname{Cos}[e + f x]^3 \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) \left(6 c \operatorname{Sin}\left[\frac{f x}{2}\right] + 5 d \operatorname{Sin}\left[\frac{f x}{2}\right]\right)}{12 f (d + c \operatorname{Cos}[e + f x]) \left(\operatorname{Cos}\left[\frac{e}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] - \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)} +$$

$$\frac{d \operatorname{Cos}[e + f x]^3 \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) \operatorname{Sin}\left[\frac{f x}{2}\right]}{24 f (d + c \operatorname{Cos}[e + f x]) \left(\operatorname{Cos}\left[\frac{e}{2}\right] + \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] + \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)^3} +$$

$$\left(\operatorname{Cos}[e + f x]^3 \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) \left(-3 c \operatorname{Cos}\left[\frac{e}{2}\right] - 7 d \operatorname{Cos}\left[\frac{e}{2}\right] - 3 c \operatorname{Sin}\left[\frac{e}{2}\right] - 5 d \operatorname{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/$$
$$\left(48 f (d + c \operatorname{Cos}[e + f x]) \left(\operatorname{Cos}\left[\frac{e}{2}\right] + \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] + \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)^2\right) +$$

$$\frac{\operatorname{Cos}[e + f x]^3 \operatorname{Sec}\left[\frac{e}{2} + \frac{f x}{2}\right]^4 (a + a \operatorname{Sec}[e + f x])^2 (c + d \operatorname{Sec}[e + f x]) \left(6 c \operatorname{Sin}\left[\frac{f x}{2}\right] + 5 d \operatorname{Sin}\left[\frac{f x}{2}\right]\right)}{12 f (d + c \operatorname{Cos}[e + f x]) \left(\operatorname{Cos}\left[\frac{e}{2}\right] + \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2} + \frac{f x}{2}\right] + \operatorname{Sin}\left[\frac{e}{2} + \frac{f x}{2}\right]\right)}$$

- **Problem 197: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e + f x] (a + a \operatorname{Sec}[e + f x])^2}{c + d \operatorname{Sec}[e + f x]} \, dx$$

Optimal (type 3, 95 leaves, 8 steps):

$$-\frac{a^2 (c - 2 d) \operatorname{ArcTanh}[\operatorname{Sin}[e + f x]]}{d^2 f} + \frac{2 a^2 (c - d)^{3/2} \operatorname{ArcTanh}\left[\frac{\sqrt{c-d} \operatorname{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{c+d}}\right]}{d^2 \sqrt{c + d} f} + \frac{a^2 \operatorname{Tan}[e + f x]}{d f}$$

Result (type 3, 329 leaves):

$$\frac{1}{4 d^2 f (c + d \operatorname{Sec}[e + f x])} a^2 \operatorname{Cos}[e + f x] (d + c \operatorname{Cos}[e + f x]) \operatorname{Sec}\left[\frac{1}{2} (e + f x)\right]^4 (1 + \operatorname{Sec}[e + f x])^2 \left((c - 2 d) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (e + f x)\right] - \operatorname{Sin}\left[\frac{1}{2} (e + f x)\right]\right] - \right.$$

$$(c - 2 d) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (e + f x)\right] + \operatorname{Sin}\left[\frac{1}{2} (e + f x)\right]\right] - \frac{2 i (c - d)^2 \operatorname{ArcTan}\left[\frac{(i \operatorname{Cos}[e] + \operatorname{Sin}[e]) \left(c \operatorname{Sin}[e] + (-d + c \operatorname{Cos}[e]) \operatorname{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2 - d^2} \sqrt{(\operatorname{Cos}[e] - i \operatorname{Sin}[e])^2}}\right] (\operatorname{Cos}[e] - i \operatorname{Sin}[e])}{\sqrt{c^2 - d^2} \sqrt{(\operatorname{Cos}[e] - i \operatorname{Sin}[e])^2}} +$$

$$\left. \frac{d \operatorname{Sin}\left[\frac{f x}{2}\right]}{\left(\operatorname{Cos}\left[\frac{e}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{1}{2} (e + f x)\right] - \operatorname{Sin}\left[\frac{1}{2} (e + f x)\right]\right)} + \frac{d \operatorname{Sin}\left[\frac{f x}{2}\right]}{\left(\operatorname{Cos}\left[\frac{e}{2}\right] + \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{1}{2} (e + f x)\right] + \operatorname{Sin}\left[\frac{1}{2} (e + f x)\right]\right)} \right)$$

- **Problem 198: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e + f x] (a + a \operatorname{Sec}[e + f x])^2}{(c + d \operatorname{Sec}[e + f x])^2} \, dx$$

Optimal (type 3, 117 leaves, 8 steps):

$$\frac{a^2 \operatorname{ArcTanh}[\operatorname{Sin}[e + f x]]}{d^2 f} - \frac{2 a^2 \sqrt{c - d} (c + 2 d) \operatorname{ArcTanh}\left[\frac{\sqrt{c - d} \operatorname{Tan}\left[\frac{1}{2} (e + f x)\right]}{\sqrt{c + d}}\right]}{d^2 (c + d)^{3/2} f} - \frac{a^2 (c - d) \operatorname{Tan}[e + f x]}{d (c + d) f (c + d \operatorname{Sec}[e + f x])}$$

Result (type 3, 312 leaves):

$$\frac{1}{4 d^2 f (c + d \operatorname{Sec}[e + f x])^2} a^2 (d + c \operatorname{Cos}[e + f x]) \operatorname{Sec}\left[\frac{1}{2} (e + f x)\right]^4 (1 + \operatorname{Sec}[e + f x])^2$$

$$\left(-(d + c \operatorname{Cos}[e + f x]) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (e + f x)\right] - \operatorname{Sin}\left[\frac{1}{2} (e + f x)\right]\right] + (d + c \operatorname{Cos}[e + f x]) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (e + f x)\right] + \operatorname{Sin}\left[\frac{1}{2} (e + f x)\right]\right] + \right.$$

$$\left(2 \left(c^2 + c d - 2 d^2\right) \operatorname{ArcTan}\left[\frac{(i \operatorname{Cos}[e] + \operatorname{Sin}[e]) \left(c \operatorname{Sin}[e] + (-d + c \operatorname{Cos}[e]) \operatorname{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2 - d^2} \sqrt{(\operatorname{Cos}[e] - i \operatorname{Sin}[e])^2}}\right] (d + c \operatorname{Cos}[e + f x]) (i \operatorname{Cos}[e] + \operatorname{Sin}[e])\right) \Big/$$

$$\left. \left((c + d) \sqrt{c^2 - d^2} \sqrt{(\operatorname{Cos}[e] - i \operatorname{Sin}[e])^2}\right) + \frac{(c - d) d (d \operatorname{Sin}[e] - c \operatorname{Sin}[f x])}{c (c + d) \left(\operatorname{Cos}\left[\frac{e}{2}\right] - \operatorname{Sin}\left[\frac{e}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{e}{2}\right] + \operatorname{Sin}\left[\frac{e}{2}\right]\right)} \right)$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^2}{(c+d \text{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 130 leaves, 5 steps):

$$\frac{3 a^2 \text{ArcTanh}\left[\frac{\sqrt{c-d} \text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{\sqrt{c-d} (c+d)^{5/2} f}+\frac{\left(a^2+a^2 \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{2 (c+d) f (c+d \text{Sec}[e+f x])^2}+\frac{3 a^2 \text{Tan}[e+f x]}{2 (c+d)^2 f (c+d \text{Sec}[e+f x])}$$

Result (type 3, 249 leaves):

$$\left(a^2 (d+c \text{Cos}[e+f x]) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^4 \text{Sec}[e+f x] (1+\text{Sec}[e+f x])^2 \left(-\frac{6 i \text{ArcTan}\left[\frac{(i \text{Cos}[e]+\text{Sin}[e]) \left(c \text{Sin}[e]+(-d+c \text{Cos}[e]) \text{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2-d^2} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}}\right] (d+c \text{Cos}[e+f x])^2 (\text{Cos}[e]-i \text{Sin}[e])}{\sqrt{c^2-d^2} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}}+\frac{(c-d) (c+d) \text{Sec}[e] (-d \text{Sin}[e]+c \text{Sin}[f x])}{c^2}+\frac{(d+c \text{Cos}[e+f x]) \text{Sec}[e] \left(\left(c^2-4 c d-2 d^2\right) \text{Sin}[e]+c (4 c+d) \text{Sin}[f x]\right)}{c^2}\right)\right) \Big/ \left(8 (c+d)^2 f (c+d \text{Sec}[e+f x])^3\right)$$

Problem 204: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x] (a+a \text{Sec}[e+f x])^3 (c+d \text{Sec}[e+f x]) \, dx$$

Optimal (type 3, 125 leaves, 10 steps):

$$\frac{5 a^3 (4 c+3 d) \text{ArcTanh}[\text{Sin}[e+f x]]}{8 f}+\frac{a^3 (4 c+3 d) \text{Tan}[e+f x]}{f}+\frac{3 a^3 (4 c+3 d) \text{Sec}[e+f x] \text{Tan}[e+f x]}{8 f}+\frac{d (a+a \text{Sec}[e+f x])^3 \text{Tan}[e+f x]}{4 f}+\frac{a^3 (4 c+3 d) \text{Tan}[e+f x]^3}{12 f}$$

Result (type 3, 273 leaves):

$$-\frac{1}{1536\,f}\,a^3\,(1+\text{Cos}[e+f\,x])^3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^6\,\text{Sec}[e+f\,x]^4$$
$$\left(120\,(4\,c+3\,d)\,\text{Cos}[e+f\,x]^4\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\right)-\right.$$
$$\text{Sec}[e]\,(-24\,(11\,c+9\,d)\,\text{Sin}[e]+(36\,c+69\,d)\,\text{Sin}[f\,x]+36\,c\,\text{Sin}[2\,e+f\,x]+69\,d\,\text{Sin}[2\,e+f\,x]+$$
$$280\,c\,\text{Sin}[e+2\,f\,x]+264\,d\,\text{Sin}[e+2\,f\,x]-72\,c\,\text{Sin}[3\,e+2\,f\,x]-24\,d\,\text{Sin}[3\,e+2\,f\,x]+36\,c\,\text{Sin}[2\,e+3\,f\,x]+$$
$$\left.45\,d\,\text{Sin}[2\,e+3\,f\,x]+36\,c\,\text{Sin}[4\,e+3\,f\,x]+45\,d\,\text{Sin}[4\,e+3\,f\,x]+88\,c\,\text{Sin}[3\,e+4\,f\,x]+72\,d\,\text{Sin}[3\,e+4\,f\,x])\right)$$

- **Problem 205: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^3}{c+d\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 153 leaves, 9 steps):

$$\frac{a^3\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,d\,f}+\frac{a^3\,\left(c^2-3\,c\,d+3\,d^2\right)\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{d^3\,f}-$$
$$\frac{2\,a^3\,(c-d)^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{c+d}}\right]}{d^3\,\sqrt{c+d}\,f}-\frac{a^3\,(c-3\,d)\,\text{Tan}[e+f\,x]}{d^2\,f}+\frac{a^3\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{2\,d\,f}$$

Result (type 3, 419 leaves):

$$\frac{1}{32\, d^3 f\, (c + d\, \text{Sec}[e + f x])} a^3 \text{Cos}[e + f x]^2 (d + c\, \text{Cos}[e + f x])\, \text{Sec}\left[\frac{1}{2} (e + f x)\right]^6 (1 + \text{Sec}[e + f x])^3$$

$$\left(-2 \left(2 c^2 - 6 c d + 7 d^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (e + f x)\right] - \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right] + 2 \left(2 c^2 - 6 c d + 7 d^2\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (e + f x)\right] + \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right] + \right.$$

$$\frac{8 (c - d)^3 \text{ArcTan}\left[\frac{(i\, \text{Cos}[e] + \text{Sin}[e]) \left(c\, \text{Sin}[e] + (-d + c\, \text{Cos}[e])\, \text{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2 - d^2} \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}}\right] (i\, \text{Cos}[e] + \text{Sin}[e])}{\sqrt{c^2 - d^2} \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}} +$$

$$\frac{d^2}{\left(\text{Cos}\left[\frac{1}{2} (e + f x)\right] - \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right)^2} - \frac{4 (c - 3 d)\, d\, \text{Sin}\left[\frac{f x}{2}\right]}{\left(\text{Cos}\left[\frac{e}{2}\right] - \text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (e + f x)\right] - \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right)} -$$

$$\left.\frac{d^2}{\left(\text{Cos}\left[\frac{1}{2} (e + f x)\right] + \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right)^2} - \frac{4 (c - 3 d)\, d\, \text{Sin}\left[\frac{f x}{2}\right]}{\left(\text{Cos}\left[\frac{e}{2}\right] + \text{Sin}\left[\frac{e}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (e + f x)\right] + \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right)}\right)$$

- **Problem 206: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e + f x] (a + a\, \text{Sec}[e + f x])^3}{(c + d\, \text{Sec}[e + f x])^2} \, dx$$

Optimal (type 3, 161 leaves, 9 steps):

$$-\frac{a^3 (2 c - 3 d)\, \text{ArcTanh}[\text{Sin}[e + f x]]}{d^3 f} + \frac{2 a^3 (c - d)^{3/2} (2 c + 3 d)\, \text{ArcTanh}\left[\frac{\sqrt{c - d}\, \text{Tan}\left[\frac{1}{2} (e + f x)\right]}{\sqrt{c + d}}\right]}{d^3 (c + d)^{3/2} f} +$$

$$\frac{2 a^3 c\, \text{Tan}[e + f x]}{d^2 (c + d) f} - \frac{(c - d) \left(a^3 + a^3 \text{Sec}[e + f x]\right) \text{Tan}[e + f x]}{d (c + d) f (c + d\, \text{Sec}[e + f x])}$$

Result (type 3, 979 leaves):

$$\frac{1}{8 d^3 f (c+d \operatorname{Sec}[e+f x])^2}(2 c-3 d) \operatorname{Cos}[e+f x] (d+c \operatorname{Cos}[e+f x])^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \operatorname{Sec}[e+f x])^3+$$
$$\frac{1}{8 d^3 f (c+d \operatorname{Sec}[e+f x])^2}(-2 c+3 d) \operatorname{Cos}[e+f x] (d+c \operatorname{Cos}[e+f x])^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \operatorname{Sec}[e+f x])^3+$$
$$\left((-c+d)^2 (2 c+3 d) \operatorname{Cos}[e+f x] (d+c \operatorname{Cos}[e+f x])^2 \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \operatorname{Sec}[e+f x])^3\right.$$
$$\left(-\left(i \operatorname{ArcTan}\left[\operatorname{Sec}\left[\frac{f x}{2}\right]\left(\frac{\operatorname{Cos}[e]}{\sqrt{c^2-d^2} \sqrt{\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]}}-\frac{i \operatorname{Sin}[e]}{\sqrt{c^2-d^2} \sqrt{\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]}}\right)\left(-i d \operatorname{Sin}\left[\frac{f x}{2}\right]+i c \operatorname{Sin}\left[e+\frac{f x}{2}\right]\right)\right] \operatorname{Cos}[e]\right)\Big/\right.$$
$$\left(4 d^3 \sqrt{c^2-d^2} f \sqrt{\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]}\right)-\left(\operatorname{ArcTan}\left[\operatorname{Sec}\left[\frac{f x}{2}\right]\left(\frac{\operatorname{Cos}[e]}{\sqrt{c^2-d^2} \sqrt{\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]}}-\frac{i \operatorname{Sin}[e]}{\sqrt{c^2-d^2} \sqrt{\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]}}\right)\right.\right.$$
$$\left.\left.\left.\left(-i d \operatorname{Sin}\left[\frac{f x}{2}\right]+i c \operatorname{Sin}\left[e+\frac{f x}{2}\right]\right)\right] \operatorname{Sin}[e]\right)\Big/\left(4 d^3 \sqrt{c^2-d^2} f \sqrt{\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]}\right)\right)\Big/$$
$$\left((c+d) (c+d \operatorname{Sec}[e+f x])^2\right)+\left(\operatorname{Cos}[e+f x] (d+c \operatorname{Cos}[e+f x]) \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \operatorname{Sec}[e+f x])^3\right.$$
$$\left.\left(-c^2 d \operatorname{Sin}[e]+2 c d^2 \operatorname{Sin}[e]-d^3 \operatorname{Sin}[e]+c^3 \operatorname{Sin}[f x]-2 c^2 d \operatorname{Sin}[f x]+c d^2 \operatorname{Sin}[f x]\right)\right)\Big/$$
$$\left(8 c d^2 (c+d) f (c+d \operatorname{Sec}[e+f x])^2\left(\operatorname{Cos}\left[\frac{e}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{e}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}\right]\right)\right)+$$
$$\frac{\operatorname{Cos}[e+f x] (d+c \operatorname{Cos}[e+f x])^2 \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \operatorname{Sec}[e+f x])^3 \operatorname{Sin}\left[\frac{f x}{2}\right]}{8 d^2 f (c+d \operatorname{Sec}[e+f x])^2\left(\operatorname{Cos}\left[\frac{e}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}+$$
$$\frac{\operatorname{Cos}[e+f x] (d+c \operatorname{Cos}[e+f x])^2 \operatorname{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 (a+a \operatorname{Sec}[e+f x])^3 \operatorname{Sin}\left[\frac{f x}{2}\right]}{8 d^2 f (c+d \operatorname{Sec}[e+f x])^2\left(\operatorname{Cos}\left[\frac{e}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\operatorname{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)}$$

- **Problem 207: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e+f x] (a+a \operatorname{Sec}[e+f x])^3}{(c+d \operatorname{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 188 leaves, 9 steps) :

$$\frac{a^3\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{d^3\,f}-\frac{a^3\,\sqrt{c-d}\,\left(2\,c^2+6\,c\,d+7\,d^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{c+d}}\right]}{d^3\,(c+d)^{5/2}\,f}-$$
$$\frac{(c-d)\,\left(a^3+a^3\,\text{Sec}[e+f\,x]\right)\,\text{Tan}[e+f\,x]}{2\,d\,(c+d)\,f\,(c+d\,\text{Sec}[e+f\,x])^2}-\frac{a^3\,(c-d)\,(2\,c+5\,d)\,\text{Tan}[e+f\,x]}{2\,d^2\,(c+d)^2\,f\,(c+d\,\text{Sec}[e+f\,x])}$$

Result (type 3, 393 leaves) :

$$\frac{1}{32\,d^3\,f\,(c+d\,\text{Sec}[e+f\,x])^3}\,a^3\,(d+c\,\text{Cos}[e+f\,x])\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^6\,(1+\text{Sec}[e+f\,x])^3$$
$$\left(-4\,(d+c\,\text{Cos}[e+f\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+4\,(d+c\,\text{Cos}[e+f\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+\right.$$
$$\left(4\,\left(2\,c^3+4\,c^2\,d+c\,d^2-7\,d^3\right)\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\,\left(c\,\text{Sin}[e]+(-d+c\,\text{Cos}[e])\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\,(d+c\,\text{Cos}[e+f\,x])^2\,(i\,\text{Cos}[e]+\text{Sin}[e])\right)\Bigg/$$
$$\left((c+d)^2\,\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)+\frac{1}{c^2\,(c+d)^2}(c-d)\,d\,\text{Sec}[e]\,\left(\left(2\,c^4+6\,c^3\,d+5\,c^2\,d^2+12\,c\,d^3+2\,d^4\right)\,\text{Sin}[e]-\right.$$
$$\left.\left.c\,\left(d\,\left(7\,c^2+18\,c\,d+2\,d^2\right)\,\text{Sin}[f\,x]-d\,\left(c^2+6\,c\,d+2\,d^2\right)\,\text{Sin}[2\,e+f\,x]+c\,\left(2\,c^2+6\,c\,d+d^2\right)\,\text{Sin}[e+2\,f\,x]\right)\right)\right)$$

- **Problem 208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(a+a\,\text{Sec}[e+f\,x])^3}{(c+d\,\text{Sec}[e+f\,x])^4}\,dx$$

Optimal (type 3, 178 leaves, 6 steps) :

$$\frac{5\,a^3\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{c+d}}\right]}{\sqrt{c-d}\,(c+d)^{7/2}\,f}+\frac{a\,(a+a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{3\,(c+d)\,f\,(c+d\,\text{Sec}[e+f\,x])^3}-\frac{5\,a^3\,(c-d)\,\text{Tan}[e+f\,x]}{6\,d\,(c+d)^2\,f\,(c+d\,\text{Sec}[e+f\,x])^2}+\frac{5\,a^3\,(c+4\,d)\,\text{Tan}[e+f\,x]}{6\,d\,(c+d)^3\,f\,(c+d\,\text{Sec}[e+f\,x])}$$

Result (type 3, 398 leaves) :

$$\frac{1}{192\,(c+d)^3\,f\,(c+d\,\mathrm{Sec}[e+f\,x])^4}\,a^3\,(d+c\,\mathrm{Cos}[e+f\,x])\,\mathrm{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^6\,\mathrm{Sec}[e+f\,x]$$

$$(1+\mathrm{Sec}[e+f\,x])^3\left(-\frac{120\,\mathrm{i}\,\mathrm{ArcTan}\left[\frac{(\mathrm{i}\,\mathrm{Cos}[e]+\mathrm{Sin}[e])\,\left(c\,\mathrm{Sin}[e]+(-d+c\,\mathrm{Cos}[e])\,\mathrm{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{c^2-d^2}\,\sqrt{(\mathrm{Cos}[e]-\mathrm{i}\,\mathrm{Sin}[e])^2}}\right]\,(d+c\,\mathrm{Cos}[e+f\,x])^3\,(\mathrm{Cos}[e]-\mathrm{i}\,\mathrm{Sin}[e])}{\sqrt{c^2-d^2}\,\sqrt{(\mathrm{Cos}[e]-\mathrm{i}\,\mathrm{Sin}[e])^2}}+\right.$$

$$\frac{1}{c^3}\left(c\,\mathrm{Sec}[e]\,\left(6\,\left(8\,c^4+6\,c^3\,d+30\,c^2\,d^2+9\,c\,d^3+2\,d^4\right)\,\mathrm{Sin}[f\,x]-3\,\left(6\,c^4-3\,c^3\,d+30\,c^2\,d^2+18\,c\,d^3+4\,d^4\right)\,\mathrm{Sin}[2\,e+f\,x]+\right.\right.$$
$$c\,\left(3\,\left(3\,c^3+38\,c^2\,d+12\,c\,d^2+2\,d^3\right)\,\mathrm{Sin}[e+2\,f\,x]+3\,\left(3\,c^3-6\,c^2\,d-6\,c\,d^2-2\,d^3\right)\,\mathrm{Sin}[3\,e+2\,f\,x]+\right.$$
$$\left.\left.\left.\left.c\,\left(22\,c^2+9\,c\,d+2\,d^2\right)\,\mathrm{Sin}[2\,e+3\,f\,x]\right)\right)-2\,d\,\left(66\,c^4+27\,c^3\,d+50\,c^2\,d^2+18\,c\,d^3+4\,d^4\right)\,\mathrm{Tan}[e]\right)\right)$$

▪ Problem 210: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Sec}[e+f\,x]\,(c+d\,\mathrm{Sec}[e+f\,x])^4}{a+a\,\mathrm{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 183 leaves, 7 steps):

$$\frac{d\,\left(8\,c^3-12\,c^2\,d+12\,c\,d^2-3\,d^3\right)\,\mathrm{ArcTanh}[\mathrm{Sin}[e+f\,x]]}{2\,a\,f}-\frac{(3\,c-4\,d)\,d\,(c+d\,\mathrm{Sec}[e+f\,x])^2\,\mathrm{Tan}[e+f\,x]}{3\,a\,f}+$$
$$\frac{(c-d)\,(c+d\,\mathrm{Sec}[e+f\,x])^3\,\mathrm{Tan}[e+f\,x]}{f\,(a+a\,\mathrm{Sec}[e+f\,x])}-\frac{d\,\left(4\,\left(3\,c^3-16\,c^2\,d+12\,c\,d^2-4\,d^3\right)+d\,\left(6\,c^2-20\,c\,d+9\,d^2\right)\,\mathrm{Sec}[e+f\,x]\right)\,\mathrm{Tan}[e+f\,x]}{6\,a\,f}$$

Result (type 3, 1243 leaves):

$$\left(\left(-8 c^3 d+12 c^2 d^2-12 c d^3+3 d^4\right) \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Cos}[e+f x]^3 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c+d \text{Sec}[e+f x])^4\right) \Big/ \left(f (d+c \text{Cos}[e+f x])^4 (a+a \text{Sec}[e+f x])\right)+$$
$$\left(\left(8 c^3 d-12 c^2 d^2+12 c d^3-3 d^4\right) \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Cos}[e+f x]^3 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c+d \text{Sec}[e+f x])^4\right) \Big/ \left(f (d+c \text{Cos}[e+f x])^4 (a+a \text{Sec}[e+f x])\right)+\frac{1}{48 f (d+c \text{Cos}[e+f x])^4 (a+a \text{Sec}[e+f x])}$$
$$\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right] \text{Sec}\left[\frac{e}{2}\right] \text{Sec}[e] (c+d \text{Sec}[e+f x])^4 \left(-18 c^4 \text{Sin}\left[\frac{f x}{2}\right]+72 c^3 d \text{Sin}\left[\frac{f x}{2}\right]-36 c^2 d^2 \text{Sin}\left[\frac{f x}{2}\right]+24 c d^3 \text{Sin}\left[\frac{f x}{2}\right]+6 d^4 \text{Sin}\left[\frac{f x}{2}\right]+\right.$$
$$18 c^4 \text{Sin}\left[\frac{3 f x}{2}\right]-72 c^3 d \text{Sin}\left[\frac{3 f x}{2}\right]+180 c^2 d^2 \text{Sin}\left[\frac{3 f x}{2}\right]-108 c d^3 \text{Sin}\left[\frac{3 f x}{2}\right]+39 d^4 \text{Sin}\left[\frac{3 f x}{2}\right]-72 c^2 d^2 \text{Sin}\left[e-\frac{f x}{2}\right]+$$
$$48 c d^3 \text{Sin}\left[e-\frac{f x}{2}\right]-24 d^4 \text{Sin}\left[e-\frac{f x}{2}\right]-36 c^2 d^2 \text{Sin}\left[e+\frac{f x}{2}\right]+24 c d^3 \text{Sin}\left[e+\frac{f x}{2}\right]-6 d^4 \text{Sin}\left[e+\frac{f x}{2}\right]-18 c^4 \text{Sin}\left[2 e+\frac{f x}{2}\right]+$$
$$72 c^3 d \text{Sin}\left[2 e+\frac{f x}{2}\right]-144 c^2 d^2 \text{Sin}\left[2 e+\frac{f x}{2}\right]+96 c d^3 \text{Sin}\left[2 e+\frac{f x}{2}\right]-24 d^4 \text{Sin}\left[2 e+\frac{f x}{2}\right]+72 c^2 d^2 \text{Sin}\left[e+\frac{3 f x}{2}\right]-36 c d^3 \text{Sin}\left[e+\frac{3 f x}{2}\right]+$$
$$21 d^4 \text{Sin}\left[e+\frac{3 f x}{2}\right]+18 c^4 \text{Sin}\left[2 e+\frac{3 f x}{2}\right]-72 c^3 d \text{Sin}\left[2 e+\frac{3 f x}{2}\right]+72 c^2 d^2 \text{Sin}\left[2 e+\frac{3 f x}{2}\right]-36 c d^3 \text{Sin}\left[2 e+\frac{3 f x}{2}\right]+$$
$$9 d^4 \text{Sin}\left[2 e+\frac{3 f x}{2}\right]-36 c^2 d^2 \text{Sin}\left[3 e+\frac{3 f x}{2}\right]+36 c d^3 \text{Sin}\left[3 e+\frac{3 f x}{2}\right]-9 d^4 \text{Sin}\left[3 e+\frac{3 f x}{2}\right]+36 c^2 d^2 \text{Sin}\left[e+\frac{5 f x}{2}\right]-$$
$$12 c d^3 \text{Sin}\left[e+\frac{5 f x}{2}\right]+7 d^4 \text{Sin}\left[e+\frac{5 f x}{2}\right]-6 c^4 \text{Sin}\left[2 e+\frac{5 f x}{2}\right]+24 c^3 d \text{Sin}\left[2 e+\frac{5 f x}{2}\right]+12 c d^3 \text{Sin}\left[2 e+\frac{5 f x}{2}\right]+d^4 \text{Sin}\left[2 e+\frac{5 f x}{2}\right]+$$
$$12 c d^3 \text{Sin}\left[3 e+\frac{5 f x}{2}\right]-3 d^4 \text{Sin}\left[3 e+\frac{5 f x}{2}\right]-6 c^4 \text{Sin}\left[4 e+\frac{5 f x}{2}\right]+24 c^3 d \text{Sin}\left[4 e+\frac{5 f x}{2}\right]-36 c^2 d^2 \text{Sin}\left[4 e+\frac{5 f x}{2}\right]+$$
$$36 c d^3 \text{Sin}\left[4 e+\frac{5 f x}{2}\right]-9 d^4 \text{Sin}\left[4 e+\frac{5 f x}{2}\right]+6 c^4 \text{Sin}\left[2 e+\frac{7 f x}{2}\right]-24 c^3 d \text{Sin}\left[2 e+\frac{7 f x}{2}\right]+72 c^2 d^2 \text{Sin}\left[2 e+\frac{7 f x}{2}\right]-$$
$$48 c d^3 \text{Sin}\left[2 e+\frac{7 f x}{2}\right]+16 d^4 \text{Sin}\left[2 e+\frac{7 f x}{2}\right]+36 c^2 d^2 \text{Sin}\left[3 e+\frac{7 f x}{2}\right]-24 c d^3 \text{Sin}\left[3 e+\frac{7 f x}{2}\right]+10 d^4 \text{Sin}\left[3 e+\frac{7 f x}{2}\right]+$$
$$\left.6 c^4 \text{Sin}\left[4 e+\frac{7 f x}{2}\right]-24 c^3 d \text{Sin}\left[4 e+\frac{7 f x}{2}\right]+36 c^2 d^2 \text{Sin}\left[4 e+\frac{7 f x}{2}\right]-24 c d^3 \text{Sin}\left[4 e+\frac{7 f x}{2}\right]+6 d^4 \text{Sin}\left[4 e+\frac{7 f x}{2}\right]\right)\Big)$$

- **Problem 211: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x] (c+d \text{Sec}[e+f x])^3}{a+a \text{Sec}[e+f x]} \, dx$$

Optimal (type 3, 117 leaves, 6 steps):

$$\frac{3 d \left(2 c^2-2 c d+d^2\right) \text{ArcTanh}[\text{Sin}[e+f x]]}{2 a f}+\frac{(c-d) (c+d \text{Sec}[e+f x])^2 \text{Tan}[e+f x]}{f (a+a \text{Sec}[e+f x])}-\frac{d \left(4 \left(c^2-3 c d+d^2\right)+(2 c-3 d) d \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{2 a f}$$

Result (type 3, 275 leaves):

$$\frac{1}{a\,f\,(1+\text{Cos}[e+f\,x])}\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^6\text{Sec}[e+f\,x]^2\left(16\,d^3\,\text{Csc}[e+f\,x]^3\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^4+\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\left(3\,d\,(2\,c^2-2\,c\,d+d^2)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]\right)-2\,(c^3-3\,c^2\,d+9\,c\,d^2-3\,d^3)\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]-3\,d\,(2\,c^2-2\,c\,d+d^2)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2+2\,(c-d)^3\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^3\right)\right)$$

Problem 212: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])^2}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 68 leaves, 6 steps):

$$\frac{(2\,c-d)\,d\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{a\,f}+\frac{d^2\,\text{Tan}[e+f\,x]}{a\,f}+\frac{(c-d)^2\,\text{Tan}[e+f\,x]}{f\,(a+a\,\text{Sec}[e+f\,x])}$$

Result (type 3, 237 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\text{Cos}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])^2\left((c-d)^2\,\text{Sec}\left[\frac{e}{2}\right]\text{Sin}\left[\frac{f\,x}{2}\right]+d\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\left(-(2\,c-d)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]\right)+(d\,\text{Sin}[f\,x])\Big/\left(\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right)\right)\right)\right)\right)\Big/\left(a\,f\,(d+c\,\text{Cos}[e+f\,x])^2\,(1+\text{Sec}[e+f\,x])\right)$$

Problem 213: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])}{a+a\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 43 leaves, 3 steps):

$$\frac{d\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{a\,f}+\frac{(c-d)\,\text{Tan}[e+f\,x]}{f\,(a+a\,\text{Sec}[e+f\,x])}$$

Result (type 3, 109 leaves):

$$\frac{1}{a\,f\,(1+\text{Cos}[e+f\,x])}2\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\left(d\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\left(-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]\right)+(c-d)\,\text{Sec}\left[\frac{e}{2}\right]\text{Sin}\left[\frac{f\,x}{2}\right]\right)$$

Problem 214: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])}\,dx$$

Optimal (type 3, 83 leaves, 4 steps):

$$-\frac{2\,d\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{a\,(c-d)^{3/2}\,\sqrt{c+d}\,f}+\frac{\text{Tan}[e+f x]}{(c-d)\,f\,(a+a\,\text{Sec}[e+f x])}$$

Result (type 3, 160 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\left(\frac{2\,d\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\,\left(c\,\text{Sin}[e]+(-d+c\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\,(i\,\text{Cos}[e]+\text{Sin}[e])}{\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}+\text{Sec}\left[\frac{e}{2}\right]\,\text{Sin}\left[\frac{f x}{2}\right]\right)\right)\Big/$$
$$(a\,(c-d)\,f\,(1+\text{Cos}[e+f x]))$$

Problem 215: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 145 leaves, 6 steps):

$$-\frac{2\,d\,(2 c+d)\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{a\,(c-d)^{5/2}\,(c+d)^{3/2}\,f}+\frac{(c+2 d)\,\text{Tan}[e+f x]}{(c-d)^2\,(c+d)\,f\,(a+a\,\text{Sec}[e+f x])}-\frac{d\,\text{Tan}[e+f x]}{\left(c^2-d^2\right)\,f\,(a+a\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])}$$

Result (type 3, 286 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\,(d+c\,\text{Cos}[e+f x])\,\text{Sec}[e+f x]^3\right.$$
$$\left(\left(2\,d\,(2 c+d)\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\,\left(c\,\text{Sin}[e]+(-d+c\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\,(d+c\,\text{Cos}[e+f x])\,(i\,\text{Cos}[e]+\text{Sin}[e])\right)\Big/\right.$$
$$\left((c+d)\,\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)+(d+c\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{e}{2}\right]\,\text{Sin}\left[\frac{f x}{2}\right]+$$
$$\left.\left.\frac{d^2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\,(-d\,\text{Sin}[e]+c\,\text{Sin}[f x])}{c\,(c+d)\,\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\,\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)}\right)\right)\Big/\left(a\,(c-d)^2\,f\,(1+\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])^2\right)$$

Problem 216: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])^3}\,dx$$

Optimal (type 3, 207 leaves, 7 steps):

$$-\frac{3 d\left(2 c^2+2 c d+d^2\right) \text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{a (c-d)^{7/2} (c+d)^{5/2} f}+\frac{d (2 c+3 d) \text{Tan}[e+f x]}{2 a (c-d)^2 (c+d) f (c+d\,\text{Sec}[e+f x])^2}+\frac{\text{Tan}[e+f x]}{(c-d) f (a+a\,\text{Sec}[e+f x]) (c+d\,\text{Sec}[e+f x])^2}+\frac{d (2 c+d) (c+4 d) \text{Tan}[e+f x]}{2 a (c-d)^3 (c+d)^2 f (c+d\,\text{Sec}[e+f x])}$$

Result (type 3, 1422 leaves):

$$\Bigg(\left(2 c^2+2 c d+d^2\right) \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 (d+c\,\text{Cos}[e+f x])^3\,\text{Sec}[e+f x]^4$$

$$\Bigg(-\Bigg(6 i d\,\text{ArcTan}\left[\text{Sec}\left[\frac{f x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}}\right)\left(-i d\,\text{Sin}\left[\frac{f x}{2}\right]+i c\,\text{Sin}\left[e+\frac{f x}{2}\right]\right)\right]$$

$$\text{Cos}[e]\Bigg)\Bigg/\left(\sqrt{c^2-d^2}\,f\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}\right)-$$

$$\Bigg(6 d\,\text{ArcTan}\left[\text{Sec}\left[\frac{f x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}}\right)\left(-i d\,\text{Sin}\left[\frac{f x}{2}\right]+i c\,\text{Sin}\left[e+\frac{f x}{2}\right]\right)\right]$$

$$\text{Sin}[e]\Bigg)\Bigg/\left(\sqrt{c^2-d^2}\,f\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}\right)\Bigg)\Bigg)\Bigg/$$

$$\left((-c+d)^3 (c+d)^2 (a+a\,\text{Sec}[e+f x]) (c+d\,\text{Sec}[e+f x])^3\right)+\frac{1}{8 c^2 (-c+d)^3 (c+d)^2 f (a+a\,\text{Sec}[e+f x]) (c+d\,\text{Sec}[e+f x])^3}$$

$$\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]$$

$$(d+c\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{e}{2}\right]$$

$$\text{Sec}[e]\,\text{Sec}[e+f x]^4$$

$$\Bigg(8 c^5 d\,\text{Sin}\left[\frac{f x}{2}\right]+10 c^4 d^2\,\text{Sin}\left[\frac{f x}{2}\right]-11 c^3 d^3\,\text{Sin}\left[\frac{f x}{2}\right]-17 c^2 d^4\,\text{Sin}\left[\frac{f x}{2}\right]-2 c d^5\,\text{Sin}\left[\frac{f x}{2}\right]+2 d^6\,\text{Sin}\left[\frac{f x}{2}\right]-$$

$$8 c^5 d\,\text{Sin}\left[\frac{3 f x}{2}\right]-22 c^4 d^2\,\text{Sin}\left[\frac{3 f x}{2}\right]-27 c^3 d^3\,\text{Sin}\left[\frac{3 f x}{2}\right]-5 c^2 d^4\,\text{Sin}\left[\frac{3 f x}{2}\right]+2 c d^5\,\text{Sin}\left[\frac{3 f x}{2}\right]+4 c^6\,\text{Sin}\left[e-\frac{f x}{2}\right]+$$

$8 c^5 d \,\text{Sin}\left[e-\frac{f x}{2}\right]+18 c^4 d^2 \,\text{Sin}\left[e-\frac{f x}{2}\right]+35 c^3 d^3 \,\text{Sin}\left[e-\frac{f x}{2}\right]+25 c^2 d^4 \,\text{Sin}\left[e-\frac{f x}{2}\right]+2 c d^5 \,\text{Sin}\left[e-\frac{f x}{2}\right]-2 d^6 \,\text{Sin}\left[e-\frac{f x}{2}\right]-$
$4 c^6 \,\text{Sin}\left[e+\frac{f x}{2}\right]-8 c^5 d \,\text{Sin}\left[e+\frac{f x}{2}\right]-6 c^4 d^2 \,\text{Sin}\left[e+\frac{f x}{2}\right]-7 c^3 d^3 \,\text{Sin}\left[e+\frac{f x}{2}\right]+5 c^2 d^4 \,\text{Sin}\left[e+\frac{f x}{2}\right]+2 c d^5 \,\text{Sin}\left[e+\frac{f x}{2}\right]-$
$2 d^6 \,\text{Sin}\left[e+\frac{f x}{2}\right]+8 c^5 d \,\text{Sin}\left[2 e+\frac{f x}{2}\right]+22 c^4 d^2 \,\text{Sin}\left[2 e+\frac{f x}{2}\right]+17 c^3 d^3 \,\text{Sin}\left[2 e+\frac{f x}{2}\right]+13 c^2 d^4 \,\text{Sin}\left[2 e+\frac{f x}{2}\right]+$
$2 c d^5 \,\text{Sin}\left[2 e+\frac{f x}{2}\right]-2 d^6 \,\text{Sin}\left[2 e+\frac{f x}{2}\right]+2 c^6 \,\text{Sin}\left[e+\frac{3 f x}{2}\right]+4 c^5 d \,\text{Sin}\left[e+\frac{3 f x}{2}\right]-4 c^4 d^2 \,\text{Sin}\left[e+\frac{3 f x}{2}\right]-$
$19 c^3 d^3 \,\text{Sin}\left[e+\frac{3 f x}{2}\right]-5 c^2 d^4 \,\text{Sin}\left[e+\frac{3 f x}{2}\right]+2 c d^5 \,\text{Sin}\left[e+\frac{3 f x}{2}\right]-8 c^5 d \,\text{Sin}\left[2 e+\frac{3 f x}{2}\right]-16 c^4 d^2 \,\text{Sin}\left[2 e+\frac{3 f x}{2}\right]-$
$c^3 d^3 \,\text{Sin}\left[2 e+\frac{3 f x}{2}\right]+2 c^2 d^4 \,\text{Sin}\left[2 e+\frac{3 f x}{2}\right]-2 c d^5 \,\text{Sin}\left[2 e+\frac{3 f x}{2}\right]+2 c^6 \,\text{Sin}\left[3 e+\frac{3 f x}{2}\right]+4 c^5 d \,\text{Sin}\left[3 e+\frac{3 f x}{2}\right]+$
$2 c^4 d^2 \,\text{Sin}\left[3 e+\frac{3 f x}{2}\right]+7 c^3 d^3 \,\text{Sin}\left[3 e+\frac{3 f x}{2}\right]+2 c^2 d^4 \,\text{Sin}\left[3 e+\frac{3 f x}{2}\right]-2 c d^5 \,\text{Sin}\left[3 e+\frac{3 f x}{2}\right]-2 c^6 \,\text{Sin}\left[e+\frac{5 f x}{2}\right]-$
$4 c^5 d \,\text{Sin}\left[e+\frac{5 f x}{2}\right]-8 c^4 d^2 \,\text{Sin}\left[e+\frac{5 f x}{2}\right]-2 c^3 d^3 \,\text{Sin}\left[e+\frac{5 f x}{2}\right]+c^2 d^4 \,\text{Sin}\left[e+\frac{5 f x}{2}\right]-6 c^4 d^2 \,\text{Sin}\left[2 e+\frac{5 f x}{2}\right]-$
$2 c^3 d^3 \,\text{Sin}\left[2 e+\frac{5 f x}{2}\right]+c^2 d^4 \,\text{Sin}\left[2 e+\frac{5 f x}{2}\right]-2 c^6 \,\text{Sin}\left[3 e+\frac{5 f x}{2}\right]-4 c^5 d \,\text{Sin}\left[3 e+\frac{5 f x}{2}\right]-2 c^4 d^2 \,\text{Sin}\left[3 e+\frac{5 f x}{2}\right]\Big)\Big)$

- **Problem 217: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]\,(c+d\,\text{Sec}[e+f x])^5}{(a+a\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 258 leaves, 8 steps):

$$\frac{5\,(2 c-d)\,d^2\,\left(2 c^2-3 c d+2 d^2\right)\text{ArcTanh}[\text{Sin}[e+f x]]}{2 a^2 f}-\frac{d\,\left(c^2+10 c d-12 d^2\right)\,(c+d\,\text{Sec}[e+f x])^2\,\text{Tan}[e+f x]}{3 a^2 f}+$$
$$\frac{(c-d)\,(c+10 d)\,(c+d\,\text{Sec}[e+f x])^3\,\text{Tan}[e+f x]}{3 f\,\left(a^2+a^2\,\text{Sec}[e+f x]\right)}+\frac{(c-d)\,(c+d\,\text{Sec}[e+f x])^4\,\text{Tan}[e+f x]}{3 f\,(a+a\,\text{Sec}[e+f x])^2}-$$
$$\frac{d\,\left(4\,\left(c^4+10 c^3 d-44 c^2 d^2+40 c d^3-12 d^4\right)+d\,\left(2 c^3+20 c^2 d-57 c d^2+30 d^3\right)\text{Sec}[e+f x]\right)\text{Tan}[e+f x]}{6 a^2 f}$$

Result (type 3, 743 leaves):

$$\left(10\left(-4c^3d^2+8c^2d^3-7cd^4+2d^5\right)\operatorname{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]^4\operatorname{Cos}[e+fx]^3\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+fx)\right]-\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]\right](c+d\operatorname{Sec}[e+fx])^5\right)\Big/$$
$$\left(f(d+c\operatorname{Cos}[e+fx])^5(a+a\operatorname{Sec}[e+fx])^2\right)-$$
$$\left(10\left(-4c^3d^2+8c^2d^3-7cd^4+2d^5\right)\operatorname{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]^4\operatorname{Cos}[e+fx]^3\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(e+fx)\right]+\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]\right](c+d\operatorname{Sec}[e+fx])^5\right)\Big/$$
$$\left(f(d+c\operatorname{Cos}[e+fx])^5(a+a\operatorname{Sec}[e+fx])^2\right)+\frac{1}{24f(d+c\operatorname{Cos}[e+fx])^5(a+a\operatorname{Sec}[e+fx])^2}$$
$$\operatorname{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]^4\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^3(c+d\operatorname{Sec}[e+fx])^5\left(6c^5\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]-30c^4d\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]+60c^3d^2\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]-\right.$$
$$15cd^4\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]+18d^5\operatorname{Sin}\left[\frac{1}{2}(e+fx)\right]-2c^5\operatorname{Sin}\left[\frac{3}{2}(e+fx)\right]+40c^4d\operatorname{Sin}\left[\frac{3}{2}(e+fx)\right]-140c^3d^2\operatorname{Sin}\left[\frac{3}{2}(e+fx)\right]+$$
$$320c^2d^3\operatorname{Sin}\left[\frac{3}{2}(e+fx)\right]-205cd^4\operatorname{Sin}\left[\frac{3}{2}(e+fx)\right]+70d^5\operatorname{Sin}\left[\frac{3}{2}(e+fx)\right]+6c^5\operatorname{Sin}\left[\frac{5}{2}(e+fx)\right]-60c^3d^2\operatorname{Sin}\left[\frac{5}{2}(e+fx)\right]+$$
$$240c^2d^3\operatorname{Sin}\left[\frac{5}{2}(e+fx)\right]-165cd^4\operatorname{Sin}\left[\frac{5}{2}(e+fx)\right]+54d^5\operatorname{Sin}\left[\frac{5}{2}(e+fx)\right]+15c^4d\operatorname{Sin}\left[\frac{7}{2}(e+fx)\right]-$$
$$60c^3d^2\operatorname{Sin}\left[\frac{7}{2}(e+fx)\right]+180c^2d^3\operatorname{Sin}\left[\frac{7}{2}(e+fx)\right]-135cd^4\operatorname{Sin}\left[\frac{7}{2}(e+fx)\right]+42d^5\operatorname{Sin}\left[\frac{7}{2}(e+fx)\right]+2c^5\operatorname{Sin}\left[\frac{9}{2}(e+fx)\right]+$$
$$\left.5c^4d\operatorname{Sin}\left[\frac{9}{2}(e+fx)\right]-40c^3d^2\operatorname{Sin}\left[\frac{9}{2}(e+fx)\right]+100c^2d^3\operatorname{Sin}\left[\frac{9}{2}(e+fx)\right]-80cd^4\operatorname{Sin}\left[\frac{9}{2}(e+fx)\right]+24d^5\operatorname{Sin}\left[\frac{9}{2}(e+fx)\right]\right)$$

Problem 219: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Sec}[e+fx](c+d\operatorname{Sec}[e+fx])^3}{(a+a\operatorname{Sec}[e+fx])^2}\,dx$$

Optimal (type 3, 133 leaves, 6 steps):

$$\frac{(3c-2d)d^2\operatorname{ArcTanh}[\operatorname{Sin}[e+fx]]}{a^2f}+\frac{(c-d)(c+d\operatorname{Sec}[e+fx])^2\operatorname{Tan}[e+fx]}{3f(a+a\operatorname{Sec}[e+fx])^2}+\frac{\left(c^3+4c^2d-12cd^2+10d^3-(c-4d)d^2\operatorname{Sec}[e+fx]\right)\operatorname{Tan}[e+fx]}{3f\left(a^2+a^2\operatorname{Sec}[e+fx]\right)}$$

Result (type 3, 294 leaves):

$$\frac{1}{3\,a^2\,f\,(1+\text{Cos}[e+f\,x])^2}$$
$$2\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^6\,\text{Sec}[e+f\,x]\,\Big(6\,d^2\,(-3\,c+2\,d)\,\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\Big)-$$
$$8\,(c-d)^3\,\text{Csc}[e+f\,x]^3\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]^4+32\,(c-d)^3\,\text{Csc}[e+f\,x]^5\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]^8+2\,\big(2\,c^3+3\,c^2\,d-12\,c\,d^2+13\,d^3\big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+$$
$$6\,(3\,c-2\,d)\,d^2\,\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2-$$
$$2\,(c-d)^2\,(2\,c+7\,d)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^3\Big)$$

- **Problem 220: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])^2}{(a+a\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 89 leaves, 6 steps):

$$\frac{d^2\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{a^2\,f}+\frac{(c-d)^2\,\text{Tan}[e+f\,x]}{3\,f\,(a+a\,\text{Sec}[e+f\,x])^2}+\frac{(c-d)\,(c+5\,d)\,\text{Tan}[e+f\,x]}{3\,f\,\big(a^2+a^2\,\text{Sec}[e+f\,x]\big)}$$

Result (type 3, 181 leaves):

$$-\frac{1}{3\,a^2\,f\,(1+\text{Cos}[e+f\,x])^2}$$
$$2\,\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]\,\Big(6\,d^2\,\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^3\,\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\Big)+$$
$$(c-d)^2\,\text{Sec}\Big[\frac{e}{2}\Big]\,\text{Sin}\Big[\frac{f\,x}{2}\Big]-4\,\big(c^2+c\,d-2\,d^2\big)\,\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}\Big[\frac{e}{2}\Big]\,\text{Sin}\Big[\frac{f\,x}{2}\Big]+(c-d)^2\,\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]\,\text{Tan}\Big[\frac{e}{2}\Big]\Big)$$

- **Problem 222: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f\,x]}{(a+a\,\text{Sec}[e+f\,x])^2\,(c+d\,\text{Sec}[e+f\,x])}\,dx$$

Optimal (type 3, 129 leaves, 6 steps):

$$\frac{2\,d^2\,\text{ArcTanh}\Big[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{c+d}}\Big]}{a^2\,(c-d)^{5/2}\,\sqrt{c+d}\,f}+\frac{\text{Tan}[e+f\,x]}{3\,(c-d)\,f\,(a+a\,\text{Sec}[e+f\,x])^2}+\frac{(c-4\,d)\,\text{Tan}[e+f\,x]}{3\,(c-d)^2\,f\,\big(a^2+a^2\,\text{Sec}[e+f\,x]\big)}$$

Result (type 3, 209 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]\left(-\frac{24\, i\, d^2\, \text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\left(c\,\text{Sin}[e]+(-d+c\,\text{Cos}[e])\,\text{Tan}\left[\frac{f x}{2}\right]\right)}{\sqrt{c^2-d^2}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\text{Cos}\left[\frac{1}{2}(e+f x)\right]^3(\text{Cos}[e]-i\,\text{Sin}[e])}{\sqrt{c^2-d^2}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}+\right.\right.$$

$$\left.\left.\text{Sec}\left[\frac{e}{2}\right]\left(3(c-3d)\,\text{Sin}\left[\frac{f x}{2}\right]-3(c-2d)\,\text{Sin}\left[e+\frac{f x}{2}\right]+(2c-5d)\,\text{Sin}\left[e+\frac{3 f x}{2}\right]\right)\right)\right)\Big/\left(3a^2(c-d)^2 f\,(1+\text{Cos}[e+f x])^2\right)$$

- **Problem 223: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])^2\,(c+d\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 211 leaves, 7 steps):

$$\frac{2 d^2 (3c+2d)\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{c+d}}\right]}{a^2 (c-d)^{7/2}(c+d)^{3/2} f}+\frac{d\left(c^2-6 c d-10 d^2\right)\text{Tan}[e+f x]}{3a^2(c-d)^3(c+d) f\,(c+d\,\text{Sec}[e+f x])}+$$

$$\frac{(c-6d)\,\text{Tan}[e+f x]}{3a^2(c-d)^2 f\,(1+\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])}+\frac{\text{Tan}[e+f x]}{3(c-d) f\,(a+a\,\text{Sec}[e+f x])^2\,(c+d\,\text{Sec}[e+f x])}$$

Result (type 3, 764 leaves):

$$\left((3c+2d)\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (d+c\,\text{Cos}[e+f x])^2\,\text{Sec}[e+f x]^4\right.$$

$$\left(\left(\left(8\,\mathrm{i}\,d^2\,\text{ArcTan}\left[\text{Sec}\left[\frac{f x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2e]-\mathrm{i}\,\text{Sin}[2e]}}-\frac{\mathrm{i}\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2e]-\mathrm{i}\,\text{Sin}[2e]}}\right)\left(-\mathrm{i}\,d\,\text{Sin}\left[\frac{f x}{2}\right]+\mathrm{i}\,c\,\text{Sin}\left[e+\frac{f x}{2}\right]\right)\right]\right.\right.\right.$$

$$\left.\text{Cos}[e]\right)\Big/\left(\sqrt{c^2-d^2}\,f\,\sqrt{\text{Cos}[2e]-\mathrm{i}\,\text{Sin}[2e]}\right)+$$

$$\left(8\,d^2\,\text{ArcTan}\left[\text{Sec}\left[\frac{f x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2e]-\mathrm{i}\,\text{Sin}[2e]}}-\frac{\mathrm{i}\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2e]-\mathrm{i}\,\text{Sin}[2e]}}\right)\left(-\mathrm{i}\,d\,\text{Sin}\left[\frac{f x}{2}\right]+\mathrm{i}\,c\,\text{Sin}\left[e+\frac{f x}{2}\right]\right)\right]\right.$$

$$\left.\left.\left.\text{Sin}[e]\right)\Big/\left(\sqrt{c^2-d^2}\,f\,\sqrt{\text{Cos}[2e]-\mathrm{i}\,\text{Sin}[2e]}\right)\right)\right)\Big/$$

$$\left((-c+d)^3 (c+d) (a+a\,\text{Sec}[e+f x])^2 (c+d\,\text{Sec}[e+f x])^2\right)-\frac{2\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right](d+c\,\text{Cos}[e+f x])^2\,\text{Sec}\left[\frac{e}{2}\right]\text{Sec}[e+f x]^4\,\text{Sin}\left[\frac{f x}{2}\right]}{3(-c+d)^2 f (a+a\,\text{Sec}[e+f x])^2 (c+d\,\text{Sec}[e+f x])^2}+$$

$$\frac{8\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 (d+c\,\text{Cos}[e+f x])^2\,\text{Sec}\left[\frac{e}{2}\right]\text{Sec}[e+f x]^4\left(-c\,\text{Sin}\left[\frac{f x}{2}\right]+4\,d\,\text{Sin}\left[\frac{f x}{2}\right]\right)}{3(-c+d)^3 f (a+a\,\text{Sec}[e+f x])^2 (c+d\,\text{Sec}[e+f x])^2}-$$

$$\frac{4\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 (d+c\,\text{Cos}[e+f x])\,\text{Sec}[e+f x]^4\left(d^4\,\text{Sin}[e]-c\,d^3\,\text{Sin}[f x]\right)}{c(-c+d)^3(c+d) f (a+a\,\text{Sec}[e+f x])^2 (c+d\,\text{Sec}[e+f x])^2\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)}-$$

$$\frac{2\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 (d+c\,\text{Cos}[e+f x])^2\,\text{Sec}[e+f x]^4\,\text{Tan}\left[\frac{e}{2}\right]}{3(-c+d)^2 f (a+a\,\text{Sec}[e+f x])^2 (c+d\,\text{Sec}[e+f x])^2}$$

- **Problem 224: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a\,\text{Sec}[e+f x])^2 (c+d\,\text{Sec}[e+f x])^3}\,dx$$

Optimal (type 3, 284 leaves, 8 steps) :

$$\frac{d^2\left(12c^2+16cd+7d^2\right)\text{ArcTanh}\left[\frac{\sqrt{c-d}\ \text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{c+d}}\right]}{a^2(c-d)^{9/2}(c+d)^{5/2}f}+$$

$$\frac{d\left(2c^2-16cd-21d^2\right)\text{Tan}[e+fx]}{6a^2(c-d)^3(c+d)f(c+d\,\text{Sec}[e+fx])^2}+\frac{(c-8d)\text{Tan}[e+fx]}{3a^2(c-d)^2f(1+\text{Sec}[e+fx])(c+d\,\text{Sec}[e+fx])^2}+$$

$$\frac{\text{Tan}[e+fx]}{3(c-d)f(a+a\,\text{Sec}[e+fx])^2(c+d\,\text{Sec}[e+fx])^2}+\frac{d\left(2c^3-16c^2d-59cd^2-32d^3\right)\text{Tan}[e+fx]}{6a^2(c-d)^4(c+d)^2f(c+d\,\text{Sec}[e+fx])}$$

Result (type 3, 2220 leaves) :

$$\Bigg(\left(12c^2+16cd+7d^2\right)\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]^4(d+c\,\text{Cos}[e+fx])^3\,\text{Sec}[e+fx]^5$$

$$\left(-\left(4\,i\,d^2\,\text{ArcTan}\left[\text{Sec}\left[\frac{fx}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}}\right)\left(-i\,d\,\text{Sin}\left[\frac{fx}{2}\right]+i\,c\,\text{Sin}\left[e+\frac{fx}{2}\right]\right)\right]\right.\right.$$

$$\left.\text{Cos}[e]\right)\Big/\left(\sqrt{c^2-d^2}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)-$$

$$\left(4d^2\,\text{ArcTan}\left[\text{Sec}\left[\frac{fx}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}}\right)\left(-i\,d\,\text{Sin}\left[\frac{fx}{2}\right]+i\,c\,\text{Sin}\left[e+\frac{fx}{2}\right]\right)\right]\right.$$

$$\left.\left.\text{Sin}[e]\right)\Big/\left(\sqrt{c^2-d^2}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)\right)\Bigg)\Big/$$

$$\left((-c+d)^4(c+d)^2(a+a\,\text{Sec}[e+fx])^2(c+d\,\text{Sec}[e+fx])^3\right)+\frac{1}{48c^2(-c+d)^4(c+d)^2f(a+a\,\text{Sec}[e+fx])^2(c+d\,\text{Sec}[e+fx])^3}$$

$$\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]$$

$$(d+c\,\text{Cos}[e+fx])\,\text{Sec}\left[\frac{e}{2}\right]$$

$$\text{Sec}[e]\,\text{Sec}[e+fx]^5$$

$$\left(-16c^7\,\text{Sin}\left[\frac{fx}{2}\right]+14c^6d\,\text{Sin}\left[\frac{fx}{2}\right]+220c^5d^2\,\text{Sin}\left[\frac{fx}{2}\right]+334c^4d^3\,\text{Sin}\left[\frac{fx}{2}\right]+54c^3d^4\,\text{Sin}\left[\frac{fx}{2}\right]-156c^2d^5\,\text{Sin}\left[\frac{fx}{2}\right]-\right.$$

$$48cd^6\,\text{Sin}\left[\frac{fx}{2}\right]+18d^7\,\text{Sin}\left[\frac{fx}{2}\right]+14c^7\,\text{Sin}\left[\frac{3fx}{2}\right]-16c^6d\,\text{Sin}\left[\frac{3fx}{2}\right]-226c^5d^2\,\text{Sin}\left[\frac{3fx}{2}\right]-532c^4d^3\,\text{Sin}\left[\frac{3fx}{2}\right]-$$

$$583c^3d^4\,\text{Sin}\left[\frac{3fx}{2}\right]-232c^2d^5\,\text{Sin}\left[\frac{3fx}{2}\right]-6cd^6\,\text{Sin}\left[\frac{3fx}{2}\right]+6d^7\,\text{Sin}\left[\frac{3fx}{2}\right]-12c^7\,\text{Sin}\left[e-\frac{fx}{2}\right]+20c^6d\,\text{Sin}\left[e-\frac{fx}{2}\right]+$$

$$236\,c^5\,d^2\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+628\,c^4\,d^3\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+778\,c^3\,d^4\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+420\,c^2\,d^5\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+48\,c\,d^6\,\text{Sin}\left[e-\frac{f\,x}{2}\right]-$$

$$18\,d^7\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+12\,c^7\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-20\,c^6\,d\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-236\,c^5\,d^2\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-460\,c^4\,d^3\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-310\,c^3\,d^4\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+$$

$$39\,c^2\,d^5\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+48\,c\,d^6\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-18\,d^7\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-16\,c^7\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+14\,c^6\,d\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+220\,c^5\,d^2\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+$$

$$502\,c^4\,d^3\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+522\,c^3\,d^4\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+303\,c^2\,d^5\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+48\,c\,d^6\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-18\,d^7\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-$$

$$6\,c^7\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+6\,c^6\,d\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+126\,c^5\,d^2\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+114\,c^4\,d^3\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-159\,c^3\,d^4\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-$$

$$144\,c^2\,d^5\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-6\,c\,d^6\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+6\,d^7\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+14\,c^7\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-16\,c^6\,d\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-$$

$$226\,c^5\,d^2\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-412\,c^4\,d^3\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-235\,c^3\,d^4\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-7\,c^2\,d^5\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]+6\,c\,d^6\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-$$

$$6\,d^7\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-6\,c^7\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+6\,c^6\,d\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+126\,c^5\,d^2\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+234\,c^4\,d^3\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+$$

$$189\,c^3\,d^4\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+81\,c^2\,d^5\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+6\,c\,d^6\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]-6\,d^7\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+6\,c^7\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-$$

$$14\,c^6\,d\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-134\,c^5\,d^2\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-274\,c^4\,d^3\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-193\,c^3\,d^4\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-27\,c^2\,d^5\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]+$$

$$6\,c\,d^6\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-6\,c^7\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+12\,c^6\,d\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+42\,c^5\,d^2\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-48\,c^4\,d^3\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-$$

$$105\,c^3\,d^4\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-27\,c^2\,d^5\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+6\,c\,d^6\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+6\,c^7\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-14\,c^6\,d\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-$$

$$134\,c^5\,d^2\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-202\,c^4\,d^3\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-61\,c^3\,d^4\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]+12\,c^2\,d^5\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-6\,c\,d^6\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-$$

$$6\,c^7\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+12\,c^6\,d\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+42\,c^5\,d^2\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+24\,c^4\,d^3\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+27\,c^3\,d^4\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+$$

$$12\,c^2\,d^5\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]-6\,c\,d^6\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+4\,c^7\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]-14\,c^6\,d\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]-40\,c^5\,d^2\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]-$$

$$46\,c^4\,d^3\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]-12\,c^3\,d^4\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]+3\,c^2\,d^5\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]-24\,c^4\,d^3\,\text{Sin}\left[3\,e+\frac{7\,f\,x}{2}\right]-12\,c^3\,d^4\,\text{Sin}\left[3\,e+\frac{7\,f\,x}{2}\right]+$$

$$3\,c^2\,d^5\,\text{Sin}\left[3\,e+\frac{7\,f\,x}{2}\right]+4\,c^7\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]-14\,c^6\,d\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]-40\,c^5\,d^2\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]-22\,c^4\,d^3\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]\Bigg)\Bigg)$$

- **Problem 225: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])^6}{(a+a\,\text{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 363 leaves, 9 steps) :

$$\frac{d^3 \left(40 c^3-90 c^2 d+78 c d^2-23 d^3\right) \text{ArcTanh}[\text{Sin}[e+f x]]}{2 a^3 f}-\frac{2 d \left(2 c^5+18 c^4 d+107 c^3 d^2-472 c^2 d^3+456 c d^4-136 d^5\right) \text{Tan}[e+f x]}{15 a^3 f}-\frac{d^2 \left(4 c^4+36 c^3 d+216 c^2 d^2-626 c d^3+345 d^4\right) \text{Sec}[e+f x] \text{Tan}[e+f x]}{30 a^3 f}-\frac{d \left(2 c^3+18 c^2 d+111 c d^2-136 d^3\right) (c+d \text{Sec}[e+f x])^2 \text{Tan}[e+f x]}{15 a^3 f}+\frac{(c-d) \left(2 c^2+18 c d+115 d^2\right) (c+d \text{Sec}[e+f x])^3 \text{Tan}[e+f x]}{15 f \left(a^3+a^3 \text{Sec}[e+f x]\right)}+\frac{(c-d) (2 c+13 d) (c+d \text{Sec}[e+f x])^4 \text{Tan}[e+f x]}{15 a f (a+a \text{Sec}[e+f x])^2}+\frac{(c-d) (c+d \text{Sec}[e+f x])^5 \text{Tan}[e+f x]}{5 f (a+a \text{Sec}[e+f x])^3}$$

Result (type 3, 1338 leaves) :

$$\left(4\left(-40 c^3 d^3+90 c^2 d^4-78 c d^5+23 d^6\right) \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Cos}[e+f x]^3 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c+d \text{Sec}[e+f x])^6\right) \Big/$$
$$\left(f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) -$$
$$\left(4\left(-40 c^3 d^3+90 c^2 d^4-78 c d^5+23 d^6\right) \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Cos}[e+f x]^3 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right] (c+d \text{Sec}[e+f x])^6\right) \Big/$$
$$\left(f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) + \left(2 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Cos}[e+f x]^3 \text{Sec}\left[\frac{e}{2}\right] (c+d \text{Sec}[e+f x])^6\right.$$
$$\left.\left(c^6 \text{Sin}\left[\frac{e}{2}\right]-6 c^5 d \text{Sin}\left[\frac{e}{2}\right]+15 c^4 d^2 \text{Sin}\left[\frac{e}{2}\right]-20 c^3 d^3 \text{Sin}\left[\frac{e}{2}\right]+15 c^2 d^4 \text{Sin}\left[\frac{e}{2}\right]-6 c d^5 \text{Sin}\left[\frac{e}{2}\right]+d^6 \text{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/$$
$$\left(5 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) + \left(8 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4 \text{Cos}[e+f x]^3 \text{Sec}\left[\frac{e}{2}\right] (c+d \text{Sec}[e+f x])^6\right.$$
$$\left.\left(-4 c^6 \text{Sin}\left[\frac{e}{2}\right]+9 c^5 d \text{Sin}\left[\frac{e}{2}\right]+15 c^4 d^2 \text{Sin}\left[\frac{e}{2}\right]-70 c^3 d^3 \text{Sin}\left[\frac{e}{2}\right]+90 c^2 d^4 \text{Sin}\left[\frac{e}{2}\right]-51 c d^5 \text{Sin}\left[\frac{e}{2}\right]+11 d^6 \text{Sin}\left[\frac{e}{2}\right]\right)\right) \Big/$$
$$\left(15 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) + \left(2 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right] \text{Cos}[e+f x]^3 \text{Sec}\left[\frac{e}{2}\right] (c+d \text{Sec}[e+f x])^6\right.$$
$$\left.\left(c^6 \text{Sin}\left[\frac{f x}{2}\right]-6 c^5 d \text{Sin}\left[\frac{f x}{2}\right]+15 c^4 d^2 \text{Sin}\left[\frac{f x}{2}\right]-20 c^3 d^3 \text{Sin}\left[\frac{f x}{2}\right]+15 c^2 d^4 \text{Sin}\left[\frac{f x}{2}\right]-6 c d^5 \text{Sin}\left[\frac{f x}{2}\right]+d^6 \text{Sin}\left[\frac{f x}{2}\right]\right)\right) \Big/$$
$$\left(5 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) + \left(8 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^3 \text{Cos}[e+f x]^3 \text{Sec}\left[\frac{e}{2}\right] (c+d \text{Sec}[e+f x])^6\right.$$
$$\left.\left(-4 c^6 \text{Sin}\left[\frac{f x}{2}\right]+9 c^5 d \text{Sin}\left[\frac{f x}{2}\right]+15 c^4 d^2 \text{Sin}\left[\frac{f x}{2}\right]-70 c^3 d^3 \text{Sin}\left[\frac{f x}{2}\right]+90 c^2 d^4 \text{Sin}\left[\frac{f x}{2}\right]-51 c d^5 \text{Sin}\left[\frac{f x}{2}\right]+11 d^6 \text{Sin}\left[\frac{f x}{2}\right]\right)\right) \Big/$$
$$\left(15 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) + \left(8 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^5 \text{Cos}[e+f x]^3 \text{Sec}\left[\frac{e}{2}\right] (c+d \text{Sec}[e+f x])^6\right.$$
$$\left.\left(7 c^6 \text{Sin}\left[\frac{f x}{2}\right]+18 c^5 d \text{Sin}\left[\frac{f x}{2}\right]+30 c^4 d^2 \text{Sin}\left[\frac{f x}{2}\right]-440 c^3 d^3 \text{Sin}\left[\frac{f x}{2}\right]+855 c^2 d^4 \text{Sin}\left[\frac{f x}{2}\right]-642 c d^5 \text{Sin}\left[\frac{f x}{2}\right]+172 d^6 \text{Sin}\left[\frac{f x}{2}\right]\right)\right) \Big/$$
$$\left(15 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) + \frac{8 d^6 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Sec}[e] (c+d \text{Sec}[e+f x])^6 \text{Sin}[f x]}{3 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3} -$$
$$\left(4 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Cos}[e+f x]^2 \text{Sec}[e] (c+d \text{Sec}[e+f x])^6 \left(-18 c d^5 \text{Sin}[e]+9 d^6 \text{Sin}[e]-90 c^2 d^4 \text{Sin}[f x]+108 c d^5 \text{Sin}[f x]-40 d^6 \text{Sin}[f x]\right)\right) \Big/$$
$$\left(3 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3\right) +$$
$$\frac{4 \text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^6 \text{Cos}[e+f x] \text{Sec}[e] (c+d \text{Sec}[e+f x])^6 \left(2 d^6 \text{Sin}[e]+18 c d^5 \text{Sin}[f x]-9 d^6 \text{Sin}[f x]\right)}{3 f (d+c \text{Cos}[e+f x])^6 (a+a \text{Sec}[e+f x])^3}$$

- **Problem 228: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x] (c+d \text{Sec}[e+f x])^3}{(a+a \text{Sec}[e+f x])^3} \, dx$$

Optimal (type 3, 133 leaves, 6 steps):

$$\frac{d^3 \text{ArcTanh}[\text{Sin}[e+f x]]}{a^3 f}+\frac{(c-d) (c+d \text{Sec}[e+f x])^2 \text{Tan}[e+f x]}{5 f (a+a \text{Sec}[e+f x])^3}+\frac{(c-d) \left(2 \left(2 c^2+8 c d+11 d^2\right)+\left(2 c^2+11 c d+29 d^2\right) \text{Sec}[e+f x]\right) \text{Tan}[e+f x]}{15 a f (a+a \text{Sec}[e+f x])^2}$$

Result (type 3, 295 leaves):

$$\frac{1}{30 a^3 f (1+\text{Cos}[e+f x])^3}\left(-240 d^3 \text{Cos}\left[\frac{1}{2} (e+f x)\right]^6 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right)+(c-d) \text{Cos}\left[\frac{1}{2} (e+f x)\right] \text{Sec}\left[\frac{e}{2}\right] \left(5 \left(8 c^2+17 c d+29 d^2\right) \text{Sin}\left[\frac{f x}{2}\right]-15 \left(2 c^2+5 c d+5 d^2\right) \text{Sin}\left[e+\frac{f x}{2}\right]+20 c^2 \text{Sin}\left[e+\frac{3 f x}{2}\right]+65 c d \text{Sin}\left[e+\frac{3 f x}{2}\right]+95 d^2 \text{Sin}\left[e+\frac{3 f x}{2}\right]-15 c^2 \text{Sin}\left[2 e+\frac{3 f x}{2}\right]-15 c d \text{Sin}\left[2 e+\frac{3 f x}{2}\right]-15 d^2 \text{Sin}\left[2 e+\frac{3 f x}{2}\right]+7 c^2 \text{Sin}\left[2 e+\frac{5 f x}{2}\right]+16 c d \text{Sin}\left[2 e+\frac{5 f x}{2}\right]+22 d^2 \text{Sin}\left[2 e+\frac{5 f x}{2}\right]\right)\right)$$

- **Problem 231: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[e+f x]}{(a+a \text{Sec}[e+f x])^3 (c+d \text{Sec}[e+f x])} \, dx$$

Optimal (type 3, 181 leaves, 7 steps):

$$-\frac{2 d^3 \text{ArcTanh}\left[\frac{\sqrt{c-d} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{c+d}}\right]}{a^3 (c-d)^{7/2} \sqrt{c+d} f}+\frac{\text{Tan}[e+f x]}{5 (c-d) f (a+a \text{Sec}[e+f x])^3}+\frac{(2 c-7 d) \text{Tan}[e+f x]}{15 a (c-d)^2 f (a+a \text{Sec}[e+f x])^2}+\frac{\left(2 c^2-9 c d+22 d^2\right) \text{Tan}[e+f x]}{15 (c-d)^3 f \left(a^3+a^3 \text{Sec}[e+f x]\right)}$$

Result (type 3, 345 leaves):

$$\frac{1}{30\,a^3\,(c-d)^3\,f\,(1+\text{Cos}[e+f\,x])^3}$$

$$\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\left(\frac{480\,d^3\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[e]+\text{Sin}[e])\,\left(c\,\text{Sin}[e]+(-d+c\,\text{Cos}[e])\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\right]\,\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]^5\,(i\,\text{Cos}[e]+\text{Sin}[e])}{\sqrt{c^2-d^2}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}+\text{Sec}\left[\frac{e}{2}\right]\right.$$

$$\left(5\,\left(8\,c^2-27\,c\,d+37\,d^2\right)\,\text{Sin}\left[\frac{f\,x}{2}\right]-15\,\left(2\,c^2-7\,c\,d+9\,d^2\right)\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+20\,c^2\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-75\,c\,d\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+115\,d^2\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-15\right.$$

$$\left.\left.c^2\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]+45\,c\,d\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-45\,d^2\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]+7\,c^2\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-24\,c\,d\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+32\,d^2\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]\right)\right)$$

Problem 232: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f\,x]}{(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^2}\,dx$$

Optimal (type 3, 288 leaves, 8 steps):

$$-\frac{2\,d^3\,(4\,c+3\,d)\,\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{c+d}}\right]}{a^3\,(c-d)^{9/2}\,(c+d)^{3/2}\,f}+\frac{d\,\left(2\,c^3-12\,c^2\,d+43\,c\,d^2+72\,d^3\right)\,\text{Tan}[e+f\,x]}{15\,a^3\,(c-d)^4\,(c+d)\,f\,(c+d\,\text{Sec}[e+f\,x])}+\frac{\text{Tan}[e+f\,x]}{5\,(c-d)\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])}+$$

$$\frac{(2\,c-9\,d)\,\text{Tan}[e+f\,x]}{15\,a\,(c-d)^2\,f\,(a+a\,\text{Sec}[e+f\,x])^2\,(c+d\,\text{Sec}[e+f\,x])}+\frac{\left(2\,c^2-12\,c\,d+45\,d^2\right)\,\text{Tan}[e+f\,x]}{15\,(c-d)^3\,f\,\left(a^3+a^3\,\text{Sec}[e+f\,x]\right)\,(c+d\,\text{Sec}[e+f\,x])}$$

Result (type 3, 1772 leaves):

$$\left((4\,c+3\,d)\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(d+c\,\text{Cos}[e+f\,x])^2\,\text{Sec}[e+f\,x]^5\right.$$

$$\left(\left(16\,i\,d^3\,\text{ArcTan}\left[\text{Sec}\left[\frac{f\,x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}\right)\left(-i\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]+i\,c\,\text{Sin}\left[e+\frac{f\,x}{2}\right]\right)\right]\right.\right.$$

$$\left.\text{Cos}[e]\right)\Big/\left(\sqrt{c^2-d^2}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)+$$

$$\left(16\,d^3\,\text{ArcTan}\left[\text{Sec}\left[\frac{f\,x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}\right)\left(-i\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]+i\,c\,\text{Sin}\left[e+\frac{f\,x}{2}\right]\right)\right]\right.$$

$$\text{Sin}[e]\Bigg)\Bigg/\left(\sqrt{c^2-d^2}\ f\ \sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)\Bigg)\Bigg)\Bigg/$$

$$\left((-c+d)^4\,(c+d)\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^2\right)+\frac{1}{120\,c\,(-c+d)^4\,(c+d)\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^2}$$

$$\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]$$

$$(d+c\,\text{Cos}[e+f\,x])\,\text{Sec}\left[\frac{e}{2}\right]\,\text{Sec}[e]\,\text{Sec}[e+f\,x]^5$$

$$\Bigg(-55\,c^5\,\text{Sin}\left[\frac{f\,x}{2}\right]+135\,c^4\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]-20\,c^3\,d^2\,\text{Sin}\left[\frac{f\,x}{2}\right]-810\,c^2\,d^3\,\text{Sin}\left[\frac{f\,x}{2}\right]-450\,c\,d^4\,\text{Sin}\left[\frac{f\,x}{2}\right]+150\,d^5\,\text{Sin}\left[\frac{f\,x}{2}\right]+47\,c^5\,\text{Sin}\left[\frac{3\,f\,x}{2}\right]-$$

$$137\,c^4\,d\,\text{Sin}\left[\frac{3\,f\,x}{2}\right]+88\,c^3\,d^2\,\text{Sin}\left[\frac{3\,f\,x}{2}\right]+812\,c^2\,d^3\,\text{Sin}\left[\frac{3\,f\,x}{2}\right]+690\,c\,d^4\,\text{Sin}\left[\frac{3\,f\,x}{2}\right]+75\,d^5\,\text{Sin}\left[\frac{3\,f\,x}{2}\right]-50\,c^5\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+$$

$$130\,c^4\,d\,\text{Sin}\left[e-\frac{f\,x}{2}\right]-10\,c^3\,d^2\,\text{Sin}\left[e-\frac{f\,x}{2}\right]-1030\,c^2\,d^3\,\text{Sin}\left[e-\frac{f\,x}{2}\right]-990\,c\,d^4\,\text{Sin}\left[e-\frac{f\,x}{2}\right]-150\,d^5\,\text{Sin}\left[e-\frac{f\,x}{2}\right]+50\,c^5\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-$$

$$130\,c^4\,d\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+10\,c^3\,d^2\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+1030\,c^2\,d^3\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+765\,c\,d^4\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-150\,d^5\,\text{Sin}\left[e+\frac{f\,x}{2}\right]-55\,c^5\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]+$$

$$135\,c^4\,d\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-20\,c^3\,d^2\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-810\,c^2\,d^3\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-675\,c\,d^4\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-150\,d^5\,\text{Sin}\left[2\,e+\frac{f\,x}{2}\right]-$$

$$30\,c^5\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+90\,c^4\,d\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-60\,c^3\,d^2\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-360\,c^2\,d^3\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]-30\,c\,d^4\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+75\,d^5\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+$$

$$47\,c^5\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-137\,c^4\,d\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]+88\,c^3\,d^2\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]+812\,c^2\,d^3\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]+525\,c\,d^4\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-$$

$$75\,d^5\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-30\,c^5\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+90\,c^4\,d\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]-60\,c^3\,d^2\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]-360\,c^2\,d^3\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]-$$

$$195\,c\,d^4\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]-75\,d^5\,\text{Sin}\left[3\,e+\frac{3\,f\,x}{2}\right]+20\,c^5\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-76\,c^4\,d\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]+106\,c^3\,d^2\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]+$$

$$346\,c^2\,d^3\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]+219\,c\,d^4\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]+15\,d^5\,\text{Sin}\left[e+\frac{5\,f\,x}{2}\right]-15\,c^5\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+45\,c^4\,d\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-$$

$$30\,c^3\,d^2\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-90\,c^2\,d^3\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+75\,c\,d^4\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+15\,d^5\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]+20\,c^5\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-$$

$$76\,c^4\,d\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]+106\,c^3\,d^2\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]+346\,c^2\,d^3\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]+144\,c\,d^4\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-15\,d^5\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]-$$

$$15\,c^5\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+45\,c^4\,d\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]-30\,c^3\,d^2\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]-90\,c^2\,d^3\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]-15\,d^5\,\text{Sin}\left[4\,e+\frac{5\,f\,x}{2}\right]+$$

$$7\,c^5\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]-27\,c^4\,d\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]+38\,c^3\,d^2\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]+72\,c^2\,d^3\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]+15\,c\,d^4\,\text{Sin}\left[2\,e+\frac{7\,f\,x}{2}\right]+$$

$$15\,c\,d^4\,\text{Sin}\left[3\,e+\frac{7\,f\,x}{2}\right]+7\,c^5\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]-27\,c^4\,d\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]+38\,c^3\,d^2\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]+72\,c^2\,d^3\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]\Bigg)$$

- **Problem 233: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]}{(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3}\,dx$$

Optimal (type 3, 368 leaves, 9 steps):

$$-\frac{d^3\left(20\,c^2+30\,c\,d+13\,d^2\right)\text{ArcTanh}\left[\frac{\sqrt{c-d}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{c+d}}\right]}{a^3\,(c-d)^{11/2}\,(c+d)^{5/2}\,f}+\frac{d\left(4\,c^3-30\,c^2\,d+146\,c\,d^2+195\,d^3\right)\text{Tan}[e+f\,x]}{30\,a^3\,(c-d)^4\,(c+d)\,f\,(c+d\,\text{Sec}[e+f\,x])^2}+$$
$$\frac{\text{Tan}[e+f\,x]}{5\,(c-d)\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^2}+\frac{(2\,c-11\,d)\,\text{Tan}[e+f\,x]}{15\,a\,(c-d)^2\,f\,(a+a\,\text{Sec}[e+f\,x])^2\,(c+d\,\text{Sec}[e+f\,x])^2}+$$
$$\frac{\left(2\,c^2-15\,c\,d+76\,d^2\right)\text{Tan}[e+f\,x]}{15\,(c-d)^3\,f\left(a^3+a^3\,\text{Sec}[e+f\,x]\right)(c+d\,\text{Sec}[e+f\,x])^2}+\frac{d\left(4\,c^4-30\,c^3\,d+142\,c^2\,d^2+525\,c\,d^3+304\,d^4\right)\text{Tan}[e+f\,x]}{30\,a^3\,(c-d)^5\,(c+d)^2\,f\,(c+d\,\text{Sec}[e+f\,x])}$$

Result (type 3, 1096 leaves):

$$\frac{4\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}\left[\frac{e}{2}\right]\,\text{Sec}[e+f\,x]^6\,\left(-8\,c\,\text{Sin}\left[\frac{e}{2}\right]+23\,d\,\text{Sin}\left[\frac{e}{2}\right]\right)}{15\,(-c+d)^4\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3}+$$

$$\left(\left(20\,c^2+30\,c\,d+13\,d^2\right)\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}[e+f\,x]^6\right.$$

$$\left(-\left(8\,i\,d^3\,\text{ArcTan}\left[\text{Sec}\left[\frac{f\,x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}\right)\left(-i\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]+i\,c\,\text{Sin}\left[e+\frac{f\,x}{2}\right]\right)\right]\right.\right.$$

$$\left.\text{Cos}[e]\right)\Big/\left(\sqrt{c^2-d^2}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)-$$

$$\left(8\,d^3\,\text{ArcTan}\left[\text{Sec}\left[\frac{f\,x}{2}\right]\left(\frac{\text{Cos}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}-\frac{i\,\text{Sin}[e]}{\sqrt{c^2-d^2}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}}\right)\left(-i\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]+i\,c\,\text{Sin}\left[e+\frac{f\,x}{2}\right]\right)\right]\right.$$

$$\left.\left.\left.\text{Sin}[e]\right)\Big/\left(\sqrt{c^2-d^2}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)\right)\right)\Big/$$

$$\left((-c+d)^5\,(c+d)^2\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3\right)-\frac{2\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}\left[\frac{e}{2}\right]\,\text{Sec}[e+f\,x]^6\,\text{Sin}\left[\frac{f\,x}{2}\right]}{5\,(-c+d)^3\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3}+$$

$$\frac{4\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^3\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}\left[\frac{e}{2}\right]\,\text{Sec}[e+f\,x]^6\,\left(-8\,c\,\text{Sin}\left[\frac{f\,x}{2}\right]+23\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]\right)}{15\,(-c+d)^4\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3}-$$

$$\left(8\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^5\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}\left[\frac{e}{2}\right]\,\text{Sec}[e+f\,x]^6\,\left(7\,c^2\,\text{Sin}\left[\frac{f\,x}{2}\right]-44\,c\,d\,\text{Sin}\left[\frac{f\,x}{2}\right]+127\,d^2\,\text{Sin}\left[\frac{f\,x}{2}\right]\right)\right)\Big/$$

$$\left(15\,(-c+d)^5\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3\right)+$$

$$\frac{4\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(d+c\,\text{Cos}[e+f\,x])\,\text{Sec}[e]\,\text{Sec}[e+f\,x]^6\,\left(d^6\,\text{Sin}[e]-c\,d^5\,\text{Sin}[f\,x]\right)}{c^2\,(-c+d)^4\,(c+d)\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3}-$$

$$\left(4\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^6\,(d+c\,\text{Cos}[e+f\,x])^2\,\text{Sec}[e]\,\text{Sec}[e+f\,x]^6\right.$$

$$\left.\left(-11\,c^2\,d^5\,\text{Sin}[e]-6\,c\,d^6\,\text{Sin}[e]+2\,d^7\,\text{Sin}[e]+10\,c^3\,d^4\,\text{Sin}[f\,x]+6\,c^2\,d^5\,\text{Sin}[f\,x]-c\,d^6\,\text{Sin}[f\,x]\right)\right)\Big/$$

$$\left(c^2\,(-c+d)^5\,(c+d)^2\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3\right)-$$

$$\frac{2\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\,(d+c\,\text{Cos}[e+f\,x])^3\,\text{Sec}[e+f\,x]^6\,\text{Tan}\left[\frac{e}{2}\right]}{5\,(-c+d)^3\,f\,(a+a\,\text{Sec}[e+f\,x])^3\,(c+d\,\text{Sec}[e+f\,x])^3}$$

- **Problem 239: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(g \operatorname{Sec}[e+f x])^{3/2} \sqrt{a+a \operatorname{Sec}[e+f x]}}{c+d \operatorname{Sec}[e+f x]} \, dx$$

Optimal (type 3, 149 leaves, 5 steps):

$$\frac{2 \sqrt{a}\, g^{3/2} \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{g} \operatorname{Tan}[e+f x]}{\sqrt{g \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}\right]}{d f}-\frac{2 \sqrt{a} \sqrt{c}\, g^{3/2} \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{c} \sqrt{g} \operatorname{Tan}[e+f x]}{\sqrt{c+d} \sqrt{g \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}\right]}{d \sqrt{c+d}\, f}$$

Result (type 3, 427 leaves):

$$\frac{1}{4 \left(i+\sqrt{2}\right) d \sqrt{c+d}\, f \sqrt{g \operatorname{Sec}[e+f x]}} \left(-2 i+\sqrt{2}\right) g^2$$
$$\left(2 \sqrt{c+d} \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(e+f x)\right]-\left(-1+\sqrt{2}\right) \operatorname{Sin}\left[\frac{1}{4}(e+f x)\right]}{\left(1+\sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{4}(e+f x)\right]}\right]+2 \sqrt{c+d} \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(e+f x)\right]-\left(1+\sqrt{2}\right) \operatorname{Sin}\left[\frac{1}{4}(e+f x)\right]}{\left(-1+\sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4}(e+f x)\right]-\operatorname{Sin}\left[\frac{1}{4}(e+f x)\right]}\right]+\right.$$
$$i \left(2 \sqrt{c+d} \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\sqrt{c+d} \operatorname{Log}\left[2-\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-\right.$$
$$\sqrt{c+d} \operatorname{Log}\left[2+\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+2 \sqrt{c} \operatorname{Log}\left[\sqrt{2} \sqrt{c+d}-2 \sqrt{c} \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-$$
$$\left.\left.2 \sqrt{c} \operatorname{Log}\left[\sqrt{2} \sqrt{c+d}+2 \sqrt{c} \operatorname{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)\right) \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right] \sqrt{a (1+\operatorname{Sec}[e+f x])}$$

- **Problem 243: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(g \operatorname{Sec}[e+f x])^{5/2}}{\sqrt{a+a \operatorname{Sec}[e+f x]}\, (c+d \operatorname{Sec}[e+f x])} \, dx$$

Optimal (type 3, 231 leaves, 8 steps):

$$\frac{2 g^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{g} \operatorname{Tan}[e+f x]}{\sqrt{g \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}\right]}{\sqrt{a}\, d f}+\frac{\sqrt{2}\, g^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{g} \operatorname{Tan}[e+f x]}{\sqrt{2} \sqrt{g \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}\right]}{\sqrt{a}\, (c-d) f}-\frac{2 c^{3/2} g^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{c} \sqrt{g} \operatorname{Tan}[e+f x]}{\sqrt{c+d} \sqrt{g \operatorname{Sec}[e+f x]} \sqrt{a+a \operatorname{Sec}[e+f x]}}\right]}{\sqrt{a}\, (c-d) d \sqrt{c+d}\, f}$$

Result (type 3, 1097 leaves):

$$\frac{1}{2\left(i+\sqrt{2}\right) d\,(-c+d)\sqrt{c+d}\, f\sqrt{a\,(1+\text{Sec}[e+f x])}}$$

$$g^2 \text{Cos}\left[\frac{1}{2}(e+f x)\right]\left(-2\left(-2 i+\sqrt{2}\right)(c-d)\sqrt{c+d}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(e+f x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\text{Sin}\left[\frac{1}{4}(e+f x)\right]}\right]-\right.$$

$$2\left(-2 i+\sqrt{2}\right)(c-d)\sqrt{c+d}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(e+f x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\text{Sin}\left[\frac{1}{4}(e+f x)\right]}\right]+4 i d\sqrt{c+d}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\text{Sin}\left[\frac{1}{4}(e+f x)\right]\right]+$$

$$4\sqrt{2}\, d\sqrt{c+d}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(e+f x)\right]-\text{Sin}\left[\frac{1}{4}(e+f x)\right]\right]-4 i d\sqrt{c+d}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(e+f x)\right]+\text{Sin}\left[\frac{1}{4}(e+f x)\right]\right]-$$

$$4\sqrt{2}\, d\sqrt{c+d}\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(e+f x)\right]+\text{Sin}\left[\frac{1}{4}(e+f x)\right]\right]-4 c\sqrt{c+d}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-$$

$$2 i\sqrt{2}\, c\sqrt{c+d}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+4 d\sqrt{c+d}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+2 i\sqrt{2}\, d\sqrt{c+d}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+$$

$$2 c\sqrt{c+d}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+i\sqrt{2}\, c\sqrt{c+d}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-$$

$$2 d\sqrt{c+d}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-i\sqrt{2}\, d\sqrt{c+d}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+$$

$$2 c\sqrt{c+d}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+i\sqrt{2}\, c\sqrt{c+d}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-$$

$$2 d\sqrt{c+d}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-i\sqrt{2}\, d\sqrt{c+d}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-$$

$$4 c^{3/2}\,\text{Log}\left[\sqrt{2}\sqrt{c+d}-2\sqrt{c}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]-2 i\sqrt{2}\, c^{3/2}\,\text{Log}\left[\sqrt{2}\sqrt{c+d}-2\sqrt{c}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+$$

$$\left.4 c^{3/2}\,\text{Log}\left[\sqrt{2}\sqrt{c+d}+2\sqrt{c}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+2 i\sqrt{2}\, c^{3/2}\,\text{Log}\left[\sqrt{2}\sqrt{c+d}+2\sqrt{c}\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)\sqrt{g\,\text{Sec}[e+f x]}$$

Problem 245: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]\,(a+b\,\text{Sec}[e+f x])\,(c+d\,\text{Sec}[e+f x])^3\,dx$$

Optimal (type 3, 180 leaves, 7 steps):

$$\frac{\left(8 a c^3+12 b c^2 d+12 a c d^2+3 b d^3\right)\text{ArcTanh}[\text{Sin}[e+f x]]}{8 f}+\frac{\left(4 a d\left(4 c^2+d^2\right)+3 b\left(c^3+4 c d^2\right)\right)\text{Tan}[e+f x]}{6 f}+$$

$$\frac{d\left(6 b c^2+20 a c d+9 b d^2\right)\text{Sec}[e+f x]\,\text{Tan}[e+f x]}{24 f}+\frac{(3 b c+4 a d)\,(c+d\,\text{Sec}[e+f x])^2\,\text{Tan}[e+f x]}{12 f}+\frac{b\,(c+d\,\text{Sec}[e+f x])^3\,\text{Tan}[e+f x]}{4 f}$$

Result (type 3, 1179 leaves):

$$\left(\left(-8 a c^3-12 b c^2 d-12 a c d^2-3 b d^3\right) \text{Cos}[e+f x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right] (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3\right)\Big/$$
$$\left(8 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3\right)+$$
$$\left(\left(8 a c^3+12 b c^2 d+12 a c d^2+3 b d^3\right) \text{Cos}[e+f x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right] (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3\right)\Big/$$
$$\left(8 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3\right)+\frac{b d^3 \text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3}{16 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^4}+$$
$$\frac{\left(36 b c^2 d+36 a c d^2+12 b c d^2+4 a d^3+9 b d^3\right) \text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3}{48 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^2}-$$
$$\frac{b d^3 \text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3}{16 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^4}+$$
$$\frac{\left(-36 b c^2 d-36 a c d^2-12 b c d^2-4 a d^3-9 b d^3\right) \text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3}{48 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^2}+$$
$$\frac{\text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3 \left(3 b c d^2 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+a d^3 \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)}{6 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^3}+$$
$$\frac{\text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^3 \left(3 b c d^2 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+a d^3 \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)}{6 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^3}+\Big(\text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x])$$
$$(c+d \text{Sec}[e+f x])^3 \left(3 b c^3 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+9 a c^2 d \text{Sin}\left[\frac{1}{2} (e+f x)\right]+6 b c d^2 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+2 a d^3 \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)\Big)\Big/$$
$$\left(3 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)\right)+\Big(\text{Cos}[e+f x]^4 (a+b \text{Sec}[e+f x])$$
$$(c+d \text{Sec}[e+f x])^3 \left(3 b c^3 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+9 a c^2 d \text{Sin}\left[\frac{1}{2} (e+f x)\right]+6 b c d^2 \text{Sin}\left[\frac{1}{2} (e+f x)\right]+2 a d^3 \text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)\Big)\Big/$$
$$\left(3 f (b+a \text{Cos}[e+f x]) (d+c \text{Cos}[e+f x])^3 \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)\right)$$

- **Problem 246: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f x] (a+b \text{Sec}[e+f x]) (c+d \text{Sec}[e+f x])^2 \, dx$$

Optimal (type 3, 115 leaves, 6 steps):

$$\frac{\left(2\,b\,c\,d+a\,\left(2\,c^2+d^2\right)\right)\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,f}+\frac{2\,\left(3\,a\,c\,d+b\,\left(c^2+d^2\right)\right)\,\text{Tan}[e+f\,x]}{3\,f}+\frac{d\,(2\,b\,c+3\,a\,d)\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{6\,f}+\frac{b\,(c+d\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{3\,f}$$

Result (type 3, 239 leaves) :

$$\frac{1}{6\,f}\,\text{Sec}[e+f\,x]^3\,\left(-\frac{9}{4}\,\left(2\,b\,c\,d+a\,\left(2\,c^2+d^2\right)\right)\,\text{Cos}[e+f\,x]\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\right)-\frac{3}{4}\,\left(2\,b\,c\,d+a\,\left(2\,c^2+d^2\right)\right)\,\text{Cos}[3\,(e+f\,x)]\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\right)+\left(3\,b\,c^2+6\,a\,c\,d+4\,b\,d^2+3\,d\,(2\,b\,c+a\,d)\,\text{Cos}[e+f\,x]+\left(3\,b\,c^2+6\,a\,c\,d+2\,b\,d^2\right)\,\text{Cos}[2\,(e+f\,x)]\right)\,\text{Sin}[e+f\,x]\right)$$

Problem 247: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f\,x]\,(a+b\,\text{Sec}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])\,dx$$

Optimal (type 3, 61 leaves, 5 steps) :

$$\frac{(2\,a\,c+b\,d)\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,f}+\frac{(b\,c+a\,d)\,\text{Tan}[e+f\,x]}{f}+\frac{b\,d\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{2\,f}$$

Result (type 3, 164 leaves) :

$$\frac{1}{4\,f}\left(-2\,(2\,a\,c+b\,d)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+4\,a\,c\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+2\,b\,d\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+\frac{b\,d}{\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)^2}-\frac{b\,d}{\left(\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right)^2}+4\,(b\,c+a\,d)\,\text{Tan}[e+f\,x]\right)$$

Problem 252: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f\,x]\,(c+d\,\text{Sec}[e+f\,x])^4}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 3, 247 leaves, 12 steps) :

$$\frac{d^3\,(4\,b\,c-a\,d)\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{2\,b^2\,f}+\frac{d\,(2\,b\,c-a\,d)\,\left(2\,b^2\,c^2-2\,a\,b\,c\,d+a^2\,d^2\right)\,\text{ArcTanh}[\text{Sin}[e+f\,x]]}{b^4\,f}+\frac{2\,(b\,c-a\,d)^4\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\,b^4\,\sqrt{a+b}\,f}+\frac{d^4\,\text{Tan}[e+f\,x]}{b\,f}+\frac{d^2\,\left(6\,b^2\,c^2-4\,a\,b\,c\,d+a^2\,d^2\right)\,\text{Tan}[e+f\,x]}{b^3\,f}+\frac{d^3\,(4\,b\,c-a\,d)\,\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{2\,b^2\,f}+\frac{d^4\,\text{Tan}[e+f\,x]^3}{3\,b\,f}$$

Result (type 3, 1150 leaves) :

$$-\frac{2\,(b\,c-a\,d)^4\,\text{ArcTanh}\Big[\frac{(-a+b)\,\text{Tan}\big[\frac{1}{2}\,(e+f\,x)\big]}{\sqrt{a^2-b^2}}\Big]\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^4}{b^4\,\sqrt{a^2-b^2}\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])}+$$

$$\Big(\big(-8\,b^3\,c^3\,d+12\,a\,b^2\,c^2\,d^2-8\,a^2\,b\,c\,d^3-4\,b^3\,c\,d^3+2\,a^3\,d^4+a\,b^2\,d^4\big)\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])$$
$$\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\,(c+d\,\text{Sec}[e+f\,x])^4\Big)\Big/\Big(2\,b^4\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\Big)+$$

$$\Big(\big(8\,b^3\,c^3\,d-12\,a\,b^2\,c^2\,d^2+8\,a^2\,b\,c\,d^3+4\,b^3\,c\,d^3-2\,a^3\,d^4-a\,b^2\,d^4\big)\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])$$
$$\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\,(c+d\,\text{Sec}[e+f\,x])^4\Big)\Big/\Big(2\,b^4\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\Big)+$$

$$\frac{\big(12\,b\,c\,d^3-3\,a\,d^4+b\,d^4\big)\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^4}{12\,b^2\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\,\big(\text{Cos}\big[\frac{1}{2}\,(e+f\,x)\big]-\text{Sin}\big[\frac{1}{2}\,(e+f\,x)\big]\big)^2}+$$

$$\frac{d^4\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^4\,\text{Sin}\big[\frac{1}{2}\,(e+f\,x)\big]}{6\,b\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\,\big(\text{Cos}\big[\frac{1}{2}\,(e+f\,x)\big]-\text{Sin}\big[\frac{1}{2}\,(e+f\,x)\big]\big)^3}+$$

$$\frac{d^4\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^4\,\text{Sin}\big[\frac{1}{2}\,(e+f\,x)\big]}{6\,b\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\,\big(\text{Cos}\big[\frac{1}{2}\,(e+f\,x)\big]+\text{Sin}\big[\frac{1}{2}\,(e+f\,x)\big]\big)^3}+$$

$$\frac{\big(-12\,b\,c\,d^3+3\,a\,d^4-b\,d^4\big)\,\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^4}{12\,b^2\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\,\big(\text{Cos}\big[\frac{1}{2}\,(e+f\,x)\big]+\text{Sin}\big[\frac{1}{2}\,(e+f\,x)\big]\big)^2}+$$

$$\Big(\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])\,(c+d\,\text{Sec}[e+f\,x])^4$$
$$\Big(18\,b^2\,c^2\,d^2\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]-12\,a\,b\,c\,d^3\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]+3\,a^2\,d^4\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]+2\,b^2\,d^4\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big)\Big/$$
$$\Big(3\,b^3\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\,\Big(\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big)+\Big(\text{Cos}[e+f\,x]^3\,(b+a\,\text{Cos}[e+f\,x])$$
$$(c+d\,\text{Sec}[e+f\,x])^4\,\Big(18\,b^2\,c^2\,d^2\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]-12\,a\,b\,c\,d^3\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]+3\,a^2\,d^4\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]+2\,b^2\,d^4\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big)\Big/$$
$$\Big(3\,b^3\,f\,(d+c\,\text{Cos}[e+f\,x])^4\,(a+b\,\text{Sec}[e+f\,x])\,\Big(\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big)$$

Problem 253: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]\,(c+d\,\text{Sec}[e+f x])^3}{a+b\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 3, 170 leaves, 10 steps):

$$\frac{d^3\,\text{ArcTanh}[\text{Sin}[e+f x]]}{2 b f}+\frac{d\left(3 b^2 c^2-3 a b c d+a^2 d^2\right)\text{ArcTanh}[\text{Sin}[e+f x]]}{b^3 f}+$$
$$\frac{2\,(b c-a d)^3\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\,b^3\sqrt{a+b}\,f}+\frac{d^2\,(3 b c-a d)\,\text{Tan}[e+f x]}{b^2 f}+\frac{d^3\,\text{Sec}[e+f x]\,\text{Tan}[e+f x]}{2 b f}$$

Result (type 3, 389 leaves):

$$\frac{1}{4 b^3 f\,(d+c\,\text{Cos}[e+f x])^3\,(a+b\,\text{Sec}[e+f x])}\text{Cos}[e+f x]^2\,(b+a\,\text{Cos}[e+f x])\,(c+d\,\text{Sec}[e+f x])^3$$
$$\left(\frac{8\,(-b c+a d)^3\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}}-2 d\left(-6 a b c d+2 a^2 d^2+b^2\left(6 c^2+d^2\right)\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+\right.$$
$$2 d\left(-6 a b c d+2 a^2 d^2+b^2\left(6 c^2+d^2\right)\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]+\frac{b^2 d^3}{\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+$$
$$\left.\frac{4 b d^2\,(3 b c-a d)\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]}-\frac{b^2 d^3}{\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+\frac{4 b d^2\,(3 b c-a d)\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]}{\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]}\right)$$

Problem 258: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]\,(c+d\,\text{Sec}[e+f x])^5}{(a+b\,\text{Sec}[e+f x])^2}\,dx$$

Optimal (type 3, 379 leaves, 16 steps):

$$\frac{d^4 (5 b c - 2 a d) \text{ArcTanh}[\text{Sin}[e + f x]]}{2 b^3 f} + \frac{d^2 \left(10 b^3 c^3 - 20 a b^2 c^2 d + 15 a^2 b c d^2 - 4 a^3 d^3\right) \text{ArcTanh}[\text{Sin}[e + f x]]}{b^5 f} +$$

$$\frac{2 (b c - a d)^5 \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a+b}}\right]}{a (a - b)^{3/2} b^3 (a + b)^{3/2} f} + \frac{2 (b c - a d)^4 (b c + 4 a d) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{a+b}}\right]}{a \sqrt{a - b} b^5 \sqrt{a + b} f} - \frac{(b c - a d)^5 \text{Sin}[e + f x]}{b^4 \left(a^2 - b^2\right) f (b + a \text{Cos}[e + f x])} +$$

$$\frac{d^5 \text{Tan}[e + f x]}{b^2 f} + \frac{d^3 \left(10 b^2 c^2 - 10 a b c d + 3 a^2 d^2\right) \text{Tan}[e + f x]}{b^4 f} + \frac{d^4 (5 b c - 2 a d) \text{Sec}[e + f x] \text{Tan}[e + f x]}{2 b^3 f} + \frac{d^5 \text{Tan}[e + f x]^3}{3 b^2 f}$$

Result (type 3, 1137 leaves) :

$$-\left(2 (b c - a d)^4 \left(-a b c - 4 a^2 d + 5 b^2 d\right) \text{ArcTanh}\left[\frac{(-a + b) \text{Tan}\left[\frac{1}{2} (e + f x)\right]}{\sqrt{a^2 - b^2}}\right] \text{Cos}[e + f x]^3 (b + a \text{Cos}[e + f x])^2 (c + d \text{Sec}[e + f x])^5\right) \Big/$$

$$\left(b^5 \sqrt{a^2 - b^2} \left(-a^2 + b^2\right) f (d + c \text{Cos}[e + f x])^5 (a + b \text{Sec}[e + f x])^2\right) +$$

$$\left(\left(-20 b^3 c^3 d^2 + 40 a b^2 c^2 d^3 - 30 a^2 b c d^4 - 5 b^3 c d^4 + 8 a^3 d^5 + 2 a b^2 d^5\right) \text{Cos}[e + f x]^3 (b + a \text{Cos}[e + f x])^2\right.$$

$$\left.\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e + f x)\right] - \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right] (c + d \text{Sec}[e + f x])^5\right) \Big/ \left(2 b^5 f (d + c \text{Cos}[e + f x])^5 (a + b \text{Sec}[e + f x])^2\right) +$$

$$\left(\left(20 b^3 c^3 d^2 - 40 a b^2 c^2 d^3 + 30 a^2 b c d^4 + 5 b^3 c d^4 - 8 a^3 d^5 - 2 a b^2 d^5\right) \text{Cos}[e + f x]^3 (b + a \text{Cos}[e + f x])^2\right.$$

$$\left.\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e + f x)\right] + \text{Sin}\left[\frac{1}{2} (e + f x)\right]\right] (c + d \text{Sec}[e + f x])^5\right) \Big/ \left(2 b^5 f (d + c \text{Cos}[e + f x])^5 (a + b \text{Sec}[e + f x])^2\right) +$$

$$\frac{1}{24 b^4 \left(-a^2 + b^2\right) f (d + c \text{Cos}[e + f x])^5 (a + b \text{Sec}[e + f x])^2} (b + a \text{Cos}[e + f x]) (c + d \text{Sec}[e + f x])^5$$

$$\left(-60 a^2 b^3 c^2 d^3 \text{Sin}[e + f x] + 60 b^5 c^2 d^3 \text{Sin}[e + f x] + 45 a^3 b^2 c d^4 \text{Sin}[e + f x] - 45 a b^4 c d^4 \text{Sin}[e + f x] - 12 a^4 b d^5 \text{Sin}[e + f x] +\right.$$
$$12 b^5 d^5 \text{Sin}[e + f x] + 6 b^5 c^5 \text{Sin}[2 (e + f x)] - 30 a b^4 c^4 d \text{Sin}[2 (e + f x)] + 60 a^2 b^3 c^3 d^2 \text{Sin}[2 (e + f x)] -$$
$$120 a^3 b^2 c^2 d^3 \text{Sin}[2 (e + f x)] + 60 a b^4 c^2 d^3 \text{Sin}[2 (e + f x)] + 90 a^4 b c d^4 \text{Sin}[2 (e + f x)] - 90 a^2 b^3 c d^4 \text{Sin}[2 (e + f x)] +$$
$$30 b^5 c d^4 \text{Sin}[2 (e + f x)] - 24 a^5 d^5 \text{Sin}[2 (e + f x)] + 22 a^3 b^2 d^5 \text{Sin}[2 (e + f x)] - 4 a b^4 d^5 \text{Sin}[2 (e + f x)] -$$
$$60 a^2 b^3 c^2 d^3 \text{Sin}[3 (e + f x)] + 60 b^5 c^2 d^3 \text{Sin}[3 (e + f x)] + 45 a^3 b^2 c d^4 \text{Sin}[3 (e + f x)] - 45 a b^4 c d^4 \text{Sin}[3 (e + f x)] -$$
$$12 a^4 b d^5 \text{Sin}[3 (e + f x)] + 8 a^2 b^3 d^5 \text{Sin}[3 (e + f x)] + 4 b^5 d^5 \text{Sin}[3 (e + f x)] + 3 b^5 c^5 \text{Sin}[4 (e + f x)] - 15 a b^4 c^4 d \text{Sin}[4 (e + f x)] +$$
$$30 a^2 b^3 c^3 d^2 \text{Sin}[4 (e + f x)] - 60 a^3 b^2 c^2 d^3 \text{Sin}[4 (e + f x)] + 30 a b^4 c^2 d^3 \text{Sin}[4 (e + f x)] + 45 a^4 b c d^4 \text{Sin}[4 (e + f x)] -$$
$$\left.30 a^2 b^3 c d^4 \text{Sin}[4 (e + f x)] - 12 a^5 d^5 \text{Sin}[4 (e + f x)] + 7 a^3 b^2 d^5 \text{Sin}[4 (e + f x)] + 2 a b^4 d^5 \text{Sin}[4 (e + f x)]\right)$$

- **Problem 264: Unable to integrate problem.**

$$\int \frac{\text{Sec}[e + f x] \sqrt{a + b \text{Sec}[e + f x]}}{c + d \text{Sec}[e + f x]} \, dx$$

Optimal (type 4, 213 leaves, 3 steps) :

$$\frac{2\sqrt{a+b}\;\text{Cot}[e+f x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{d f}-$$

$$\frac{2\,(b c-a d)\;\text{EllipticPi}\left[\frac{2 d}{c+d},\text{ArcSin}\left[\frac{\sqrt{1-\text{Sec}[e+f x]}}{\sqrt{2}}\right],\frac{2 b}{a+b}\right]\sqrt{\frac{a+b\,\text{Sec}[e+f x]}{a+b}}\;\text{Tan}[e+f x]}{d\,(c+d)\,f\sqrt{a+b\,\text{Sec}[e+f x]}\;\sqrt{-\text{Tan}[e+f x]^2}}$$

Result (type 8, 35 leaves) :

$$\int \frac{\text{Sec}[e+f x]\;\sqrt{a+b\,\text{Sec}[e+f x]}}{c+d\,\text{Sec}[e+f x]}\,dx$$

Problem 265: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x]\;\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{c+d\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 4, 196 leaves, 1 step) :

$$\frac{1}{d\sqrt{\frac{a+b}{c+d}}\;f}2\,\text{Cot}[e+f x]\;\text{EllipticPi}\left[\frac{b\,(c+d)}{(a+b)\,d},\text{ArcSin}\left[\frac{\sqrt{\frac{a+b}{c+d}}\;\sqrt{c+d\,\text{Sec}[e+f x]}}{\sqrt{a+b\,\text{Sec}[e+f x]}}\right],\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]$$

$$\sqrt{-\frac{(b c-a d)\,(1-\text{Sec}[e+f x])}{(c+d)\,(a+b\,\text{Sec}[e+f x])}}\;\sqrt{\frac{(b c-a d)\,(1+\text{Sec}[e+f x])}{(c-d)\,(a+b\,\text{Sec}[e+f x])}}\;(a+b\,\text{Sec}[e+f x])$$

Result (type 8, 37 leaves) :

$$\int \frac{\text{Sec}[e+f x]\;\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{c+d\,\text{Sec}[e+f x]}}\,dx$$

Problem 269: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x]^2}{\sqrt{a+b\,\text{Sec}[e+f x]}\;\sqrt{c+d\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 4, 396 leaves, 3 steps) :

$$\frac{1}{b\,d\,\sqrt{\frac{a+b}{c+d}}\,f}2\,\text{Cot}[e+f\,x]\,\text{EllipticPi}\left[\frac{b\,(c+d)}{(a+b)\,d},\,\text{ArcSin}\left[\frac{\sqrt{\frac{a+b}{c+d}}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}}\right],\,\frac{(a-b)\,(c+d)}{(a+b)\,(c-d)}\right]$$

$$\sqrt{-\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(c+d)\,(a+b\,\text{Sec}[e+f\,x])}}\,\sqrt{\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(c-d)\,(a+b\,\text{Sec}[e+f\,x])}}\,(a+b\,\text{Sec}[e+f\,x])-$$

$$\frac{1}{b\,\sqrt{c+d}\,(b\,c-a\,d)\,f}2\,a\,\sqrt{a+b}\,\text{Cot}[e+f\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{c+d}\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}\right],\,\frac{(a+b)\,(c-d)}{(a-b)\,(c+d)}\right]$$

$$\sqrt{\frac{(b\,c-a\,d)\,(1-\text{Sec}[e+f\,x])}{(a+b)\,(c+d\,\text{Sec}[e+f\,x])}}\,\sqrt{-\frac{(b\,c-a\,d)\,(1+\text{Sec}[e+f\,x])}{(a-b)\,(c+d\,\text{Sec}[e+f\,x])}}\,(c+d\,\text{Sec}[e+f\,x])$$

Result (type 8, 39 leaves) :

$$\int\frac{\text{Sec}[e+f\,x]^2}{\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}\,dx$$

- **Problem 270: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{(g\,\text{Sec}[e+f\,x])^{3/2}\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 170 leaves, 7 steps) :

$$\frac{2\,d\,g\,\sqrt{\frac{d+c\,\text{Cos}[e+f\,x]}{c+d}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(e+f\,x),\,\frac{2\,c}{c+d}\right]\,\sqrt{g\,\text{Sec}[e+f\,x]}}{b\,f\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}+$$

$$\frac{2\,(b\,c-a\,d)\,g\,\sqrt{\frac{d+c\,\text{Cos}[e+f\,x]}{c+d}}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(e+f\,x),\,\frac{2\,c}{c+d}\right]\,\sqrt{g\,\text{Sec}[e+f\,x]}}{b\,(a+b)\,f\,\sqrt{c+d\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 223 leaves) :

$$-\left(2\,i\,g\sqrt{-\frac{c\,(-1+\text{Cos}[e+f\,x])}{c+d}}\sqrt{\frac{c\,(1+\text{Cos}[e+f\,x])}{c-d}}\,\text{Cot}[e+f\,x]\left(\text{EllipticPi}\left[1-\frac{c}{d},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{c-d}}\sqrt{d+c\,\text{Cos}[e+f\,x]}\right],\,\frac{-c+d}{c+d}\right]-\text{EllipticPi}\left[\frac{a\,(-c+d)}{-b\,c+a\,d},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{c-d}}\sqrt{d+c\,\text{Cos}[e+f\,x]}\right],\,\frac{-c+d}{c+d}\right]\right)\sqrt{g\,\text{Sec}[e+f\,x]}\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)\Big/\left(b\sqrt{\frac{1}{c-d}}\,f\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)$$

- **Problem 272: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\sqrt{g\,\text{Sec}[e+f\,x]}\sqrt{c+d\,\text{Sec}[e+f\,x]}}{a+b\,\text{Cos}[e+f\,x]}\,dx$$

Optimal (type 4, 168 leaves, 8 steps):

$$\frac{2\,d\sqrt{\frac{d+c\,\text{Cos}[e+f\,x]}{c+d}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(e+f\,x),\,\frac{2\,c}{c+d}\right]\sqrt{g\,\text{Sec}[e+f\,x]}}{a\,f\sqrt{c+d\,\text{Sec}[e+f\,x]}}+\frac{2\,(a\,c-b\,d)\sqrt{\frac{d+c\,\text{Cos}[e+f\,x]}{c+d}}\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,(e+f\,x),\,\frac{2\,c}{c+d}\right]\sqrt{g\,\text{Sec}[e+f\,x]}}{a\,(a+b)\,f\sqrt{c+d\,\text{Sec}[e+f\,x]}}$$

Result (type 4, 222 leaves):

$$-\left(2\,i\sqrt{-\frac{c\,(-1+\text{Cos}[e+f\,x])}{c+d}}\sqrt{\frac{c\,(1+\text{Cos}[e+f\,x])}{c-d}}\,\text{Cot}[e+f\,x]\left(\text{EllipticPi}\left[1-\frac{c}{d},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{c-d}}\sqrt{d+c\,\text{Cos}[e+f\,x]}\right],\,\frac{-c+d}{c+d}\right]-\text{EllipticPi}\left[\frac{b\,(-c+d)}{-a\,c+b\,d},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{c-d}}\sqrt{d+c\,\text{Cos}[e+f\,x]}\right],\,\frac{-c+d}{c+d}\right]\right)\sqrt{g\,\text{Sec}[e+f\,x]}\sqrt{c+d\,\text{Sec}[e+f\,x]}\right)\Big/\left(a\sqrt{\frac{1}{c-d}}\,f\sqrt{d+c\,\text{Cos}[e+f\,x]}\right)$$

Problem 273: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x] \sqrt{a+b \text{Sec}[e+f x]}}{c+c \text{Sec}[e+f x]} \, dx$$

Optimal (type 4, 95 leaves, 1 step):

$$\frac{\text{EllipticE}\left[\text{ArcSin}\left[\frac{\text{Tan}[e+f x]}{1+\text{Sec}[e+f x]}\right], \frac{a-b}{a+b}\right] \sqrt{\frac{1}{1+\text{Sec}[e+f x]}} \sqrt{a+b \text{Sec}[e+f x]}}{c f \sqrt{\frac{a+b \text{Sec}[e+f x]}{(a+b) (1+\text{Sec}[e+f x])}}}$$

Result (type 4, 1999 leaves):

$$\frac{\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sec}[e+f x] \sqrt{a+b \text{Sec}[e+f x]} \left(-2 \text{Sin}[e+f x]+2 \text{Tan}\left[\frac{1}{2} (e+f x)\right]\right)}{f (c+c \text{Sec}[e+f x])}+\left(\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sec}\left[\frac{1}{2} (e+f x)\right]^5\right.$$

$$\left(\frac{b}{\sqrt{b+a \text{Cos}[e+f x]} \sqrt{\text{Sec}[e+f x]}}+\frac{a \sqrt{\text{Sec}[e+f x]}}{\sqrt{b+a \text{Cos}[e+f x]}}+\frac{b \sqrt{\text{Sec}[e+f x]}}{\sqrt{b+a \text{Cos}[e+f x]}}+\frac{a \text{Cos}[2 (e+f x)] \sqrt{\text{Sec}[e+f x]}}{\sqrt{b+a \text{Cos}[e+f x]}}\right) \sqrt{\text{Sec}[e+f x]}$$

$$\sqrt{1+\text{Sec}[e+f x]} \sqrt{a+b \text{Sec}[e+f x]} \left(2 \text{Cos}\left[\frac{1}{2} (e+f x)\right] \sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}} \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right], \frac{a-b}{a+b}\right]+\right.$$

$$\left.\left.\sqrt{\frac{b+a \text{Cos}[e+f x]}{(a+b) (1+\text{Cos}[e+f x])}} \left(-\text{Sin}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{3}{2} (e+f x)\right]\right)\right)\right) \Big/$$

$$\left(4 f \left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2} \sqrt{\frac{b+a \text{Cos}[e+f x]}{(a+b) (1+\text{Cos}[e+f x])}} (c+c \text{Sec}[e+f x])\right.$$

$$\left(-\left(a \text{Sec}\left[\frac{1}{2} (e+f x)\right]^5 \sqrt{1+\text{Sec}[e+f x]} \text{Sin}[e+f x] \left(2 \text{Cos}\left[\frac{1}{2} (e+f x)\right] \sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}} \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (e+f x)\right]\right], \frac{a-b}{a+b}\right]+\right.\right.\right.$$

$$\left.\left.\sqrt{\frac{b+a \text{Cos}[e+f x]}{(a+b) (1+\text{Cos}[e+f x])}} \left(-\text{Sin}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{3}{2} (e+f x)\right]\right)\right)\right) \Big/$$

$$\left(8\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\sqrt{b+a\,\text{Cos}[e+f x]}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\right)-\Bigg(3\sqrt{b+a\,\text{Cos}[e+f x]}\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^5$$

$$\sqrt{1+\text{Sec}[e+f x]}\,\text{Sin}[e+f x]\Bigg(2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\Bigg)\Bigg)\Bigg/\left(8\sqrt{\frac{1}{1+\text{Cos}[e+f x]}}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\right)-$$

$$\Bigg(\sqrt{b+a\,\text{Cos}[e+f x]}\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^5\sqrt{1+\text{Sec}[e+f x]}\left(-\frac{a\,\text{Sin}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}+\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sin}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])^2}\right)$$

$$\Bigg(2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\Bigg)\Bigg)\Bigg/\left(8\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\left(\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}\right)^{3/2}\right)+$$

$$\Bigg(5\sqrt{b+a\,\text{Cos}[e+f x]}\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^5\sqrt{1+\text{Sec}[e+f x]}\Bigg(2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,\text{EllipticE}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\Big]+\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg/$$

$$\left(8\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\right)+\frac{1}{4\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}}$$

$$\sqrt{b+a\,\text{Cos}[e+f x]}\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^5\sqrt{1+\text{Sec}[e+f x]}\left(\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\left(-\frac{1}{2}\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\frac{3}{2}\text{Cos}\left[\frac{3}{2}(e+f x)\right]\right)-\right.$$

$$\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]\text{Sin}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]\left(\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right)}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}+$$

$$\frac{\left(-\frac{a\,\text{Sin}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}+\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sin}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])^2}\right)\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)}{2\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}}+$$

$$\left.\frac{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\right)+$$

$$\left(\sqrt{b+a\,\text{Cos}[e+f x]}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^5\text{Sec}[e+f x]\left(2\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]+\right.\right.$$

$$\left.\left.\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\right)\text{Tan}[e+f x]\right)\Big/$$

$$\left.\left.\left(8\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\sqrt{1+\text{Sec}[e+f x]}\right)\right)\right)$$

- **Problem 274: Unable to integrate problem.**

$$\int\frac{(g\,\text{Sec}[e+f x])^{3/2}\sqrt{a+b\,\text{Sec}[e+f x]}}{c+c\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 4, 295 leaves, 11 steps):

$$\frac{g\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{EllipticE}\left[\frac{1}{2}(e+f\,x),\frac{2a}{a+b}\right]\sqrt{g\,\mathrm{Sec}[e+f\,x]}}{c\,f\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}+\frac{(a-b)\,g\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}(e+f\,x),\frac{2a}{a+b}\right]\sqrt{g\,\mathrm{Sec}[e+f\,x]}}{c\,f\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}+$$

$$\frac{2\,b\,g\,\sqrt{\frac{b+a\,\mathrm{Cos}[e+f\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}(e+f\,x),\frac{2a}{a+b}\right]\sqrt{g\,\mathrm{Sec}[e+f\,x]}}{c\,f\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}-\frac{g\,(b+a\,\mathrm{Cos}[e+f\,x])\,\sqrt{g\,\mathrm{Sec}[e+f\,x]}\,\mathrm{Sin}[e+f\,x]}{f\,(c+c\,\mathrm{Cos}[e+f\,x])\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}$$

Result (type 8, 41 leaves):

$$\int\frac{(g\,\mathrm{Sec}[e+f\,x])^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{c+c\,\mathrm{Sec}[e+f\,x]}\,dx$$

Problem 275: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\,(c+c\,\mathrm{Sec}[e+f\,x])}\,dx$$

Optimal (type 4, 209 leaves, 3 steps):

$$-\frac{2\,\sqrt{a+b}\,\mathrm{Cot}[e+f\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[e+f\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[e+f\,x])}{a-b}}}{(a-b)\,c\,f}+$$

$$\frac{\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}[e+f\,x]}{1+\mathrm{Sec}[e+f\,x]}\right],\frac{a-b}{a+b}\right]\sqrt{\frac{1}{1+\mathrm{Sec}[e+f\,x]}}\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}}{(a-b)\,c\,f\,\sqrt{\frac{a+b\,\mathrm{Sec}[e+f\,x]}{(a+b)\,(1+\mathrm{Sec}[e+f\,x])}}}$$

Result (type 4, 2173 leaves):

$$\frac{\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\,(b+a\,\mathrm{Cos}[e+f\,x])\,\mathrm{Sec}[e+f\,x]^2\left(\frac{2\,\mathrm{Sin}[e+f\,x]}{-a+b}-\frac{2\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{-a+b}\right)}{f\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]}\,(c+c\,\mathrm{Sec}[e+f\,x])}-$$

$$\left(2\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\left(-\frac{b}{(-a+b)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}\,\sqrt{\mathrm{Sec}[e+f\,x]}}-\frac{a\,\sqrt{\mathrm{Sec}[e+f\,x]}}{(-a+b)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}+\right.\right.$$

$$\left.\frac{b\,\sqrt{\mathrm{Sec}[e+f\,x]}}{(-a+b)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}-\frac{a\,\mathrm{Cos}[2\,(e+f\,x)]\,\sqrt{\mathrm{Sec}[e+f\,x]}}{(-a+b)\,\sqrt{b+a\,\mathrm{Cos}[e+f\,x]}}\right)\mathrm{Sec}[e+f\,x]^{3/2}\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\,\mathrm{Sec}[e+f\,x]}$$

$$\Bigg((a-b)\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+$$

$$\sqrt{2}\,\sqrt{\frac{a-b}{a+b}}\,\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,(b+a\,\text{Cos}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)\Big/$$

$$\left(\left(\frac{a-b}{a+b}\right)^{3/2}(a+b)\,f\,\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4}\,\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])\right)$$

$$\Bigg(-\Bigg(2\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg((a-b)\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+\sqrt{2}\,\sqrt{\frac{a-b}{a+b}}\,\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,(b+a\,\text{Cos}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Big/$$

$$\left(\left(\frac{a-b}{a+b}\right)^{3/2}(a+b)\,\sqrt{b+a\,\text{Cos}[e+f x]}\,\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4}\right)-\Bigg(a\,\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}$$

$$\text{Sin}[e+f x]\Bigg((a-b)\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+$$

$$\sqrt{2}\,\sqrt{\frac{a-b}{a+b}}\,\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,(b+a\,\text{Cos}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg)\Big/$$

$$\left(\left(\frac{a-b}{a+b}\right)^{3/2}(a+b)\,(b+a\,\text{Cos}[e+f x])^{3/2}\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4}\right)+$$

$$\left(\sqrt{\cos\left[\frac{1}{2}(e+fx)\right]^2\operatorname{Sec}[e+fx]}\left((a-b)\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\cos[e+fx])\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}}+\right.\right.$$

$$\left.\sqrt{2}\sqrt{\frac{a-b}{a+b}}\sqrt{\frac{\cos[e+fx]}{1+\cos[e+fx]}}(b+a\cos[e+fx])\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]\right)$$

$$\left.\left(-\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^4\operatorname{Sin}[e+fx]+2\cos[e+fx]\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^4\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\left(-1+\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Big/$$

$$\left(\left(\frac{a-b}{a+b}\right)^{3/2}(a+b)\sqrt{b+a\cos[e+fx]}\left(\cos[e+fx]\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^4\right)^{3/2}\right)-$$

$$\frac{1}{\left(\frac{a-b}{a+b}\right)^{3/2}(a+b)\sqrt{b+a\cos[e+fx]}\sqrt{\cos[e+fx]\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^4}}2\sqrt{\cos\left[\frac{1}{2}(e+fx)\right]^2\operatorname{Sec}[e+fx]}\left(-1+\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$

$$\left(\frac{\sqrt{\frac{a-b}{a+b}}\sqrt{\frac{\cos[e+fx]}{1+\cos[e+fx]}}(b+a\cos[e+fx])\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{\sqrt{2}}-\sqrt{2}\,a\sqrt{\frac{a-b}{a+b}}\sqrt{\frac{\cos[e+fx]}{1+\cos[e+fx]}}\operatorname{Sin}[e+fx]\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]+\right.$$

$$\frac{\sqrt{\frac{a-b}{a+b}}(b+a\cos[e+fx])\left(\frac{\cos[e+fx]\operatorname{Sin}[e+fx]}{(1+\cos[e+fx])^2}-\frac{\operatorname{Sin}[e+fx]}{1+\cos[e+fx]}\right)\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{2}\sqrt{\frac{\cos[e+fx]}{1+\cos[e+fx]}}}+\left((a-b)\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]\right],\right.\right.$$

$$\left.\left.\frac{a+b}{a-b}\right]\left(-\frac{a\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2\operatorname{Sin}[e+fx]}{a+b}+\frac{(b+a\cos[e+fx])\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]}{a+b}\right)\right)\Big/$$

$$\left(2\sqrt{\frac{(b+a\cos[e+fx])\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}}\right)+\frac{(a-b)\sqrt{\frac{a-b}{a+b}}\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2\sqrt{\frac{(b+a\cos[e+fx])\operatorname{Sec}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}}\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]^2}}{2\sqrt{1-\frac{(a-b)\operatorname{Tan}\left[\frac{1}{2}(e+fx)\right]^2}{a+b}}}-$$

$$\left(\left((a-b)\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+\right.\right.$$

$$\left.\sqrt{2}\sqrt{\frac{a-b}{a+b}}\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\,(b+a\,\text{Cos}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$

$$\left.\left(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\right)\right)\Big/$$

$$\left.\left(\left(\frac{a-b}{a+b}\right)^{3/2}(a+b)\sqrt{b+a\,\text{Cos}[e+f x]}\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4}\sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]}\right)\right)$$

- **Problem 276: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f x]^2}{\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])}\,dx$$

Optimal (type 4, 214 leaves, 3 steps):

$$\frac{2\,a\sqrt{a+b}\,\text{Cot}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{(a-b)\,b\,c\,f}-$$

$$\frac{\text{EllipticE}\left[\text{ArcSin}\left[\frac{\text{Tan}[e+f x]}{1+\text{Sec}[e+f x]}\right],\frac{a-b}{a+b}\right]\sqrt{\frac{1}{1+\text{Sec}[e+f x]}}\sqrt{a+b\,\text{Sec}[e+f x]}}{(a-b)\,c\,f\sqrt{\frac{a+b\,\text{Sec}[e+f x]}{(a+b)\,(1+\text{Sec}[e+f x])}}}$$

Result (type 4, 1482 leaves):

$$\left(8\,a\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]\right.$$

$$\left.\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4}\,\text{Sec}[e+f x]^{3/2}\sqrt{1+\text{Sec}[e+f x]}\right)\Big/\left((-a+b)\,f\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])\right)-$$

$$\left(4\,b\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]\right.$$

$$\left.\sqrt{\text{Cos}[e+f x]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4}\,\text{Sec}[e+f x]^{3/2}\sqrt{1+\text{Sec}[e+f x]}\right)\Big/\left((-a+b)\,f\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])\right)+$$

$$\frac{\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2(b+a\,\text{Cos}[e+f x])\,\text{Sec}[e+f x]^2\left(-\frac{2\,\text{Sin}[e+f x]}{-a+b}+\frac{2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{-a+b}\right)}{f\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])}-$$

$$\left(2\,\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\sqrt{b+a\,\text{Cos}[e+f x]}\,\text{Sec}[e+f x]^{3/2}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right.$$

$$\left(-a\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}-b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}+\right.$$

$$a\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}-b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}+$$

$$4\,i\,a\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}-$$

$$2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+$$

$$4\,i\,a\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}-2\,i\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2 \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}+i(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}-2 i(a-b)$$

$$\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left((-a+b)\sqrt{\frac{-a+b}{a+b}}\,f\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\right)$$

- **Problem 277: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(g\,\text{Sec}[e+f x])^{3/2}}{\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])}\,dx$$

Optimal (type 4, 229 leaves, 7 steps):

$$\frac{g\,(b+a\,\text{Cos}[e+f x])\,\text{EllipticE}\left[\frac{1}{2}(e+f x),\frac{2a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f x]}}{(a-b)\,c\,f\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\sqrt{a+b\,\text{Sec}[e+f x]}}+$$

$$\frac{g\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(e+f x),\frac{2a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f x]}}{c\,f\sqrt{a+b\,\text{Sec}[e+f x]}}-\frac{g\,(b+a\,\text{Cos}[e+f x])\sqrt{g\,\text{Sec}[e+f x]}\,\text{Sin}[e+f x]}{(a-b)\,f\,(c+c\,\text{Cos}[e+f x])\sqrt{a+b\,\text{Sec}[e+f x]}}$$

Result (type 6, 1019 leaves):

$$\frac{\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^2(b+a\,\text{Cos}[e+f x])\,(g\,\text{Sec}[e+f x])^{3/2}\left(\frac{2\,\text{Csc}[e]}{(-a+b)\,f}+\frac{2\,\text{Sec}\left[\frac{e}{2}\right]\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]\text{Sin}\left[\frac{f x}{2}\right]}{(-a+b)\,f}\right)}{\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])}+$$

$$\frac{1}{(-a+b)\,f\sqrt{1+\text{Cot}[e]^2}\sqrt{a+b\,\text{Sec}[e+f x]}\,(c+c\,\text{Sec}[e+f x])}$$

$$\text{AppellF1}\Big[\frac{1}{2},\ \frac{1}{2},\ \frac{1}{2},\ \frac{3}{2},\ \frac{\text{Csc}[e]\left(b-a\sqrt{1+\text{Cot}[e]^2}\ \text{Sin}[e]\ \text{Sin}[f\,x-\text{ArcTan}[\text{Cot}[e]]]\right)}{a\sqrt{1+\text{Cot}[e]^2}\left(1+\frac{b\,\text{Csc}[e]}{a\sqrt{1+\text{Cot}[e]^2}}\right)},$$

$$\frac{\text{Csc}[e]\left(b-a\sqrt{1+\text{Cot}[e]^2}\ \text{Sin}[e]\ \text{Sin}[f\,x-\text{ArcTan}[\text{Cot}[e]]]\right)}{a\sqrt{1+\text{Cot}[e]^2}\left(-1+\frac{b\,\text{Csc}[e]}{a\sqrt{1+\text{Cot}[e]^2}}\right)}\Big]\ \text{Cos}\Big[\frac{e}{2}+\frac{f\,x}{2}\Big]^2\sqrt{b+a\,\text{Cos}[e+f\,x]}\ \text{Csc}\Big[\frac{e}{2}\Big]$$

$$\text{Sec}\Big[\frac{e}{2}\Big]\ (g\,\text{Sec}[e+f\,x])^{3/2}\ \text{Sec}[f\,x-\text{ArcTan}[\text{Cot}[e]]]\ \sqrt{\frac{a\sqrt{1+\text{Cot}[e]^2}-a\sqrt{1+\text{Cot}[e]^2}\ \text{Sin}[f\,x-\text{ArcTan}[\text{Cot}[e]]]}{a\sqrt{1+\text{Cot}[e]^2}-b\,\text{Csc}[e]}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Cot}[e]^2}+a\sqrt{1+\text{Cot}[e]^2}\ \text{Sin}[f\,x-\text{ArcTan}[\text{Cot}[e]]]}{a\sqrt{1+\text{Cot}[e]^2}+b\,\text{Csc}[e]}}\ \sqrt{b-a\sqrt{1+\text{Cot}[e]^2}\ \text{Sin}[e]\ \text{Sin}[f\,x-\text{ArcTan}[\text{Cot}[e]]]}\ +$$

$$\Big(a\,\text{Cos}\Big[\frac{e}{2}+\frac{f\,x}{2}\Big]^2\sqrt{b+a\,\text{Cos}[e+f\,x]}\ \text{Csc}\Big[\frac{e}{2}\Big]\ \text{Sec}\Big[\frac{e}{2}\Big]\ (g\,\text{Sec}[e+f\,x])^{3/2}$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},\ -\frac{1}{2},\ -\frac{1}{2},\ \frac{1}{2},\ -\frac{\text{Sec}[e]\left(b+a\,\text{Cos}[e]\ \text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\sqrt{1+\text{Tan}[e]^2}\right)}{a\sqrt{1+\text{Tan}[e]^2}\left(1-\frac{b\,\text{Sec}[e]}{a\sqrt{1+\text{Tan}[e]^2}}\right)},$$

$$-\frac{\text{Sec}[e]\left(b+a\,\text{Cos}[e]\ \text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\sqrt{1+\text{Tan}[e]^2}\right)}{a\sqrt{1+\text{Tan}[e]^2}\left(-1-\frac{b\,\text{Sec}[e]}{a\sqrt{1+\text{Tan}[e]^2}}\right)}\Big]\ \text{Sin}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\ \text{Tan}[e]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\text{Tan}[e]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[e]^2}-a\,\text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\sqrt{1+\text{Tan}[e]^2}}{b\,\text{Sec}[e]+a\sqrt{1+\text{Tan}[e]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[e]^2}+a\,\text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\,\sqrt{1+\text{Tan}[e]^2}}{-b\,\text{Sec}[e]+a\sqrt{1+\text{Tan}[e]^2}}}\;\sqrt{b+a\,\text{Cos}[e]\,\text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\,\sqrt{1+\text{Tan}[e]^2}}\Bigg)-$$

$$\left.\frac{\frac{\text{Sin}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\,\text{Tan}[e]}{\sqrt{1+\text{Tan}[e]^2}}+\frac{2\,a\,\text{Cos}[e]\left(b+a\,\text{Cos}[e]\,\text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\,\sqrt{1+\text{Tan}[e]^2}\right)}{a^2\,\text{Cos}[e]^2+a^2\,\text{Sin}[e]^2}}{\sqrt{b+a\,\text{Cos}[e]\,\text{Cos}[f\,x+\text{ArcTan}[\text{Tan}[e]]]\,\sqrt{1+\text{Tan}[e]^2}}}\right)\Bigg)\Bigg/\left(2\,(-a+b)\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\,(c+c\,\text{Sec}[e+f\,x])\right)$$

Problem 278: Unable to integrate problem.

$$\int\frac{(g\,\text{Sec}[e+f\,x])^{5/2}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\,(c+c\,\text{Sec}[e+f\,x])}\,dx$$

Optimal (type 4, 312 leaves, 11 steps):

$$-\frac{g^2\,(b+a\,\text{Cos}[e+f\,x])\,\text{EllipticE}\left[\frac{1}{2}\,(e+f\,x),\,\frac{2\,a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f\,x]}}{(a-b)\,c\,f\,\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}\,\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}-\frac{g^2\,\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}\,\,\text{EllipticF}\left[\frac{1}{2}\,(e+f\,x),\,\frac{2\,a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f\,x]}}{c\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}+$$

$$\frac{2\,g^2\,\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{a+b}}\,\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(e+f\,x),\,\frac{2\,a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f\,x]}}{c\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}+\frac{g^2\,(b+a\,\text{Cos}[e+f\,x])\,\sqrt{g\,\text{Sec}[e+f\,x]}\,\,\text{Sin}[e+f\,x]}{(a-b)\,f\,(c+c\,\text{Cos}[e+f\,x])\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}$$

Result (type 8, 41 leaves):

$$\int\frac{(g\,\text{Sec}[e+f\,x])^{5/2}}{\sqrt{a+b\,\text{Sec}[e+f\,x]}\,\,(c+c\,\text{Sec}[e+f\,x])}\,dx$$

Problem 279: Unable to integrate problem.

$$\int\frac{\text{Sec}[e+f\,x]\,\sqrt{a+b\,\text{Sec}[e+f\,x]}}{c+d\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 4, 213 leaves, 3 steps):

$$\frac{2\sqrt{a+b}\,\text{Cot}[e+f x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{d\,f}-$$

$$\frac{2\,(b\,c-a\,d)\,\text{EllipticPi}\left[\frac{2\,d}{c+d},\text{ArcSin}\left[\frac{\sqrt{1-\text{Sec}[e+f x]}}{\sqrt{2}}\right],\frac{2\,b}{a+b}\right]\sqrt{\frac{a+b\,\text{Sec}[e+f x]}{a+b}}\,\text{Tan}[e+f x]}{d\,(c+d)\,f\sqrt{a+b\,\text{Sec}[e+f x]}\sqrt{-\text{Tan}[e+f x]^2}}$$

Result (type 8, 35 leaves) :

$$\int\frac{\text{Sec}[e+f x]\sqrt{a+b\,\text{Sec}[e+f x]}}{c+d\,\text{Sec}[e+f x]}\,dx$$

■ Problem 280: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(g\,\text{Sec}[e+f x])^{3/2}\sqrt{a+b\,\text{Sec}[e+f x]}}{c+d\,\text{Sec}[e+f x]}\,dx$$

Optimal (type 4, 170 leaves, 7 steps) :

$$\frac{2\,b\,g\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}(e+f x),\frac{2\,a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f x]}}{d\,f\sqrt{a+b\,\text{Sec}[e+f x]}}-$$

$$\frac{2\,(b\,c-a\,d)\,g\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{a+b}}\,\text{EllipticPi}\left[\frac{2\,c}{c+d},\frac{1}{2}(e+f x),\frac{2\,a}{a+b}\right]\sqrt{g\,\text{Sec}[e+f x]}}{d\,(c+d)\,f\sqrt{a+b\,\text{Sec}[e+f x]}}$$

Result (type 4, 223 leaves) :

$$-\left(2\,i\,g\sqrt{-\frac{a\,(-1+\text{Cos}[e+f x])}{a+b}}\sqrt{\frac{a\,(1+\text{Cos}[e+f x])}{a-b}}\,\text{Cot}[e+f x]\right.$$

$$\left(\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[e+f x]}\right],\frac{-a+b}{a+b}\right]-\text{EllipticPi}\left[\frac{(a-b)\,c}{-b\,c+a\,d},\right.\right.$$

$$\left.\left.\left.i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[e+f x]}\right],\frac{-a+b}{a+b}\right]\right)\sqrt{g\,\text{Sec}[e+f x]}\sqrt{a+b\,\text{Sec}[e+f x]}\right)\Bigg/\left(\sqrt{\frac{1}{a-b}}\,d\,f\sqrt{b+a\,\text{Cos}[e+f x]}\right)$$

- **Problem 281: Unable to integrate problem.**

$$\int \frac{\text{Sec}[e+f x]}{\sqrt{a+b \text{Sec}[e+f x]}\ (c+d \text{Sec}[e+f x])} \, dx$$

Optimal (type 4, 102 leaves, 1 step):

$$\frac{2 \text{EllipticPi}\left[\frac{2 d}{c+d}, \text{ArcSin}\left[\frac{\sqrt{1-\text{Sec}[e+f x]}}{\sqrt{2}}\right], \frac{2 b}{a+b}\right] \sqrt{\frac{a+b \text{Sec}[e+f x]}{a+b}} \text{Tan}[e+f x]}{(c+d) f \sqrt{a+b \text{Sec}[e+f x]} \sqrt{-\text{Tan}[e+f x]^2}}$$

Result (type 8, 35 leaves):

$$\int \frac{\text{Sec}[e+f x]}{\sqrt{a+b \text{Sec}[e+f x]}\ (c+d \text{Sec}[e+f x])} \, dx$$

- **Problem 282: Unable to integrate problem.**

$$\int \frac{\text{Sec}[e+f x]^2}{\sqrt{a+b \text{Sec}[e+f x]}\ (c+d \text{Sec}[e+f x])} \, dx$$

Optimal (type 4, 209 leaves, 3 steps):

$$\frac{2 \sqrt{a+b} \text{Cot}[e+f x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[e+f x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[e+f x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[e+f x])}{a-b}}}{b d f} -$$

$$\frac{2 c \text{EllipticPi}\left[\frac{2 d}{c+d}, \text{ArcSin}\left[\frac{\sqrt{1-\text{Sec}[e+f x]}}{\sqrt{2}}\right], \frac{2 b}{a+b}\right] \sqrt{\frac{a+b \text{Sec}[e+f x]}{a+b}} \text{Tan}[e+f x]}{d (c+d) f \sqrt{a+b \text{Sec}[e+f x]} \sqrt{-\text{Tan}[e+f x]^2}}$$

Result (type 8, 37 leaves):

$$\int \frac{\text{Sec}[e+f x]^2}{\sqrt{a+b \text{Sec}[e+f x]}\ (c+d \text{Sec}[e+f x])} \, dx$$

- **Problem 284: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(g \text{Sec}[e+f x])^{5/2}}{\sqrt{a+b \text{Sec}[e+f x]}\ (c+d \text{Sec}[e+f x])} \, dx$$

Optimal (type 4, 166 leaves, 7 steps):

$$\frac{2 g^2 \sqrt{\frac{b+a \text{Cos}[e+f x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (e+f x), \frac{2 a}{a+b}\right] \sqrt{g \text{Sec}[e+f x]}}{d f \sqrt{a+b \text{Sec}[e+f x]}} - \frac{2 c g^2 \sqrt{\frac{b+a \text{Cos}[e+f x]}{a+b}} \text{EllipticPi}\left[\frac{2 c}{c+d}, \frac{1}{2} (e+f x), \frac{2 a}{a+b}\right] \sqrt{g \text{Sec}[e+f x]}}{d (c+d) f \sqrt{a+b \text{Sec}[e+f x]}}$$

Result (type 4, 246 leaves):

$$-\left(2\,i\,g\sqrt{-\frac{a\,(-1+\text{Cos}[e+f\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Cos}[e+f\,x])}{a-b}}\sqrt{b+a\,\text{Cos}[e+f\,x]}\right.$$
$$\text{Cot}[e+f\,x]\left((-b\,c+a\,d)\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[e+f\,x]}\right],\,\frac{-a+b}{a+b}\right]+\right.$$
$$\left.b\,c\,\text{EllipticPi}\left[\frac{(a-b)\,c}{-b\,c+a\,d},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[e+f\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)$$
$$\left.(g\,\text{Sec}[e+f\,x])^{3/2}\right)\Big/\left(\sqrt{\frac{1}{a-b}}\,b\,d\,(-b\,c+a\,d)\,f\sqrt{a+b\,\text{Sec}[e+f\,x]}\right)$$

- **Problem 285: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]^4}{(c-c\,\text{Sec}[e+f\,x])^7}\,dx$$

Optimal (type 3, 67 leaves, 4 steps):

$$\frac{\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^5}{20\,c^7\,f}-\frac{\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^7}{14\,c^7\,f}+\frac{\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^9}{36\,c^7\,f}$$

Result (type 3, 151 leaves):

$$\frac{1}{23\,063\,040\,c^7\,f}$$
$$\text{Csc}\left[\frac{e}{2}\right]\text{Csc}\left[\frac{1}{2}(e+f\,x)\right]^9\left(-971\,082\,\text{Sin}\left[\frac{f\,x}{2}\right]-718\,830\,\text{Sin}\left[e+\frac{f\,x}{2}\right]+467\,208\,\text{Sin}\left[e+\frac{3\,f\,x}{2}\right]+659\,400\,\text{Sin}\left[2\,e+\frac{3\,f\,x}{2}\right]-303\,192\,\text{Sin}\left[2\,e+\frac{5\,f\,x}{2}\right]-\right.$$
$$\left.179\,640\,\text{Sin}\left[3\,e+\frac{5\,f\,x}{2}\right]+30\,753\,\text{Sin}\left[3\,e+\frac{7\,f\,x}{2}\right]+89\,955\,\text{Sin}\left[4\,e+\frac{7\,f\,x}{2}\right]-13\,427\,\text{Sin}\left[4\,e+\frac{9\,f\,x}{2}\right]+15\,\text{Sin}\left[5\,e+\frac{9\,f\,x}{2}\right]\right)$$

Test results for the 634 problems in "4.5.3.1 (a+b sec)^m (d sec)^n (A+B sec).m"

- **Problem 27: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{4/3}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 5, 167 leaves, 6 steps):

$$\left(3\,A\,b\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(-1-3m),\frac{1}{6}(5-3m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1+3m)\sqrt{\text{Sin}[c+d\,x]^2}\right)+\left(3\,b\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(-4-3m),\frac{1}{6}(2-3m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(4+3m)\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 6, 4860 leaves) :

$$-\left(\left(18\,\text{Sec}[c+d\,x]^{-2+m}\,(b\,\text{Sec}[c+d\,x])^{4/3}\,(A+B\,\text{Sec}[c+d\,x])\right.\right.$$

$$\left(B\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}+\text{Cos}[2\,(c+d\,x)]\left(\frac{1}{2}A\,\text{Sec}[c+d\,x]^{\frac{4}{3}+m}-\frac{1}{2}\,i\,A\,\text{Sec}[c+d\,x]^{\frac{7}{3}+m}\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\text{Sec}[c+d\,x]\left(\frac{1}{2}A\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}+\frac{1}{2}\,i\,A\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}\,\text{Sin}[2\,(c+d\,x)]\right)+$$

$$\left.\text{Sec}[c+d\,x]^2\left(B\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}\,\text{Sin}[c+d\,x]^2+\text{Sin}[c+d\,x]\left(-\frac{1}{2}\,i\,A\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}+\frac{1}{2}A\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}\,\text{Sin}[2\,(c+d\,x)]\right)\right)\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3}+m,-\frac{1}{3}-m,\right.\right.\right.$$

$$\left.\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{4}{3}+m,\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.(4+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.\left.(7+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{10}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\left(\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3}36\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right.\right.$$

$$\left(\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3}+m,\right.\right.\right.$$

$$-\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{4}{3}+m,\ \frac{2}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(4+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(9\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{7}{3}+m,\ \frac{2}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(7+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{10}{3}+m,\ -\frac{1}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\,9\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]^{\frac{1}{3}+m}\left(\left((A-B)\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{4}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\left(9\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{4}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{4}{3}+m,\ \frac{2}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(4+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(9\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{7}{3}+m,\ \frac{2}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(7+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{10}{3}+m,\ -\frac{1}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\,18\left(\frac{1}{3}+m\right)\mathrm{Sec}[c+d\,x]^{\frac{4}{3}+m}\,\mathrm{Sin}[c+d\,x]\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\left((A-B)\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{4}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\left(9\,\mathrm{AppellF1}\left[\frac{1}{2},\ \frac{4}{3}+m,\ -\frac{1}{3}-m,\ \frac{3}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{4}{3}+m,\ \frac{2}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(4+3m)\,\mathrm{AppellF1}\left[\frac{3}{2},\ \frac{7}{3}+m,\ -\frac{1}{3}-m,\ \frac{5}{2},\ \mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\,\frac{7}{3}+m,\,-\frac{1}{3}-m,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\Big/\left(9\,\text{AppellF1}\left[\frac{1}{2},\,\frac{7}{3}+m,\,-\frac{1}{3}-m,\,\frac{3}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]+2\,\Big((1+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{3}+m,\,\frac{2}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$\left.\left.(7+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{10}{3}+m,\,-\frac{1}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2}\,18\,\text{Sec}[c+d\,x]^{\frac{1}{3}+m}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\Bigg(\Big(\Big((A-B)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{4}{3}+m,\,-\frac{1}{3}-m,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)\Big/\Big(9\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{4}{3}+m,\,-\frac{1}{3}-m,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]+2\,\Big((1+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{4}{3}+m,\,\frac{2}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$(4+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{3}+m,\,-\frac{1}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big)+$$

$$\Big((A-B)\,\Big(-\frac{1}{3}\,\left(-\frac{1}{3}-m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{4}{3}+m,\,\frac{2}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{1}{3}\,\left(\frac{4}{3}+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{3}+m,\,-\frac{1}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)$$

$$\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big)\Big/\Big(9\,\text{AppellF1}\left[\frac{1}{2},\,\frac{4}{3}+m,\,-\frac{1}{3}-m,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$2\,\Big((1+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{4}{3}+m,\,\frac{2}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$(4+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{3}+m,\,-\frac{1}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big)-$$

$$\Big(2\,B\,\Big(-\frac{1}{3}\,\left(-\frac{1}{3}-m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{3}+m,\,\frac{2}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{1}{3}\,\left(\frac{7}{3}+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{10}{3}+m,\,-\frac{1}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)\Big)\Big/$$

$$\Big(9\,\text{AppellF1}\left[\frac{1}{2},\,\frac{7}{3}+m,\,-\frac{1}{3}-m,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$2\,\Big((1+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{3}+m,\,\frac{2}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$(7+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{10}{3}+m,\,-\frac{1}{3}-m,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big)-$$

$$\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left(2\left((1+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{4}{3}+m,\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$

$$\left.(4+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$9\left(-\frac{1}{3}\left(-\frac{1}{3}-m\right)\text{AppellF1}\left[\frac{3}{2},\frac{4}{3}+m,\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{1}{3}\left(\frac{4}{3}+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left((1+3m)\left(-\frac{3}{5}\left(\frac{2}{3}-m\right)\text{AppellF1}\left[\frac{5}{2},\frac{4}{3}+m,\frac{5}{3}-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{5}\left(\frac{4}{3}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{7}{3}+m,\frac{2}{3}-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+(4+3m)\left(-\frac{3}{5}\left(-\frac{1}{3}-m\right)\text{AppellF1}\left[\frac{5}{2},\frac{7}{3}+m,\frac{2}{3}-m,\frac{7}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{5}\left(\frac{7}{3}+m\right)\text{AppellF1}\Big[\frac{5}{2},$$

$$\left.\left.\left.\left.\left.\frac{10}{3}+m,-\frac{1}{3}-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\right)\Big/$$

$$\left(9\,\text{AppellF1}\left[\frac{1}{2},\frac{4}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((1+3m)\,\text{AppellF1}\Big[\frac{3}{2},\frac{4}{3}+m,\right.\right.$$

$$\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+(4+3m)\,\text{AppellF1}\Big[\frac{3}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2+\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.$$

$$\left(2\left((1+3m)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(7+3m)\,\text{AppellF1}\Big[\frac{3}{2},\right.\right.$$

$$\left.\frac{10}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$9\left(-\frac{1}{3}\left(-\frac{1}{3}-m\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{1}{3}\left(\frac{7}{3}+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{10}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left((1+3m)\left(-\frac{3}{5}\left(\frac{2}{3}-m\right)\text{AppellF1}\left[\frac{5}{2},\frac{7}{3}+m,\frac{5}{3}-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{5}\left(\frac{7}{3}+m\right)\text{AppellF1}\left[\frac{5}{2},\frac{10}{3}+m,\frac{2}{3}-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)+(7+3\,m)\left(-\frac{3}{5}\left(-\frac{1}{3}-m\right)\text{AppellF1}\left[\frac{5}{2},\frac{10}{3}+m,\frac{2}{3}-m,\frac{7}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{5}\left(\frac{10}{3}+m\right)\text{AppellF1}\left[\frac{5}{2},\right.$$

$$\frac{13}{3}+m,-\frac{1}{3}-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(9\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{3}+m,-\frac{1}{3}-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\,\Bigg((1+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{3}+m,\right.$$

$$\frac{2}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+$$

$$(7+3\,m)\,\text{AppellF1}\left[\frac{3}{2},\frac{10}{3}+m,-\frac{1}{3}-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)^2\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 28: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{2/3}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 5, 165 leaves, 6 steps):

$$-\left(3\,A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(1-3\,m),\frac{1}{6}(7-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]\right)\Bigg/$$

$$\left(d\,(1-3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$

$$\left(3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(-2-3\,m),\frac{1}{6}(4-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{m}\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]\right)\Bigg/\left(d\,(2+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 6, 5573 leaves): Display of huge result suppressed!

- **Problem 29: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 5, 165 leaves, 6 steps):

$$-\left(3\,A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(2-3\,m),\frac{1}{6}(8-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Bigg/$$

$$\left(d\,(2-3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$

$$\left(3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(-1-3\,m),\frac{1}{6}(5-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Bigg/\left(d\,(1+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 6, 5573 leaves) : Display of huge result suppressed !

Problem 32: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^m (A+B \text{Sec}[c+d x])}{(b \text{Sec}[c+d x])^{4/3}} \, dx$$

Optimal (type 5, 173 leaves, 6 steps) :

$$-\frac{3 A \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{6} (7-3 m), \frac{1}{6} (13-3 m), \text{Cos}[c+d x]^2\right] \text{Sec}[c+d x]^{-2+m} \text{Sin}[c+d x]}{b d (7-3 m) (b \text{Sec}[c+d x])^{1/3} \sqrt{\text{Sin}[c+d x]^2}} - \frac{3 B \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{6} (4-3 m), \frac{1}{6} (10-3 m), \text{Cos}[c+d x]^2\right] \text{Sec}[c+d x]^{-1+m} \text{Sin}[c+d x]}{b d (4-3 m) (b \text{Sec}[c+d x])^{1/3} \sqrt{\text{Sin}[c+d x]^2}}$$

Result (type 6, 5557 leaves) : Display of huge result suppressed !

Problem 39: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^{3/2} (b \text{Sec}[c+d x])^n (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 5, 163 leaves, 6 steps) :

$$\left(2 A \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{4} (-1-2 n), \frac{1}{4} (3-2 n), \text{Cos}[c+d x]^2\right] \sqrt{\text{Sec}[c+d x]} (b \text{Sec}[c+d x])^n \text{Sin}[c+d x]\right) \Big/ \left(d (1+2 n) \sqrt{\text{Sin}[c+d x]^2}\right) + \left(2 B \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{4} (-3-2 n), \frac{1}{4} (1-2 n), \text{Cos}[c+d x]^2\right] \text{Sec}[c+d x]^{3/2} (b \text{Sec}[c+d x])^n \text{Sin}[c+d x]\right) \Big/ \left(d (3+2 n) \sqrt{\text{Sin}[c+d x]^2}\right)$$

Result (type 6, 4819 leaves) :

$$-\Bigg(\Bigg(6 \sqrt{\text{Sec}[c+d x]} (b \text{Sec}[c+d x])^n \left(B \text{Sec}[c+d x]^{\frac{1}{2}+n} + \text{Cos}[2 (c+d x)] \left(\frac{1}{2} A \text{Sec}[c+d x]^{\frac{3}{2}+n} - \frac{1}{2} i A \text{Sec}[c+d x]^{\frac{5}{2}+n} \text{Sin}[c+d x]\right) + \text{Sec}[c+d x] \left(\frac{1}{2} A \text{Sec}[c+d x]^{\frac{1}{2}+n} + \frac{1}{2} i A \text{Sec}[c+d x]^{\frac{1}{2}+n} \text{Sin}[2 (c+d x)]\right) + \text{Sec}[c+d x]^2 \left(B \text{Sec}[c+d x]^{\frac{1}{2}+n} \text{Sin}[c+d x]^2 + \text{Sin}[c+d x] \left(-\frac{1}{2} i A \text{Sec}[c+d x]^{\frac{1}{2}+n} + \frac{1}{2} A \text{Sec}[c+d x]^{\frac{1}{2}+n} \text{Sin}[2 (c+d x)]\right)\right)\right)$$

$$\text{Tan}\left[\frac{1}{2} (c+d x)\right] \left(\left((A-B) \text{AppellF1}\left[\frac{1}{2}, \frac{3}{2}+n, -\frac{1}{2}-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] \left(-1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)\right) \Big/ \right.$$

$$\left(3 \text{AppellF1}\left[\frac{1}{2}, \frac{3}{2}+n, -\frac{1}{2}-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + \left((1+2 n) \text{AppellF1}\left[\frac{3}{2}, \frac{3}{2}+n, \frac{1}{2}-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right] + (3+2 n) \text{AppellF1}\left[\frac{3}{2}, \frac{5}{2}+n, -\frac{1}{2}-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) -$$

$$\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2}+n,\,\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.(5+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{2}+n,\,-\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big)\Big)\Big)\Big/$$

$$\left(d\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\,\left(\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^3}\,12\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^{\frac{1}{2}+n}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.\right.$$

$$\left(\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{3}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{3}{2}+n,\right.\right.\right.$$

$$\left.-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{3}{2}+n,\,\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\right.\right.$$

$$\left.\left.\left.\frac{1}{2}\,(c+d\,x)\right]^2\right]+(3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2}+n,\,\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.(5+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{2}+n,\,-\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2}\,3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]^{\frac{1}{2}+n}\,\left(\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{3}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{3}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{3}{2}+n,\,\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.(3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2}+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\right.\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2}+n,\,\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.(5+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{2}+n,\,-\frac{1}{2}-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\,6\left(\frac{1}{2}+n\right)\text{Sec}[c+d\,x]^{\frac{3}{2}+n}\,\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.(3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(2\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\right.\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.\left.(5+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\,6\,\text{Sec}[c+d\,x]^{\frac{1}{2}+n}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\left((A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.(3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left((A-B)\left(-\frac{1}{3}\left(-\frac{1}{2}-n\right)\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$\left.\frac{1}{3}\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.(3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\Big(2\,\text{B}\,\Big(-\frac{1}{3}\left(-\frac{1}{2}-n\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{1}{3}\left(\frac{5}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{7}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\Big((1+2\,n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{2}+n,\frac{1}{2}-n,\frac{5}{2},$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+(5+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-\Big((\text{A}-\text{B})\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big(\Big(\Big((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+$$

$$(3+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$3\,\Big(-\frac{1}{3}\left(-\frac{1}{2}-n\right)\text{AppellF1}\left[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{1}{3}\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)+$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big((1+2\,n)\,\Big(-\frac{3}{5}\left(\frac{1}{2}-n\right)\text{AppellF1}\left[\frac{5}{2},\frac{3}{2}+n,\frac{3}{2}-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{5}\left(\frac{3}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\frac{5}{2}+n,\frac{1}{2}-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)+(3+2\,n)\,\Big(-\frac{3}{5}\left(-\frac{1}{2}-n\right)\text{AppellF1}\Big[\frac{5}{2},\frac{5}{2}+n,\frac{1}{2}-n,$$

$$\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{3}{5}\left(\frac{5}{2}+n\right)$$

$$\text{AppellF1}\left[\frac{5}{2},\frac{7}{2}+n,-\frac{1}{2}-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\Big((1+2\,n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{3}{2}+n,\frac{1}{2}-n,$$

$$\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+(3+2\,n)\,\text{AppellF1}\Big[\frac{3}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)^2+\Big(2\,\text{B}\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{2}+n,-\frac{1}{2}-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]$$

$$\Big(\Big((1+2\,n)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2}+n,\frac{1}{2}-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+(5+2\,n)\,\text{AppellF1}\Big[\frac{3}{2},$$

$$\frac{7}{2}+n,\ -\frac{1}{2}-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\Big)\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$3\left(-\frac{1}{3}\left(-\frac{1}{2}-n\right)\text{AppellF1}\left[\frac{3}{2},\ \frac{5}{2}+n,\ \frac{1}{2}-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\frac{1}{3}\left(\frac{5}{2}+n\right)\text{AppellF1}\left[\frac{3}{2},\ \frac{7}{2}+n,\ -\frac{1}{2}-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)+$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big((1+2 n)\Big(-\frac{3}{5}\left(\frac{1}{2}-n\right)\text{AppellF1}\left[\frac{5}{2},\ \frac{5}{2}+n,\ \frac{3}{2}-n,\ \frac{7}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{3}{5}\left(\frac{5}{2}+n\right)\text{AppellF1}\left[\frac{5}{2},\ \frac{7}{2}+n,\ \frac{1}{2}-n,\ \frac{7}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)+(5+2 n)\Big(-\frac{3}{5}\left(-\frac{1}{2}-n\right)\text{AppellF1}\Big[\frac{5}{2},\ \frac{7}{2}+n,\ \frac{1}{2}-n,\ \frac{7}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{3}{5}\left(\frac{7}{2}+n\right)\text{AppellF1}\Big[\frac{5}{2},\ \frac{9}{2}+n,\ -\frac{1}{2}-n,\ \frac{7}{2},$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big)\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\ \frac{5}{2}+n,\ -\frac{1}{2}-n,\ \frac{3}{2},$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big]+\Big((1+2 n)\,\text{AppellF1}\left[\frac{3}{2},\ \frac{5}{2}+n,\ \frac{1}{2}-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$(5+2 n)\,\text{AppellF1}\left[\frac{3}{2},\ \frac{7}{2}+n,\ -\frac{1}{2}-n,\ \frac{5}{2},\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2\Big)\Big)\Big)\Big)$$

- **Problem 40: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d x]}\ (b\,\text{Sec}[c+d x])^n\ (A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 5, 163 leaves, 6 steps):

$$-\frac{2\,A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(1-2 n),\frac{1}{4}(5-2 n),\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]}{d\,(1-2 n)\,\sqrt{\text{Sec}[c+d x]}\,\sqrt{\text{Sin}[c+d x]^2}}+$$

$$\left(2\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\ \frac{1}{4}(-1-2 n),\ \frac{1}{4}(3-2 n),\ \text{Cos}[c+d x]^2\right]\sqrt{\text{Sec}[c+d x]}\ (b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]\right)\Big/\left(d\,(1+2 n)\,\sqrt{\text{Sin}[c+d x]^2}\right)$$

Result (type 6, 5543 leaves): Display of huge result suppressed!

- **Problem 42: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(b\,\text{Sec}[c+d x])^n\ (A+B\,\text{Sec}[c+d x])}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 5, 163 leaves, 6 steps):

$$-\frac{2\,A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(5-2n),\frac{1}{4}(9-2n),\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]}{d\,(5-2n)\,\text{Sec}[c+d x]^{5/2}\sqrt{\text{Sin}[c+d x]^2}}-\frac{2\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(3-2n),\frac{1}{4}(7-2n),\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]}{d\,(3-2n)\,\text{Sec}[c+d x]^{3/2}\sqrt{\text{Sin}[c+d x]^2}}$$

Result (type 6, 5527 leaves) : Display of huge result suppressed!

Problem 44: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^3\,(a+a\,\text{Sec}[c+d x])\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 106 leaves, 6 steps) :

$$\frac{a\,(4A+3B)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8d}+\frac{a\,(A+B)\,\text{Tan}[c+d x]}{d}+\frac{a\,(4A+3B)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{8d}+\frac{a\,B\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{4d}+\frac{a\,(A+B)\,\text{Tan}[c+d x]^3}{3d}$$

Result (type 3, 403 leaves) :

$$-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2d}-\frac{3\,a\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8d}+\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2d}+\frac{3\,a\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8d}+\frac{a\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{a\,A}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{3\,a\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{a\,A}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{3\,a\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{2\,a\,A\,\text{Tan}[c+d x]}{3d}+\frac{2\,a\,B\,\text{Tan}[c+d x]}{3d}+\frac{a\,A\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3d}+\frac{a\,B\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3d}$$

Problem 46: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]\,(a+a\,\text{Sec}[c+d x])\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 56 leaves, 5 steps) :

$$\frac{a\,(2A+B)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2d}+\frac{a\,(A+B)\,\text{Tan}[c+d x]}{d}+\frac{a\,B\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2d}$$

Result (type 3, 154 leaves) :

$$\frac{1}{4\,d}a\left(-2\,(2\,A+B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+4\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{B}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{B}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+4\,(A+B)\,\text{Tan}[c+d\,x]\right)$$

- **Problem 47: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 32 leaves, 4 steps):

$$a\,A\,x+\frac{a\,(A+B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,B\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 159 leaves):

$$a\,A\,x-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Tan}[c+d\,x]}{d}$$

- **Problem 48: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 32 leaves, 3 steps):

$$a\,(A+B)\,x+\frac{a\,B\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,A\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 104 leaves):

$$a\,A\,x+a\,B\,x-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{a\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}$$

- **Problem 55: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 103 leaves, 6 steps):

$$\frac{a^2\,(3\,A+2\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{2\,a^2\,(3\,A+2\,B)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a^2\,(3\,A+2\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{6\,d}+\frac{B\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 993 leaves):

$$\frac{1}{8\,d\,(B+A\,\mathrm{Cos}[c+d\,x])}(-3\,A-2\,B)\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])+$$
$$\frac{1}{8\,d\,(B+A\,\mathrm{Cos}[c+d\,x])}(3\,A+2\,B)\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])+$$
$$\frac{B\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\left(\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(3\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]+7\,B\,\mathrm{Cos}\left[\frac{c}{2}\right]-3\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-5\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(48\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$
$$\frac{\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(6\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+5\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{12\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$
$$\frac{B\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\left(\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(-3\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]-7\,B\,\mathrm{Cos}\left[\frac{c}{2}\right]-3\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-5\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(48\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$
$$\frac{\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(6\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+5\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{12\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 56: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 82 leaves, 5 steps):

$$a^2\,A\,x+\frac{a^2\,(4\,A+3\,B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{a^2\,(2\,A+3\,B)\,\mathrm{Tan}[c+d\,x]}{2\,d}+\frac{B\,\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 307 leaves):

$$\frac{1}{16\,(B+A\,\text{Cos}[c+d\,x])}a^2\,\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(1+\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(4\,A\,x-\frac{2\,(4\,A+3\,B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{2\,(4\,A+3\,B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\right.$$
$$\frac{B}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(A+2\,B)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-$$
$$\left.\frac{B}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(A+2\,B)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

- **Problem 57: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 73 leaves, 4 steps):

$$a^2\,(2\,A+B)\,x+\frac{a^2\,(A+2\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a^2\,(A-B)\,\text{Sin}[c+d\,x]}{d}+\frac{B\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 258 leaves):

$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])}a^2\,\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(1+\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left((2\,A+B)\,x-\frac{(A+2\,B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{(A+2\,B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\right.$$
$$\left.\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{B\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+\frac{B\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

- **Problem 64: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 125 leaves, 10 steps):

$$\frac{5\,a^3\,(4\,A+3\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a^3\,(4\,A+3\,B)\,\text{Tan}[c+d\,x]}{d}+$$
$$\frac{3\,a^3\,(4\,A+3\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{B\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a^3\,(4\,A+3\,B)\,\text{Tan}[c+d\,x]^3}{12\,d}$$

Result (type 3, 273 leaves):

$$-\frac{1}{1536\,d}a^3\,(1+\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^6\,\text{Sec}[c+d\,x]^4$$
$$\left(120\,(4\,A+3\,B)\,\text{Cos}[c+d\,x]^4\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-\right.$$
$$\text{Sec}[c]\,(-24\,(11\,A+9\,B)\,\text{Sin}[c]+(36\,A+69\,B)\,\text{Sin}[d\,x]+36\,A\,\text{Sin}[2\,c+d\,x]+69\,B\,\text{Sin}[2\,c+d\,x]+$$
$$280\,A\,\text{Sin}[c+2\,d\,x]+264\,B\,\text{Sin}[c+2\,d\,x]-72\,A\,\text{Sin}[3\,c+2\,d\,x]-24\,B\,\text{Sin}[3\,c+2\,d\,x]+36\,A\,\text{Sin}[2\,c+3\,d\,x]+$$
$$\left.45\,B\,\text{Sin}[2\,c+3\,d\,x]+36\,A\,\text{Sin}[4\,c+3\,d\,x]+45\,B\,\text{Sin}[4\,c+3\,d\,x]+88\,A\,\text{Sin}[3\,c+4\,d\,x]+72\,B\,\text{Sin}[3\,c+4\,d\,x])\right)$$

- **Problem 65: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 111 leaves, 6 steps):

$$a^3\,A\,x+\frac{a^3\,(7\,A+5\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{5\,a^3\,(A+B)\,\text{Tan}[c+d\,x]}{2\,d}+$$
$$\frac{a\,B\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{(3\,A+5\,B)\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{6\,d}$$

Result (type 3, 1056 leaves):

$$\frac{A\,x\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])}{8\,(B+A\,\mathrm{Cos}[c+d\,x])}+\frac{1}{16\,d\,(B+A\,\mathrm{Cos}[c+d\,x])}$$

$$(-7\,A-5\,B)\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])+$$

$$\frac{1}{16\,d\,(B+A\,\mathrm{Cos}[c+d\,x])}(7\,A+5\,B)\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])+$$

$$\frac{B\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{48\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\left(\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(3\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]+10\,B\,\mathrm{Cos}\left[\frac{c}{2}\right]-3\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-8\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(96\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$

$$\frac{\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(9\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+11\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$

$$\frac{B\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{48\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\left(\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(-3\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]-10\,B\,\mathrm{Cos}\left[\frac{c}{2}\right]-3\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-8\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(96\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$

$$\frac{\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,\left(9\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+11\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 66: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 108 leaves, 5 steps):

$$a^3\,(3\,A+B)\,x+\frac{a^3\,(6\,A+7\,B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}-\frac{5\,a^3\,B\,\mathrm{Sin}[c+d\,x]}{2\,d}+$$

$$\frac{a\,B\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{2\,d}+\frac{(A+2\,B)\,\left(a^3+a^3\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 3, 335 leaves):

$$\frac{1}{32\,(B+A\,\mathrm{Cos}[c+d\,x])}\,a^3\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^6\,(1+\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\left(4\,(3\,A+B)\,x-\frac{2\,(6\,A+7\,B)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{2\,(6\,A+7\,B)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{4\,A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{d}+\frac{4\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}+\frac{B}{d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(A+3\,B)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-\frac{B}{d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(A+3\,B)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

- **Problem 67: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]^2\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 117 leaves, 5 steps) :

$$\frac{1}{2}\,a^3\,(7\,A+6\,B)\,x+\frac{a^3\,(A+3\,B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}+\frac{5\,a^3\,A\,\mathrm{Sin}[c+d\,x]}{2\,d}+\frac{a\,A\,\mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{2\,d}-\frac{(A-2\,B)\left(a^3+a^3\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 802 leaves) :

$$\frac{(7A+6B)\,x\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])}{16\,(B+A\,\text{Cos}[c+d x])}+\frac{1}{8 d\,(B+A\,\text{Cos}[c+d x])}$$

$$(-A-3B)\,\text{Cos}[c+d x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])+$$

$$\frac{1}{8 d\,(B+A\,\text{Cos}[c+d x])}(A+3B)\,\text{Cos}[c+d x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])+$$

$$\frac{(3A+B)\,\text{Cos}[d x]\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}[c]}{8 d\,(B+A\,\text{Cos}[c+d x])}+$$

$$\frac{A\,\text{Cos}[2 d x]\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}[2 c]}{32 d\,(B+A\,\text{Cos}[c+d x])}+$$

$$\frac{(3A+B)\,\text{Cos}[c]\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}[d x]}{8 d\,(B+A\,\text{Cos}[c+d x])}+$$

$$\frac{A\,\text{Cos}[2 c]\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}[2 d x]}{32 d\,(B+A\,\text{Cos}[c+d x])}+$$

$$\frac{B\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}\left[\frac{d x}{2}\right]}{8 d\,(B+A\,\text{Cos}[c+d x])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+$$

$$\frac{B\,\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}\left[\frac{d x}{2}\right]}{8 d\,(B+A\,\text{Cos}[c+d x])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

- **Problem 74: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d x])^4\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 151 leaves, 7 steps):

$$a^4 A x+\frac{a^4\,(48A+35B)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{5 a^4\,(8A+7B)\,\text{Tan}[c+d x]}{8 d}+\frac{a B\,(a+a\,\text{Sec}[c+d x])^3\,\text{Tan}[c+d x]}{4 d}+$$

$$\frac{(4A+7B)\left(a^2+a^2\,\text{Sec}[c+d x]\right)^2\,\text{Tan}[c+d x]}{12 d}+\frac{(32A+35B)\left(a^4+a^4\,\text{Sec}[c+d x]\right)\,\text{Tan}[c+d x]}{24 d}$$

Result (type 3, 326 leaves):

$$\frac{1}{3072\,d} a^4 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^8 (1+\operatorname{Sec}[c+d x])^4$$
$$\left(-24\,(48 A+35 B) \operatorname{Cos}[c+d x]^4 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\right.$$
$$\operatorname{Sec}[c]\,(72 A d x \operatorname{Cos}[c]+48 A d x \operatorname{Cos}[c+2 d x]+48 A d x \operatorname{Cos}[3 c+2 d x]+12 A d x \operatorname{Cos}[3 c+4 d x]+12 A d x \operatorname{Cos}[5 c+4 d x]-$$
$$480 A \operatorname{Sin}[c]-480 B \operatorname{Sin}[c]+48 A \operatorname{Sin}[d x]+105 B \operatorname{Sin}[d x]+48 A \operatorname{Sin}[2 c+d x]+105 B \operatorname{Sin}[2 c+d x]+$$
$$496 A \operatorname{Sin}[c+2 d x]+544 B \operatorname{Sin}[c+2 d x]-144 A \operatorname{Sin}[3 c+2 d x]-96 B \operatorname{Sin}[3 c+2 d x]+48 A \operatorname{Sin}[2 c+3 d x]+$$
$$\left.81 B \operatorname{Sin}[2 c+3 d x]+48 A \operatorname{Sin}[4 c+3 d x]+81 B \operatorname{Sin}[4 c+3 d x]+160 A \operatorname{Sin}[3 c+4 d x]+160 B \operatorname{Sin}[3 c+4 d x])\right)$$

- **Problem 75: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]\,(a+a \operatorname{Sec}[c+d x])^4\,(A+B \operatorname{Sec}[c+d x])\,dx$$

Optimal (type 3, 151 leaves, 6 steps) :

$$a^4 (4 A+B)\,x+\frac{a^4 (13 A+12 B) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 d}-\frac{5 a^4 (A+2 B) \operatorname{Sin}[c+d x]}{2 d}+$$
$$\frac{a B\,(a+a \operatorname{Sec}[c+d x])^3 \operatorname{Sin}[c+d x]}{3 d}+\frac{(A+2 B)\left(a^2+a^2 \operatorname{Sec}[c+d x]\right)^2 \operatorname{Sin}[c+d x]}{2 d}+\frac{(9 A+11 B)\left(a^4+a^4 \operatorname{Sec}[c+d x]\right) \operatorname{Sin}[c+d x]}{3 d}$$

Result (type 3, 1202 leaves) :

$$\frac{(4A+B)\,x\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])}{16\,(B+A\,\text{Cos}[c+dx])}+\frac{1}{32\,d\,(B+A\,\text{Cos}[c+dx])}$$

$$(-13A-12B)\,\text{Cos}[c+dx]^5\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])+$$

$$\frac{1}{32\,d\,(B+A\,\text{Cos}[c+dx])}(13A+12B)\,\text{Cos}[c+dx]^5\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])+$$

$$\frac{A\,\text{Cos}[dx]\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]}{16\,d\,(B+A\,\text{Cos}[c+dx])}+$$

$$\frac{A\,\text{Cos}[c]\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[dx]}{16\,d\,(B+A\,\text{Cos}[c+dx])}+$$

$$\frac{B\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}\left[\frac{dx}{2}\right]}{96\,d\,(B+A\,\text{Cos}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$

$$\left(\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\left(3A\,\text{Cos}\left[\frac{c}{2}\right]+13B\,\text{Cos}\left[\frac{c}{2}\right]-3A\,\text{Sin}\left[\frac{c}{2}\right]-11B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(192\,d\,(B+A\,\text{Cos}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$

$$\frac{\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+5B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{12\,d\,(B+A\,\text{Cos}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}+$$

$$\frac{B\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}\left[\frac{dx}{2}\right]}{96\,d\,(B+A\,\text{Cos}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$

$$\left(\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\left(-3A\,\text{Cos}\left[\frac{c}{2}\right]-13B\,\text{Cos}\left[\frac{c}{2}\right]-3A\,\text{Sin}\left[\frac{c}{2}\right]-11B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(192\,d\,(B+A\,\text{Cos}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$

$$\frac{\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+5B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{12\,d\,(B+A\,\text{Cos}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}$$

- **Problem 76: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^2\,(a+a\,\text{Sec}[c+dx])^4\,(A+B\,\text{Sec}[c+dx])\,dx$$

Optimal (type 3, 160 leaves, 6 steps) :

$$\frac{1}{2} a^4 (13 A + 8 B) x + \frac{a^4 (8 A + 13 B) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{5 a^4 (A - B) \text{Sin}[c + d x]}{2 d} + \frac{a A \text{Cos}[c + d x] (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{2 d} - \frac{(A - B) \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{2 d} + \frac{(A + 6 B) \left(a^4 + a^4 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{2 d}$$

Result (type 3, 1018 leaves):

$$\frac{(13 A + 8 B) x \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])}{32 (B + A \text{Cos}[c + d x])} + \frac{1}{32 d (B + A \text{Cos}[c + d x])} (-8 A - 13 B) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) + \frac{1}{32 d (B + A \text{Cos}[c + d x])} (8 A + 13 B) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) + \frac{(4 A + B) \text{Cos}[d x] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}[c]}{16 d (B + A \text{Cos}[c + d x])} + \frac{A \text{Cos}[2 d x] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}[2 c]}{64 d (B + A \text{Cos}[c + d x])} + \frac{(4 A + B) \text{Cos}[c] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}[d x]}{16 d (B + A \text{Cos}[c + d x])} + \frac{A \text{Cos}[2 c] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}[2 d x]}{64 d (B + A \text{Cos}[c + d x])} + \frac{B \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])}{64 d (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} + \frac{\text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \left(A \text{Sin}\left[\frac{d x}{2}\right] + 4 B \text{Sin}\left[\frac{d x}{2}\right]\right)}{16 d (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{c}{2}\right] - \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} - \frac{B \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])}{64 d (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} + \frac{\text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \left(A \text{Sin}\left[\frac{d x}{2}\right] + 4 B \text{Sin}\left[\frac{d x}{2}\right]\right)}{16 d (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{c}{2}\right] + \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)}$$

- **Problem 77: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d x]^3 (a + a \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \, dx$$

Optimal (type 3, 165 leaves, 6 steps):

$$\frac{1}{2} a^4 (12 A + 13 B) x + \frac{a^4 (A + 4 B) \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{5 a^4 (2 A + B) \text{Sin}[c + d x]}{2 d} + \frac{a A \text{Cos}[c + d x]^2 (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{3 d} + \frac{(2 A + B) \text{Cos}[c + d x] \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{2 d} - \frac{(8 A - 3 B) \left(a^4 + a^4 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{6 d}$$

Result (type 3, 342 leaves):

$$\frac{1}{192 (B + A \text{Cos}[c + d x])} a^4 \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{1}{2} (c + d x)\right]^8 (1 + \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \left(72 A x + 78 B x - \frac{12 (A + 4 B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]}{d} + \frac{12 (A + 4 B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]}{d} + \frac{3 (27 A + 16 B) \text{Cos}[d x] \text{Sin}[c]}{d} + \frac{3 (4 A + B) \text{Cos}[2 d x] \text{Sin}[2 c]}{d} + \frac{A \text{Cos}[3 d x] \text{Sin}[3 c]}{d} + \frac{3 (27 A + 16 B) \text{Cos}[c] \text{Sin}[d x]}{d} + \frac{3 (4 A + B) \text{Cos}[2 c] \text{Sin}[2 d x]}{d} + \frac{A \text{Cos}[3 c] \text{Sin}[3 d x]}{d} + \frac{12 B \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right] - \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)} + \frac{12 B \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right] + \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)}\right)$$

- **Problem 82: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c + d x]^4 (A + B \text{Sec}[c + d x])}{a + a \text{Sec}[c + d x]} \, dx$$

Optimal (type 3, 131 leaves, 6 steps):

$$\frac{3 (A - B) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 a d} - \frac{(3 A - 4 B) \text{Tan}[c + d x]}{a d} + \frac{3 (A - B) \text{Sec}[c + d x] \text{Tan}[c + d x]}{2 a d} + \frac{(A - B) \text{Sec}[c + d x]^3 \text{Tan}[c + d x]}{d (a + a \text{Sec}[c + d x])} - \frac{(3 A - 4 B) \text{Tan}[c + d x]^3}{3 a d}$$

Result (type 3, 635 leaves):

$$\frac{3\,(-A+B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,(A+B\,\mathrm{Sec}[c+d\,x])}{d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])}-$$

$$\frac{3\,(-A+B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,(A+B\,\mathrm{Sec}[c+d\,x])}{d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])}+$$

$$\frac{1}{48\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,(A+B\,\mathrm{Sec}[c+d\,x])$$

$$\left(6\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+6\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-27\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+39\,B\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+12\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-24\,B\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+6\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-\right.$$

$$6\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+24\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-24\,B\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-9\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+21\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$

$$9\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+9\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-9\,B\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-3\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+7\,B\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+3\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$

$$B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-3\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+9\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-9\,B\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-12\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+$$

$$\left.16\,B\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-6\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+10\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-6\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+6\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

- **Problem 83: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^3\,(A+B\,\mathrm{Sec}[c+d\,x])}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 108 leaves, 6 steps) :

$$-\frac{(2\,A-3\,B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,a\,d}+\frac{2\,(A-B)\,\mathrm{Tan}[c+d\,x]}{a\,d}-\frac{(2\,A-3\,B)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a\,d}+\frac{(A-B)\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])}$$

Result (type 3, 671 leaves) :

$$\frac{(2A-3B)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,(A+B\,\text{Sec}[c+dx])}{d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])}+$$
$$\frac{(-2A+3B)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,(A+B\,\text{Sec}[c+dx])}{d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])}-$$
$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+dx])\,\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])}+\frac{B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,(A+B\,\text{Sec}[c+dx])}{2\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}-$$
$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,(A+B\,\text{Sec}[c+dx])\,\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}-$$
$$\frac{B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,(A+B\,\text{Sec}[c+dx])}{2\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}-$$
$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,(A+B\,\text{Sec}[c+dx])\,\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}$$

- **Problem 84: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])}{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 62 leaves, 5 steps):

$$\frac{(A-B)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a\,d}+\frac{B\,\text{Tan}[c+dx]}{a\,d}-\frac{(A-B)\,\text{Tan}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 3, 224 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\,(A+B\,\text{Sec}[c+dx])\right.$$
$$\left((-A+B)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{dx}{2}\right]+\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(-(A-B)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)+\right.\right.$$
$$(B\,\text{Sin}[dx])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right.$$
$$\left.\left.\left.\left.\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\right)\right)\right)\Big/\left(a\,d\,(B+A\,\text{Cos}[c+dx])\,(1+\text{Sec}[c+dx])\right)$$

- **Problem 85: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])}{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 43 leaves, 3 steps):

$$\frac{B\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}+\frac{(A-B)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 109 leaves):

$$\frac{1}{a\,d\,(1+\text{Cos}[c+d\,x])}2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]$$
$$\left(B\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+(A-B)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)$$

Problem 86: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 35 leaves, 2 steps):

$$\frac{A\,x}{a}-\frac{(A-B)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 72 leaves):

$$\frac{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+A\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+2\,(-A+B)\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{a\,d\,(1+\text{Cos}[c+d\,x])}$$

Problem 88: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 98 leaves, 5 steps):

$$\frac{(3\,A-2\,B)\,x}{2\,a}-\frac{2\,(A-B)\,\text{Sin}[c+d\,x]}{a\,d}+\frac{(3\,A-2\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a\,d}-\frac{(A-B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 197 leaves):

$$\frac{1}{8\,a\,d\,(1+\text{Cos}[c+d\,x])}$$
$$\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(4\,(3\,A-2\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+4\,(3\,A-2\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-20\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+20\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-4\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$\left.4\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-3\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+4\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-3\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+4\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]\right)$$

- **Problem 89: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^3 (A+B\,\text{Sec}[c+d x])}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 122 leaves, 6 steps):

$$-\frac{3 (A-B) x}{2 a}+\frac{(4 A-3 B) \text{Sin}[c+d x]}{a d}-\frac{3 (A-B) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a d}-\frac{(A-B) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{d (a+a\,\text{Sec}[c+d x])}-\frac{(4 A-3 B) \text{Sin}[c+d x]^3}{3 a d}$$

Result (type 3, 249 leaves):

$$\frac{1}{24 a d (1+\text{Cos}[c+d x])}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-36 (A-B) d x\,\text{Cos}\left[\frac{d x}{2}\right]-36 (A-B) d x\,\text{Cos}\left[c+\frac{d x}{2}\right]+69 A\,\text{Sin}\left[\frac{d x}{2}\right]-60 B\,\text{Sin}\left[\frac{d x}{2}\right]+21 A\,\text{Sin}\left[c+\frac{d x}{2}\right]-12 B\,\text{Sin}\left[c+\frac{d x}{2}\right]+18 A\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-9 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+18 A\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-9 B\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-2 A\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]+3 B\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-2 A\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]+3 B\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]+A\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]+A\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]\right)$$

- **Problem 90: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^5 (A+B\,\text{Sec}[c+d x])}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 179 leaves, 7 steps):

$$\frac{(7 A-10 B) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^2 d}-\frac{4 (2 A-3 B) \text{Tan}[c+d x]}{a^2 d}+\frac{(7 A-10 B) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a^2 d}+\frac{(7 A-10 B) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}+\frac{(A-B) \text{Sec}[c+d x]^4 \text{Tan}[c+d x]}{3 d (a+a\,\text{Sec}[c+d x])^2}-\frac{4 (2 A-3 B) \text{Tan}[c+d x]^3}{3 a^2 d}$$

Result (type 3, 764 leaves):

$$\frac{2\,(-7\,A+10\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])}{d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}-$$

$$\frac{2\,(-7\,A+10\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])}{d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}+$$

$$\frac{1}{96\,d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(A+B\,\text{Sec}[c+d\,x])$$

$$\Big(45\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-201\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+310\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+195\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-306\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-51\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+$$

$$42\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+189\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-270\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+50\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-81\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$

$$90\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+119\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-170\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-129\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+198\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$

$$9\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+42\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-57\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+66\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+63\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-$$

$$90\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-75\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+114\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+36\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$

$$39\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+48\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+21\,A\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-30\,B\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-32\,A\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+$$

$$48\,B\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-12\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+22\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-20\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+26\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\Big)\Big)$$

- **Problem 91: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d\,x]^4\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 156 leaves, 7 steps) :

$$-\frac{(4\,A-7\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^2\,d}+\frac{2\,(5\,A-8\,B)\,\text{Tan}[c+d\,x]}{3\,a^2\,d}-$$

$$\frac{(4\,A-7\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^2\,d}+\frac{(5\,A-8\,B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}+\frac{(A-B)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 652 leaves) :

$$-\frac{2\,(-4 A+7 B)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]\,(A+B\,\text{Sec}[c+d x])}{d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^2}+$$

$$\frac{2\,(-4 A+7 B)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]\,(A+B\,\text{Sec}[c+d x])}{d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^2}+$$

$$\frac{1}{48\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(A+B\,\text{Sec}[c+d x])$$

$$\left(-14 A\,\text{Sin}\left[\frac{d x}{2}\right]+14 B\,\text{Sin}\left[\frac{d x}{2}\right]+64 A\,\text{Sin}\left[\frac{3 d x}{2}\right]-97 B\,\text{Sin}\left[\frac{3 d x}{2}\right]-84 A\,\text{Sin}\left[c-\frac{d x}{2}\right]+126 B\,\text{Sin}\left[c-\frac{d x}{2}\right]+42 A\,\text{Sin}\left[c+\frac{d x}{2}\right]-\right.$$

$$42 B\,\text{Sin}\left[c+\frac{d x}{2}\right]-56 A\,\text{Sin}\left[2 c+\frac{d x}{2}\right]+98 B\,\text{Sin}\left[2 c+\frac{d x}{2}\right]-6 A\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+3 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+34 A\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-$$

$$37 B\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-36 A\,\text{Sin}\left[3 c+\frac{3 d x}{2}\right]+63 B\,\text{Sin}\left[3 c+\frac{3 d x}{2}\right]+48 A\,\text{Sin}\left[c+\frac{5 d x}{2}\right]-75 B\,\text{Sin}\left[c+\frac{5 d x}{2}\right]+6 A\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-$$

$$15 B\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]+30 A\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]-39 B\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]-12 A\,\text{Sin}\left[4 c+\frac{5 d x}{2}\right]+21 B\,\text{Sin}\left[4 c+\frac{5 d x}{2}\right]+$$

$$\left.20 A\,\text{Sin}\left[2 c+\frac{7 d x}{2}\right]-32 B\,\text{Sin}\left[2 c+\frac{7 d x}{2}\right]+6 A\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]-12 B\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]+14 A\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]-20 B\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]\right)$$

Problem 92: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^3\,(A+B\,\text{Sec}[c+d x])}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 108 leaves, 6 steps):

$$\frac{(A-2 B)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}-\frac{(A-4 B)\,\text{Tan}[c+d x]}{3 a^2 d}-\frac{(A-2 B)\,\text{Tan}[c+d x]}{a^2 d\,(1+\text{Sec}[c+d x])}+\frac{(A-B)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 3, 292 leaves):

$$\frac{1}{3 a^2 d\,(B+A\,\text{Cos}[c+d x])\,(1+\text{Sec}[c+d x])^2}\,2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\,\text{Sec}[c+d x]$$

$$(A+B\,\text{Sec}[c+d x])\left((-A+B)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d x}{2}\right]-2\,(4 A-7 B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d x}{2}\right]+\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\right.$$

$$\left(-6\,(A-2 B)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+(6 B\,\text{Sin}[d x])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\right.\right.$$

$$\left.\left.\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)-(A-B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\,\text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 93: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^2 (A+B \text{Sec}[c+d x])}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 79 leaves, 4 steps):

$$\frac{B \text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{(2 A-5 B) \text{Tan}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B) \text{Tan}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 169 leaves):

$$-\frac{1}{3 a^2 d (1+\text{Cos}[c+d x])^2} 2 \text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(6 B \text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+ (-A+B) \text{Sec}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]-2 (A-4 B) \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]-(A-B) \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 95: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Sec}[c+d x]}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 70 leaves, 3 steps):

$$\frac{A x}{a^2}-\frac{(4 A-B) \text{Tan}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B) \text{Tan}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 153 leaves):

$$\frac{1}{24 a^2 d} \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \left(9 A d x \text{Cos}\left[\frac{d x}{2}\right]+9 A d x \text{Cos}\left[c+\frac{d x}{2}\right]+3 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+3 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]- 18 A \text{Sin}\left[\frac{d x}{2}\right]+6 B \text{Sin}\left[\frac{d x}{2}\right]+12 A \text{Sin}\left[c+\frac{d x}{2}\right]-6 B \text{Sin}\left[c+\frac{d x}{2}\right]-10 A \text{Sin}\left[c+\frac{3 d x}{2}\right]+4 B \text{Sin}\left[c+\frac{3 d x}{2}\right]\right)$$

Problem 96: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x] (A+B \text{Sec}[c+d x])}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 98 leaves, 5 steps):

$$-\frac{(2 A-B) x}{a^2}+\frac{2 (5 A-2 B) \text{Sin}[c+d x]}{3 a^2 d}-\frac{(2 A-B) \text{Sin}[c+d x]}{a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B) \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 245 leaves):

$$\frac{1}{12\, a^2\, d\, (1+\text{Cos}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-18\,(2\,A-B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-18\,(2\,A-B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-12\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+6\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-12\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+6\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+66\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-36\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-30\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+24\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+41\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-20\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+9\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]\right)$$

Problem 97: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 143 leaves, 6 steps):

$$\frac{(7\,A-4\,B)\,x}{2\,a^2}-\frac{2\,(8\,A-5\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d}+\frac{(7\,A-4\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,d}-\frac{(8\,A-5\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 315 leaves):

$$\frac{1}{48\, a^2\, d\, (1+\text{Cos}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(36\,(7\,A-4\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+36\,(7\,A-4\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+84\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-48\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-381\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+264\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+147\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-120\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-239\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+164\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-63\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+36\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+12\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 98: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^3\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 170 leaves, 7 steps):

$$-\frac{(10\,A-7\,B)\,x}{2\,a^2}+\frac{4\,(3\,A-2\,B)\,\text{Sin}[c+d\,x]}{a^2\,d}-\frac{(10\,A-7\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,d}-\frac{(10\,A-7\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{4\,(3\,A-2\,B)\,\text{Sin}[c+d\,x]^3}{3\,a^2\,d}$$

Result (type 3, 369 leaves):

$$\frac{1}{48\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-36\,(10\,A-7\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-36\,(10\,A-7\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-120\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-\right.$$
$$120\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+516\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-381\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-156\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+$$
$$147\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+342\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-239\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+118\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-63\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$30\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-3\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$
$$\left.3\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-3\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

- **Problem 99: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^5\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 202 leaves, 8 steps):

$$-\frac{(6\,A-13\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}+\frac{8\,(9\,A-19\,B)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}-\frac{(6\,A-13\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^3\,d}+$$
$$\frac{(A-B)\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{(6\,A-11\,B)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{4\,(9\,A-19\,B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 3, 768 leaves):

$$-\frac{4\,(-6\,A+13\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])}{d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}+$$

$$\frac{4\,(-6\,A+13\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])}{d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}+$$

$$\frac{1}{480\,d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(-870\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+1235\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+1830\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-3805\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-2094\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+4329\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+\right.$$

$$1314\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1989\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1650\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+3575\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-450\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+475\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$

$$1230\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2005\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-1050\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+2275\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+1278\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$

$$2673\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-90\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-105\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+918\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-1593\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$

$$450\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+975\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+630\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-1325\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+60\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$

$$255\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+480\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-875\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-90\,A\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+195\,B\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+$$

$$\left.144\,A\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-304\,B\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+30\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-90\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+114\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-214\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 100: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^4\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 156 leaves, 7 steps):

$$\frac{(A-3\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^3\,d}-\frac{(7\,A-27\,B)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}+$$

$$\frac{(A-B)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{(4\,A-9\,B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(A-3\,B)\,\text{Tan}[c+d\,x]}{d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 3, 642 leaves):

$$\frac{8\,(-A+3B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\mathrm{Sec}[c+dx]^2\,(A+B\,\mathrm{Sec}[c+dx])}{d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3}-$$
$$\frac{8\,(-A+3B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\mathrm{Sec}[c+dx]^2\,(A+B\,\mathrm{Sec}[c+dx])}{d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3}+$$
$$\frac{1}{120\,d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3}\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^3\,(A+B\,\mathrm{Sec}[c+dx])$$
$$\left(160\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-255\,B\,\mathrm{Sin}\left[\frac{dx}{2}\right]-167\,A\,\mathrm{Sin}\left[\frac{3dx}{2}\right]+567\,B\,\mathrm{Sin}\left[\frac{3dx}{2}\right]+170\,A\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]-600\,B\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]-170\,A\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+\right.$$
$$375\,B\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+160\,A\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]-480\,B\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]+75\,A\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-60\,B\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-167\,A\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+$$
$$402\,B\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+75\,A\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]-225\,B\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]-95\,A\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]+315\,B\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]+$$
$$15\,A\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]+30\,B\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-95\,A\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+240\,B\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+15\,A\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]-$$
$$\left.45\,B\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]-22\,A\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]+72\,B\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]+15\,B\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]-22\,A\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]+57\,B\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]\right)$$

- **Problem 104: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\mathrm{Sec}[c+dx]}{(a+a\,\mathrm{Sec}[c+dx])^3}\,dx$$

Optimal (type 3, 108 leaves, 4 steps):

$$\frac{Ax}{a^3}-\frac{(A-B)\,\mathrm{Tan}[c+dx]}{5d\,(a+a\,\mathrm{Sec}[c+dx])^3}-\frac{(7A-2B)\,\mathrm{Tan}[c+dx]}{15ad\,(a+a\,\mathrm{Sec}[c+dx])^2}-\frac{2\,(11A-B)\,\mathrm{Tan}[c+dx]}{15d\,\left(a^3+a^3\,\mathrm{Sec}[c+dx]\right)}$$

Result (type 3, 241 leaves):

$$\frac{1}{480\,a^3\,d}$$
$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^5\left(150\,A\,d\,x\,\mathrm{Cos}\left[\frac{dx}{2}\right]+150\,A\,d\,x\,\mathrm{Cos}\left[c+\frac{dx}{2}\right]+75\,A\,d\,x\,\mathrm{Cos}\left[c+\frac{3dx}{2}\right]+75\,A\,d\,x\,\mathrm{Cos}\left[2c+\frac{3dx}{2}\right]+15\,A\,d\,x\,\mathrm{Cos}\left[2c+\frac{5dx}{2}\right]+\right.$$
$$15\,A\,d\,x\,\mathrm{Cos}\left[3c+\frac{5dx}{2}\right]-370\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+80\,B\,\mathrm{Sin}\left[\frac{dx}{2}\right]+270\,A\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]-60\,B\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]-230\,A\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]+$$
$$\left.40\,B\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]+90\,A\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]-30\,B\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]-64\,A\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]+14\,B\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]\right)$$

- **Problem 105: Result more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Cos}[c+dx]\,(A+B\,\mathrm{Sec}[c+dx])}{(a+a\,\mathrm{Sec}[c+dx])^3}\,dx$$

Optimal (type 3, 136 leaves, 6 steps):

$$-\frac{(3A-B)x}{a^3}+\frac{2(36A-11B)\operatorname{Sin}[c+dx]}{15a^3d}-\frac{(A-B)\operatorname{Sin}[c+dx]}{5d(a+a\operatorname{Sec}[c+dx])^3}-\frac{(9A-4B)\operatorname{Sin}[c+dx]}{15ad(a+a\operatorname{Sec}[c+dx])^2}-\frac{(3A-B)\operatorname{Sin}[c+dx]}{d\left(a^3+a^3\operatorname{Sec}[c+dx]\right)}$$

Result (type 3, 365 leaves):

$$\frac{1}{120a^3d(1+\operatorname{Cos}[c+dx])^3}\operatorname{Cos}\left[\frac{1}{2}(c+dx)\right]\operatorname{Sec}\left[\frac{c}{2}\right]\left(-300(3A-B)dx\operatorname{Cos}\left[\frac{dx}{2}\right]-300(3A-B)dx\operatorname{Cos}\left[c+\frac{dx}{2}\right]-450Adx\operatorname{Cos}\left[c+\frac{3dx}{2}\right]+150Bdx\operatorname{Cos}\left[c+\frac{3dx}{2}\right]-450Adx\operatorname{Cos}\left[2c+\frac{3dx}{2}\right]+150Bdx\operatorname{Cos}\left[2c+\frac{3dx}{2}\right]-90Adx\operatorname{Cos}\left[2c+\frac{5dx}{2}\right]+30Bdx\operatorname{Cos}\left[2c+\frac{5dx}{2}\right]-90Adx\operatorname{Cos}\left[3c+\frac{5dx}{2}\right]+30Bdx\operatorname{Cos}\left[3c+\frac{5dx}{2}\right]+1755A\operatorname{Sin}\left[\frac{dx}{2}\right]-740B\operatorname{Sin}\left[\frac{dx}{2}\right]-1125A\operatorname{Sin}\left[c+\frac{dx}{2}\right]+540B\operatorname{Sin}\left[c+\frac{dx}{2}\right]+1215A\operatorname{Sin}\left[c+\frac{3dx}{2}\right]-460B\operatorname{Sin}\left[c+\frac{3dx}{2}\right]-225A\operatorname{Sin}\left[2c+\frac{3dx}{2}\right]+180B\operatorname{Sin}\left[2c+\frac{3dx}{2}\right]+363A\operatorname{Sin}\left[2c+\frac{5dx}{2}\right]-128B\operatorname{Sin}\left[2c+\frac{5dx}{2}\right]+75A\operatorname{Sin}\left[3c+\frac{5dx}{2}\right]+15A\operatorname{Sin}\left[3c+\frac{7dx}{2}\right]+15A\operatorname{Sin}\left[4c+\frac{7dx}{2}\right]\right)$$

- **Problem 106: Result more than twice size of optimal antiderivative.**

$$\int\frac{\operatorname{Cos}[c+dx]^2(A+B\operatorname{Sec}[c+dx])}{(a+a\operatorname{Sec}[c+dx])^3}\,dx$$

Optimal (type 3, 187 leaves, 7 steps):

$$\frac{(13A-6B)x}{2a^3}-\frac{8(19A-9B)\operatorname{Sin}[c+dx]}{15a^3d}+\frac{(13A-6B)\operatorname{Cos}[c+dx]\operatorname{Sin}[c+dx]}{2a^3d}-\frac{(A-B)\operatorname{Cos}[c+dx]\operatorname{Sin}[c+dx]}{5d(a+a\operatorname{Sec}[c+dx])^3}-\frac{(11A-6B)\operatorname{Cos}[c+dx]\operatorname{Sin}[c+dx]}{15ad(a+a\operatorname{Sec}[c+dx])^2}-\frac{4(19A-9B)\operatorname{Cos}[c+dx]\operatorname{Sin}[c+dx]}{15d\left(a^3+a^3\operatorname{Sec}[c+dx]\right)}$$

Result (type 3, 435 leaves):

$$\frac{1}{480\,a^3\,d\,(1+\text{Cos}[c+d\,x])^3}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(600\,(13\,A-6\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+600\,(13\,A-6\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+3900\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-1800\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3900\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-1800\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+780\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-360\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+780\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-360\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-12\,760\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+7020\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+7560\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-4500\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-9230\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+4860\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+930\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-900\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2782\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+1452\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-750\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+300\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-105\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+60\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-105\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+60\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

- **Problem 107: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^3\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 218 leaves, 8 steps):

$$-\frac{(23\,A-13\,B)\,x}{2\,a^3}+\frac{4\,(34\,A-19\,B)\,\text{Sin}[c+d\,x]}{5\,a^3\,d}-\frac{(23\,A-13\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,d}-\frac{(A-B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{(13\,A-8\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(23\,A-13\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}-\frac{4\,(34\,A-19\,B)\,\text{Sin}[c+d\,x]^3}{15\,a^3\,d}$$

Result (type 3, 491 leaves):

$$\frac{1}{480\,a^3\,d\,(1+\text{Cos}[c+d\,x])^3}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(-600\,(23\,A-13\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-600\,(23\,A-13\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-6900\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3900\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-6900\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+3900\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-1380\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+780\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-1380\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+780\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+20\,410\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-12\,760\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-11\,110\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+7560\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+15\,380\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9230\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-380\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+930\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+4777\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2782\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+1625\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-750\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+230\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-105\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+230\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-105\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-20\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-20\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+5\,A\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+5\,A\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)$$

Problem 108: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Sec}[c+d\,x]^6\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+a\,\mathrm{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 238 leaves, 9 steps):

$$-\frac{(8\,A-21\,B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,a^4\,d}+\frac{8\,(83\,A-216\,B)\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d}-\frac{(8\,A-21\,B)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a^4\,d}+\frac{(52\,A-129\,B)\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Sec}[c+d\,x])^2}+\frac{4\,(83\,A-216\,B)\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Sec}[c+d\,x])}+\frac{(A-B)\,\mathrm{Sec}[c+d\,x]^5\,\mathrm{Tan}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^4}+\frac{(A-2\,B)\,\mathrm{Sec}[c+d\,x]^4\,\mathrm{Tan}[c+d\,x]}{5\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}$$

Result (type 3, 880 leaves):

$$-\frac{8\,(-8\,A+21\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}[c+d\,x]^3\,(A+B\,\mathrm{Sec}[c+d\,x])}{d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^4}+$$
$$\frac{8\,(-8\,A+21\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}[c+d\,x]^3\,(A+B\,\mathrm{Sec}[c+d\,x])}{d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^4}+$$
$$\frac{1}{6720\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^4}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^5\,(A+B\,\mathrm{Sec}[c+d\,x])$$
$$\left(-38\,668\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+73\,206\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+64\,384\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]-166\,668\,B\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]-70\,896\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+183\,162\,B\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+\right.$$
$$50\,316\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-100\,842\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-59\,248\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+155\,526\,B\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-22\,820\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$37\,380\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+48\,004\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-101\,148\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-39\,200\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+102\,900\,B\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+$$
$$46\,032\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-119\,364\,B\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-8750\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+8820\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+35\,742\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$
$$78\,204\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-19\,040\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+49\,980\,B\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+24\,664\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-64\,053\,B\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-$$
$$1050\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-3885\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+19\,834\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-44\,733\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-5880\,A\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+$$
$$15\,435\,B\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+8456\,A\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-21\,987\,B\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+630\,A\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-3675\,B\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+$$
$$6986\,A\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-16\,107\,B\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-840\,A\,\mathrm{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]+2205\,B\,\mathrm{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]+1328\,A\,\mathrm{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]-$$
$$\left.3456\,B\,\mathrm{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]+210\,A\,\mathrm{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]-840\,B\,\mathrm{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+1118\,A\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]-2616\,B\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)$$

Problem 109: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^5 (A+B\,\text{Sec}[c+d x])}{(a+a\,\text{Sec}[c+d x])^4}\,dx$$

Optimal (type 3, 194 leaves, 8 steps):

$$\frac{(A-4 B)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^4 d}-\frac{(55 A-244 B)\,\text{Tan}[c+d x]}{105 a^4 d}+\frac{(25 A-88 B)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{105 a^4 d\,(1+\text{Sec}[c+d x])^2}-\frac{(A-4 B)\,\text{Tan}[c+d x]}{a^4 d\,(1+\text{Sec}[c+d x])}+\frac{(A-B)\,\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{7 d\,(a+a\,\text{Sec}[c+d x])^4}+\frac{(5 A-12 B)\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{35 a d\,(a+a\,\text{Sec}[c+d x])^3}$$

Result (type 3, 754 leaves):

$$\frac{16 (-A+4 B)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]^3 (A+B\,\text{Sec}[c+d x])}{d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^4}-$$
$$\frac{16 (-A+4 B)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}[c+d x]^3 (A+B\,\text{Sec}[c+d x])}{d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^4}+$$
$$\frac{1}{1680 d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^4}\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\,\text{Sec}[c+d x]^4 (A+B\,\text{Sec}[c+d x])$$
$$\left(4165 A\,\text{Sin}\left[\frac{d x}{2}\right]-10780 B\,\text{Sin}\left[\frac{d x}{2}\right]-4445 A\,\text{Sin}\left[\frac{3 d x}{2}\right]+18788 B\,\text{Sin}\left[\frac{3 d x}{2}\right]+4795 A\,\text{Sin}\left[c-\frac{d x}{2}\right]-20524 B\,\text{Sin}\left[c-\frac{d x}{2}\right]-\right.$$
$$4795 A\,\text{Sin}\left[c+\frac{d x}{2}\right]+14644 B\,\text{Sin}\left[c+\frac{d x}{2}\right]+4165 A\,\text{Sin}\left[2 c+\frac{d x}{2}\right]-16660 B\,\text{Sin}\left[2 c+\frac{d x}{2}\right]+2275 A\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-4690 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-$$
$$4445 A\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+14378 B\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+2275 A\,\text{Sin}\left[3 c+\frac{3 d x}{2}\right]-9100 B\,\text{Sin}\left[3 c+\frac{3 d x}{2}\right]-2785 A\,\text{Sin}\left[c+\frac{5 d x}{2}\right]+$$
$$11668 B\,\text{Sin}\left[c+\frac{5 d x}{2}\right]+735 A\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-630 B\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-2785 A\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]+9358 B\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]+$$
$$735 A\,\text{Sin}\left[4 c+\frac{5 d x}{2}\right]-2940 B\,\text{Sin}\left[4 c+\frac{5 d x}{2}\right]-1015 A\,\text{Sin}\left[2 c+\frac{7 d x}{2}\right]+4228 B\,\text{Sin}\left[2 c+\frac{7 d x}{2}\right]+105 A\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]+$$
$$315 B\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]-1015 A\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]+3493 B\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]+105 A\,\text{Sin}\left[5 c+\frac{7 d x}{2}\right]-420 B\,\text{Sin}\left[5 c+\frac{7 d x}{2}\right]-$$
$$\left.160 A\,\text{Sin}\left[3 c+\frac{9 d x}{2}\right]+664 B\,\text{Sin}\left[3 c+\frac{9 d x}{2}\right]+105 B\,\text{Sin}\left[4 c+\frac{9 d x}{2}\right]-160 A\,\text{Sin}\left[5 c+\frac{9 d x}{2}\right]+559 B\,\text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

Problem 114: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d x]}{(a+a\,\text{Sec}[c+d x])^4}\,dx$$

Optimal (type 3, 138 leaves, 5 steps):

$$\frac{A x}{a^4}-\frac{(55 A-6 B) \operatorname{Tan}[c+d x]}{105 a^4 d (1+\operatorname{Sec}[c+d x])^2}-\frac{2 (80 A-3 B) \operatorname{Tan}[c+d x]}{105 a^4 d (1+\operatorname{Sec}[c+d x])}-\frac{(A-B) \operatorname{Tan}[c+d x]}{7 d (a+a \operatorname{Sec}[c+d x])^4}-\frac{(10 A-3 B) \operatorname{Tan}[c+d x]}{35 a d (a+a \operatorname{Sec}[c+d x])^3}$$

Result (type 3, 329 leaves) :

$$\frac{1}{13440 a^4 d} \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^7 \left(3675 A d x \operatorname{Cos}\left[\frac{d x}{2}\right]+3675 A d x \operatorname{Cos}\left[c+\frac{d x}{2}\right]+2205 A d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+2205 A d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+735 A d x \operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+\right.$$
$$735 A d x \operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]+105 A d x \operatorname{Cos}\left[3 c+\frac{7 d x}{2}\right]+105 A d x \operatorname{Cos}\left[4 c+\frac{7 d x}{2}\right]-9940 A \operatorname{Sin}\left[\frac{d x}{2}\right]+1260 B \operatorname{Sin}\left[\frac{d x}{2}\right]+$$
$$8260 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]-1260 B \operatorname{Sin}\left[c+\frac{d x}{2}\right]-7140 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+882 B \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+3780 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-630 B \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-$$
$$\left.2800 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+294 B \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+840 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-210 B \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-520 A \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+72 B \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]\right)$$

- **Problem 115: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c+d x] (A+B \operatorname{Sec}[c+d x])}{(a+a \operatorname{Sec}[c+d x])^4} \, dx$$

Optimal (type 3, 166 leaves, 7 steps) :

$$-\frac{(4 A-B) x}{a^4}+\frac{8 (83 A-20 B) \operatorname{Sin}[c+d x]}{105 a^4 d}-\frac{(88 A-25 B) \operatorname{Sin}[c+d x]}{105 a^4 d (1+\operatorname{Sec}[c+d x])^2}-$$
$$\frac{(4 A-B) \operatorname{Sin}[c+d x]}{a^4 d (1+\operatorname{Sec}[c+d x])}-\frac{(A-B) \operatorname{Sin}[c+d x]}{7 d (a+a \operatorname{Sec}[c+d x])^4}-\frac{(12 A-5 B) \operatorname{Sin}[c+d x]}{35 a d (a+a \operatorname{Sec}[c+d x])^3}$$

Result (type 3, 485 leaves) :

$$\frac{1}{1680\, a^4\, d\, (1+\text{Cos}[c+d\,x])^4}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-7350\,(4\,A-B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-7350\,(4\,A-B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-17640\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+4410\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-\right.$$
$$17640\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+4410\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-5880\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+1470\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$5880\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+1470\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-840\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+210\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$
$$840\,A\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+210\,B\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+60830\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-19880\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-46130\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+$$
$$16520\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+46116\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-14280\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-18060\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+7560\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$19292\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-5600\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2100\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+1680\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$
$$\left.3791\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-1040\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+735\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+105\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+105\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 116: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 223 leaves, 8 steps):

$$\frac{(21\,A-8\,B)\,x}{2\,a^4}-\frac{8\,(216\,A-83\,B)\,\text{Sin}[c+d\,x]}{105\,a^4\,d}+\frac{(21\,A-8\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^4\,d}-\frac{(129\,A-52\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}-$$
$$\frac{4\,(216\,A-83\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{(2\,A-B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{5\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 555 leaves):

$$\frac{1}{6720\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])^4}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(14\,700\,(21\,A-8\,B)\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+14\,700\,(21\,A-8\,B)\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+185\,220\,A\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]-\right.$$
$$70\,560\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+185\,220\,A\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-70\,560\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+61\,740\,A\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$23\,520\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+61\,740\,A\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-23\,520\,B\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+8820\,A\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$
$$3360\,B\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+8820\,A\,d\,x\,\mathrm{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-3360\,B\,d\,x\,\mathrm{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-539\,490\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+243\,320\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$
$$386\,190\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-184\,520\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-422\,478\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+184\,464\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+132\,930\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$72\,240\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-181\,461\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+77\,168\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3675\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-8400\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$
$$36\,003\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+15\,164\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-9555\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+2940\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-945\,A\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+$$
$$\left.420\,B\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-945\,A\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+420\,B\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+105\,A\,\mathrm{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+105\,A\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)$$

- **Problem 117: Result more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Cos}[c+d\,x]^3\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+a\,\mathrm{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 256 leaves, 9 steps):

$$-\frac{(44\,A-21\,B)\,x}{2\,a^4}+\frac{8\,(227\,A-108\,B)\,\mathrm{Sin}[c+d\,x]}{35\,a^4\,d}-\frac{(44\,A-21\,B)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,a^4\,d}-\frac{(178\,A-87\,B)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Sec}[c+d\,x])^2}-$$
$$\frac{(44\,A-21\,B)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{3\,a^4\,d\,(1+\mathrm{Sec}[c+d\,x])}-\frac{(A-B)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^4}-\frac{(16\,A-9\,B)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{35\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}-\frac{8\,(227\,A-108\,B)\,\mathrm{Sin}[c+d\,x]^3}{105\,a^4\,d}$$

Result (type 3, 611 leaves):

$$\frac{1}{6720\, a^4\, d\, (1+\text{Cos}[c+d\,x])^4}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-14700\,(44\,A-21\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-14700\,(44\,A-21\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-388080\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+\right.$$

$$185220\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-388080\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+185220\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-129360\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$

$$61740\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-129360\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+61740\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-18480\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$

$$8820\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]-18480\,A\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+8820\,B\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+1010660\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-539490\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-$$

$$687260\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+386190\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+814107\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-422478\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-204645\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$

$$132930\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+357609\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-181461\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+18025\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$

$$3675\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+72522\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-36003\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+24010\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-9555\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+$$

$$2310\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-945\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+2310\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-945\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-175\,A\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+$$

$$\left.105\,B\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]-175\,A\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]+105\,B\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]+35\,A\,\text{Sin}\left[6\,c+\frac{13\,d\,x}{2}\right]+35\,A\,\text{Sin}\left[7\,c+\frac{13\,d\,x}{2}\right]\right)$$

- **Problem 122: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\;(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 66 leaves, 4 steps):

$$\frac{2\sqrt{a}\;A\,\text{ArcTan}\left[\frac{\sqrt{a}\;\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a\,B\,\text{Tan}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 407 leaves):

$$-\frac{1}{d\,(B+A\,\mathrm{Cos}[c+d\,x])}\,8\left(-3-2\sqrt{2}\right)A\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,+$$

$$\frac{2\,B\,\mathrm{Cos}[c+d\,x]\,\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,(B+A\,\mathrm{Cos}[c+d\,x])}$$

- **Problem 123: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 68 leaves, 3 steps):

$$\frac{\sqrt{a}\,(A+2\,B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{d}+\frac{a\,A\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 396 leaves):

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(-\frac{1}{2}A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2}A\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)}{d}-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)(A+2B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 124: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 117 leaves, 4 steps):

$$\frac{\sqrt{a}\,(3A+4B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4d}+\frac{a(3A+4B)\,\text{Sin}[c+d x]}{4d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a A\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 4, 418 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(-\frac{1}{8}(A+4B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}(A+2B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{8}A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(3A+4B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 125: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 160 leaves, 5 steps):

$$\frac{\sqrt{a}\,(5A+6B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8d}+\frac{a(5A+6B)\,\text{Sin}[c+d x]}{8d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a(5A+6B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{12d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a A\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{3d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 4, 443 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left(-\frac{1}{48}(11A+6B)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{12}(4A+3B)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{16}(A+2B)\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\frac{1}{24}A\,\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(5A+6B)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 126: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^4\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 203 leaves, 6 steps):

$$\frac{5\sqrt{a}\,(7A+8B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{64\,d}+\frac{5\,a\,(7A+8B)\,\text{Sin}[c+d\,x]}{64\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{5\,a\,(7A+8B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{96\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(7A+8B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{24\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,A\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{4\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 465 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(-\frac{1}{384}(41\,A+88\,B)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{48}(11\,A+16\,B)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{128}(15\,A+8\,B)\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\frac{1}{48}(A+2\,B)\,\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]+\frac{1}{64}A\,\text{Sin}\left[\frac{9}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{\left(-64+48\sqrt{2}\right)d}5\,(7\,A+8\,B)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 130: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 105 leaves, 5 steps) :

$$\frac{2\,a^{3/2}\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,(3\,A+4\,B)\,\text{Tan}[c+d\,x]}{3\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a\,B\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 460 leaves) :

$$\frac{1}{d\,(B+A\,\mathrm{Cos}[c+d\,x])}\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}(A+B\,\mathrm{Sec}[c+d\,x])\left(\frac{1}{3}(3A+5B)\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}B\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$

$$\frac{1}{d\,(B+A\,\mathrm{Cos}[c+d\,x])}4\left(-3-2\sqrt{2}\right)A\,\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Cos}[c+d\,x]$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3$$

$$(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}(A+B\,\mathrm{Sec}[c+d\,x])\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 131: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 103 leaves, 4 steps):

$$\frac{a^{3/2}(3A+2B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{d}+\frac{a^2(A-2B)\,\mathrm{Sin}[c+d\,x]}{d\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{2\,a\,B\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 408 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(\frac{1}{4}(-A+4B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}A\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)-$$

$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)(3A+2B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 132: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2(a+a\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 119 leaves, 4 steps):

$$\frac{a^{3/2}(7A+12B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4d}+\frac{a^2(5A+4B)\,\text{Sin}[c+d x]}{4d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a\,A\,\text{Cos}[c+d x]\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{2d}$$

Result (type 4, 428 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(-\frac{1}{16}(5A+4B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{8}(3A+2B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{16}A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(7A+12B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 133: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 164 leaves, 5 steps):

$$\frac{a^{3/2}(11A+14B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8d}+\frac{a^2(11A+14B)\,\text{Sin}[c+d x]}{8d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a^2(7A+6B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{12d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a A\,\text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3d}$$

Result (type 4, 450 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}$$
$$\left(-\frac{1}{96}(17 A+30 B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{24}(7 A+9 B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{32}(3 A+2 B)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{48}A\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]\right)+$$
$$\frac{1}{8 d}\left(4+3\sqrt{2}\right)(11 A+14 B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 134: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 209 leaves, 6 steps):

$$\frac{a^{3/2}(75 A+88 B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^2(75 A+88 B)\,\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2(75 A+88 B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{96 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a^2(9 A+8 B)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{24 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a A\,\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 471 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(-\frac{1}{768}(129 A+136 B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{96}(27 A+28 B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{256}(23 A+24 B)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{96}(3 A+2 B)\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{128}A\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]\right)+$$

$$\frac{1}{64 d}\left(4+3\sqrt{2}\right)(75 A+88 B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 138: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d x])^{5/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 142 leaves, 6 steps):

$$\frac{2 a^{5/2} A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2 a^3 (35 A+32 B)\,\text{Tan}[c+d x]}{15 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{2 a^2 (5 A+8 B)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{15 d}+\frac{2 a B (a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Tan}[c+d x]}{5 d}$$

Result (type 4, 501 leaves):

$$\frac{1}{d\,(B+A\,\text{Cos}[c+d\,x])}\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\frac{1}{30}\,(40\,A+43\,B)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{10}\,B\,\text{Sec}[c+d\,x]^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{30}\,\text{Sec}[c+d\,x]\,\left(5\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+14\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)-$$
$$\frac{1}{d\,(B+A\,\text{Cos}[c+d\,x])}\,2\,\left(-3-2\,\sqrt{2}\right)\,A\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Cos}[c+d\,x]^2$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 139: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 143 leaves, 5 steps) :

$$\frac{a^{5/2}\,(5\,A+2\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}-\frac{a^3\,(3\,A+14\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{2\,a^2\,(A+2\,B)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{d}+\frac{2\,a\,B\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 434 leaves) :

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(\frac{1}{24}(9A+32B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{6}B\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{8}A\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)+$$
$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(5A+2B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 140: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2 (a+a\,\text{Sec}[c+d x])^{5/2} (A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 154 leaves, 5 steps):

$$\frac{a^{5/2}(19A+20B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4d}+\frac{a^3(9A-4B)\,\text{Sin}[c+d x]}{4d\sqrt{a+a\,\text{Sec}[c+d x]}}-$$
$$\frac{a^2(A-4B)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{2d}+\frac{a A\,\text{Cos}[c+d x](a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{2d}$$

Result (type 4, 437 leaves):

$$\frac{1}{d}\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5 (a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left(\frac{3}{32}(-3A+4B)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{16}(5A+2B)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{32}A\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+$$
$$\frac{1}{8\,d}\left(4+3\sqrt{2}\right)(19A+20B)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$
$$\text{Cos}[c+d\,x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 141: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 164 leaves, 5 steps):

$$\frac{a^{5/2}\,(25A+38B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d}+\frac{a^3\,(49A+54B)\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(3A+2B)\,\text{Cos}[c+d\,x]\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,A\,\text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 458 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(-\frac{1}{192}(47 A+54 B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{48}(16 A+15 B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{64}(5 A+2 B)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{96} A\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]\right)+$$
$$\frac{1}{8 d}\left(2+\frac{3}{\sqrt{2}}\right)(25 A+38 B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\text{Cos}[c+d x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 142: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4(a+a\,\text{Sec}[c+d x])^{5/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 209 leaves, 6 steps) :

$$\frac{a^{5/2}(163 A+200 B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^3(163 A+200 B)\,\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^3(95 A+104 B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{96 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a^2(11 A+8 B)\,\text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{24 d}+\frac{a A\,\text{Cos}[c+d x]^3(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 479 leaves) :

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(-\frac{(265 A+376 B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{1536}+\right.$$
$$\left.\frac{1}{192}(55 A+64 B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{512}(47 A+40 B)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{192}(5 A+2 B)\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{256}A\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]\right)+$$
$$\frac{1}{64 d}\left(2+\frac{3}{\sqrt{2}}\right)(163 A+200 B)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\text{Cos}[c+d x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 143: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d x]^5 (a+a\,\text{Sec}[c+d x])^{5/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 254 leaves, 7 steps):

$$\frac{a^{5/2}(283 A+326 B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{128 d}+\frac{a^3(283 A+326 B)\,\text{Sin}[c+d x]}{128 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a^3(283 A+326 B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{192 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^3(157 A+170 B)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{240 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a^2(13 A+10 B)\,\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{40 d}+\frac{a A\,\text{Cos}[c+d x]^4(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{5 d}$$

Result (type 4, 500 leaves):

$$\frac{1}{d}\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left(-\frac{(2309\,A+2650\,B)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{15\,360}+\frac{(509\,A+550\,B)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]}{1920}+\frac{(95\,A+94\,B)\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]}{1024}+\right.$$
$$\left.\frac{1}{960}(32\,A+25\,B)\,\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]+\frac{1}{512}(5\,A+2\,B)\,\text{Sin}\left[\frac{9}{2}(c+d\,x)\right]+\frac{1}{640}A\,\text{Sin}\left[\frac{11}{2}(c+d\,x)\right]\right)+$$
$$\frac{1}{256\,d}\left(4+3\sqrt{2}\right)(283\,A+326\,B)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$
$$\text{Cos}[c+d\,x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a(1+\text{Sec}[c+d\,x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 162: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^2(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 126 leaves, 4 steps):

$$\frac{(5\,A+19\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B)\,\text{Tan}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}+\frac{(5\,A-13\,B)\,\text{Tan}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 256 leaves):

$$\frac{(5 A+19 B) \operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right] \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \operatorname{Sec}[c+d x]^{5/2} \sqrt{1+\operatorname{Sec}[c+d x]}}{4 d \sqrt{\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2} (a(1+\operatorname{Sec}[c+d x]))^{5/2}}+$$

$$\frac{1}{d (a (1+\operatorname{Sec}[c+d x]))^{5/2}} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Sec}[c+d x]^3 \left(-\frac{1}{2}(-A+9 B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \left(-A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\frac{1}{4} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \left(3 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+5 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)$$

Problem 163: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x] (A+B \operatorname{Sec}[c+d x])}{(a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 126 leaves, 4 steps):

$$\frac{(3 A+5 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}+\frac{(A-B) \operatorname{Tan}[c+d x]}{4 d (a+a \operatorname{Sec}[c+d x])^{5/2}}+\frac{(3 A+5 B) \operatorname{Tan}[c+d x]}{16 a d (a+a \operatorname{Sec}[c+d x])^{3/2}}$$

Result (type 3, 298 leaves):

$$\left((3 A+5 B) \operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right] \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \operatorname{Sec}[c+d x]^{3/2} \sqrt{1+\operatorname{Sec}[c+d x]} (A+B \operatorname{Sec}[c+d x])\right) \Big/ \left(4 d (B+A \operatorname{Cos}[c+d x]) \sqrt{\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2} (a(1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$

$$\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Sec}[c+d x]^2 (A+B \operatorname{Sec}[c+d x]) \left(\frac{1}{2}(7 A+B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \left(A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]-B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\frac{1}{4} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \left(-11 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right) \Big/ \left(d (B+A \operatorname{Cos}[c+d x]) (a(1+\operatorname{Sec}[c+d x]))^{5/2}\right)$$

Problem 164: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B \operatorname{Sec}[c+d x]}{(a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 164 leaves, 7 steps):

$$\frac{2 A \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{a^{5/2} d}-\frac{(43 A-3 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-\frac{(A-B) \operatorname{Tan}[c+d x]}{4 d (a+a \operatorname{Sec}[c+d x])^{5/2}}-\frac{(11 A-3 B) \operatorname{Tan}[c+d x]}{16 a d (a+a \operatorname{Sec}[c+d x])^{3/2}}$$

Result (type 3, 343 leaves) :

$$\left(\left(\left((-43 A+3 B) \operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right]+32 \sqrt{2} A \operatorname{ArcTan}\left[\frac{\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}}}\right]\right)\right.\right.$$

$$\left.\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \operatorname{Sec}[c+d x]^{3/2} \sqrt{1+\operatorname{Sec}[c+d x]}\,(A+B \operatorname{Sec}[c+d x])\right) \Big/$$

$$\left(4 d (B+A \operatorname{Cos}[c+d x]) \sqrt{\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2}\,(a(1+\operatorname{Sec}[c+d x]))^{5/2}\right)+\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Sec}[c+d x]^2 (A+B \operatorname{Sec}[c+d x])\right.$$

$$\left(\frac{1}{2}(-15 A+7 B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(19 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]-11 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\right.$$

$$\left.\left.\left.\frac{1}{2} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4\left(-A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right) \Big/ \left(d (B+A \operatorname{Cos}[c+d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\right)$$

- **Problem 167: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{A+A \operatorname{Sec}[c+d x]}{\sqrt{a-a \operatorname{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 89 leaves, 5 steps) :

$$\frac{2 A \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a-a \operatorname{Sec}[c+d x]}}\right]}{\sqrt{a}\, d}-\frac{2 \sqrt{2} A \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \operatorname{Sec}[c+d x]}}\right]}{\sqrt{a}\, d}$$

Result (type 3, 176 leaves) :

$$-\left(A\left(-1+e^{i (c+d x)}\right)\right.$$

$$\left.\left(\sqrt{2} d x+i \sqrt{2} \operatorname{ArcSinh}\left[e^{i (c+d x)}\right]+4 i \operatorname{Log}\left[1-e^{i (c+d x)}\right]+i \sqrt{2} \operatorname{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-4 i \operatorname{Log}\left[1+e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/$$

$$\left(\sqrt{2} d \sqrt{1+e^{2 i (c+d x)}} \sqrt{a-a \operatorname{Sec}[c+d x]}\right)$$

- **Problem 168: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c+d x] (A+A \operatorname{Sec}[c+d x])}{\sqrt{a-a \operatorname{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 115 leaves, 6 steps):

$$\frac{3\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{2\,\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{A\,\text{Sin}[c+d\,x]}{d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 382 leaves):

$$A\left(\left(e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,(1+\text{Cos}[c+d\,x])\right.\right.$$
$$\left(-3\,i\,d\,x+3\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+4\,\sqrt{2}\,\text{Log}\left[1-e^{i\,(c+d\,x)}\right]+3\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-4\,\sqrt{2}\,\text{Log}\left[1+e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Tan}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\Big/\left(2\,\sqrt{2}\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}\right)+\frac{1}{\sqrt{a-a\,\text{Sec}[c+d\,x]}}$$
$$\left.(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sec}[c+d\,x]\left(\frac{\text{Cos}\left[\frac{c}{2}\right]\text{Cos}\left[\frac{d\,x}{2}\right]}{2\,d}+\frac{\text{Cos}\left[\frac{3\,c}{2}\right]\text{Cos}\left[\frac{3\,d\,x}{2}\right]}{2\,d}-\frac{\text{Sin}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{2\,d}-\frac{\text{Sin}\left[\frac{3\,c}{2}\right]\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{2\,d}\right)\text{Tan}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)$$

- **Problem 169: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2\,(A+A\,\text{Sec}[c+d\,x])}{\sqrt{a-a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 155 leaves, 7 steps):

$$\frac{11\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{4\,\sqrt{a}\,d}-\frac{2\,\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{5\,A\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}+\frac{A\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 332 leaves):

$$\frac{1}{8\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}$$
$$A\,e^{-i\,(c+d\,x)}\left(7+6\,e^{-i\,(c+d\,x)}+7\,e^{i\,(c+d\,x)}+e^{-2\,i\,(c+d\,x)}+6\,e^{2\,i\,(c+d\,x)}+e^{3\,i\,(c+d\,x)}-11\,i\,d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,x+11\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+\right.$$
$$16\,\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1-e^{i\,(c+d\,x)}\right]+11\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$\left.16\,\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1+e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\text{Sec}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+i\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]$$

- **Problem 170: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Cos}[c+d x]^3 (A+A \text{Sec}[c+d x])}{\sqrt{a-a \text{Sec}[c+d x]}} \, dx$$

Optimal (type 3, 192 leaves, 8 steps):

$$\frac{23 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a-a \text{Sec}[c+d x]}}\right]}{8 \sqrt{a} d}-\frac{2 \sqrt{2} A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \text{Sec}[c+d x]}}\right]}{\sqrt{a} d}+\frac{9 A \text{Sin}[c+d x]}{8 d \sqrt{a-a \text{Sec}[c+d x]}}+\frac{7 A \text{Cos}[c+d x] \text{Sin}[c+d x]}{12 d \sqrt{a-a \text{Sec}[c+d x]}}+\frac{A \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 d \sqrt{a-a \text{Sec}[c+d x]}}$$

Result (type 3, 362 leaves):

$$\frac{1}{48 d \sqrt{a-a \text{Sec}[c+d x]}} A e^{-i (c+d x)} \left(47+40 e^{-i (c+d x)}+47 e^{i (c+d x)}+9 e^{-2 i (c+d x)}+40 e^{2 i (c+d x)}+2 e^{-3 i (c+d x)}+9 e^{3 i (c+d x)}+2 e^{4 i (c+d x)}-69 i d \sqrt{1+e^{2 i (c+d x)}} x+69 \sqrt{1+e^{2 i (c+d x)}} \text{ArcSinh}\left[e^{i (c+d x)}\right]+96 \sqrt{2} \sqrt{1+e^{2 i (c+d x)}} \text{Log}\left[1-e^{i (c+d x)}\right]+69 \sqrt{1+e^{2 i (c+d x)}} \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-96 \sqrt{2} \sqrt{1+e^{2 i (c+d x)}} \text{Log}\left[1+e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right) \text{Sec}[c+d x] \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+i \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]$$

- **Problem 171: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A+A \text{Sec}[c+d x]}{(a-a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 116 leaves, 6 steps):

$$\frac{2 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a-a \text{Sec}[c+d x]}}\right]}{a^{3/2} d}-\frac{3 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \text{Sec}[c+d x]}}\right]}{\sqrt{2} a^{3/2} d}-\frac{A \text{Tan}[c+d x]}{d (a-a \text{Sec}[c+d x])^{3/2}}$$

Result (type 3, 265 leaves):

$$\frac{1}{d (a-a \text{Sec}[c+d x])^{3/2}} A \left(\sqrt{2} e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \left(2 i d x-2 \text{ArcSinh}\left[e^{i (c+d x)}\right]-3 \sqrt{2} \text{Log}\left[1-e^{i (c+d x)}\right]-2 \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+3 \sqrt{2} \text{Log}\left[1+e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)-\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Cos}\left[\frac{3}{2} (c+d x)\right]\right) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{\text{Sec}[c+d x]}\right) \text{Sec}[c+d x]^{3/2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]^3$$

Problem 172: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x] (A+A \text{Sec}[c+d x])}{(a-a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 146 leaves, 7 steps):

$$\frac{5 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a-a \text{Sec}[c+d x]}}\right]}{a^{3/2} d}-\frac{7 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \text{Sec}[c+d x]}}\right]}{\sqrt{2} a^{3/2} d}-\frac{A \text{Sin}[c+d x]}{d (a-a \text{Sec}[c+d x])^{3/2}}+\frac{2 A \text{Sin}[c+d x]}{a d \sqrt{a-a \text{Sec}[c+d x]}}$$

Result (type 3, 281 leaves):

$$\frac{1}{d (a-a \text{Sec}[c+d x])^{3/2}} A \left(\sqrt{2} e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \left(5 i d x-5 \text{ArcSinh}\left[e^{i (c+d x)}\right]-7 \sqrt{2} \text{Log}\left[1-e^{i (c+d x)}\right]-5 \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+7 \sqrt{2} \text{Log}\left[1+e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{1}{2} \left(-2 \text{Cos}\left[\frac{1}{2} (c+d x)\right]-3 \text{Cos}\left[\frac{3}{2} (c+d x)\right]+\text{Cos}\left[\frac{5}{2} (c+d x)\right]\right) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{\text{Sec}[c+d x]}\right) \text{Sec}[c+d x]^{3/2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]^3$$

Problem 173: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x]^2 (A+A \text{Sec}[c+d x])}{(a-a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 194 leaves, 8 steps):

$$\frac{31 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a-a \text{Sec}[c+d x]}}\right]}{4 a^{3/2} d}-\frac{11 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \text{Sec}[c+d x]}}\right]}{\sqrt{2} a^{3/2} d}-\frac{A \text{Cos}[c+d x] \text{Sin}[c+d x]}{d (a-a \text{Sec}[c+d x])^{3/2}}+\frac{13 A \text{Sin}[c+d x]}{4 a d \sqrt{a-a \text{Sec}[c+d x]}}+\frac{3 A \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a d \sqrt{a-a \text{Sec}[c+d x]}}$$

Result (type 3, 296 leaves):

$$\frac{1}{4 d (a-a \text{Sec}[c+d x])^{3/2}} A \left(\sqrt{2} e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \left(31 i d x-31 \text{ArcSinh}\left[e^{i (c+d x)}\right]-44 \sqrt{2} \text{Log}\left[1-e^{i (c+d x)}\right]-31 \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+44 \sqrt{2} \text{Log}\left[1+e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{1}{2} \left(-9 \text{Cos}\left[\frac{1}{2} (c+d x)\right]-16 \text{Cos}\left[\frac{3}{2} (c+d x)\right]+8 \text{Cos}\left[\frac{5}{2} (c+d x)\right]+\text{Cos}\left[\frac{7}{2} (c+d x)\right]\right) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{\text{Sec}[c+d x]}\right) \text{Sec}[c+d x]^{3/2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]^3$$

Problem 174: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x]^3 (A+A \text{Sec}[c+d x])}{(a-a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 236 leaves, 9 steps):

$$\frac{85 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a-a \text{Sec}[c+d x]}}\right]}{8 a^{3/2} d}-\frac{15 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \text{Sec}[c+d x]}}\right]}{\sqrt{2} a^{3/2} d}-\frac{A \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{d (a-a \text{Sec}[c+d x])^{3/2}}+\frac{35 A \text{Sin}[c+d x]}{8 a d \sqrt{a-a \text{Sec}[c+d x]}}+\frac{25 A \text{Cos}[c+d x] \text{Sin}[c+d x]}{12 a d \sqrt{a-a \text{Sec}[c+d x]}}+\frac{4 A \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 a d \sqrt{a-a \text{Sec}[c+d x]}}$$

Result (type 3, 314 leaves):

$$\frac{1}{8 (a-a \text{Sec}[c+d x])^{3/2}} A \left(-1/\text{d5} \sqrt{2} e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \left(-17 i d x+17 \text{ArcSinh}\left[e^{i (c+d x)}\right]+24 \sqrt{2} \text{Log}\left[1-e^{i (c+d x)}\right]+17 \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-24 \sqrt{2} \text{Log}\left[1+e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+1/(6 d) \left(-61 \text{Cos}\left[\frac{1}{2} (c+d x)\right]-120 \text{Cos}\left[\frac{3}{2} (c+d x)\right]+72 \text{Cos}\left[\frac{5}{2} (c+d x)\right]+11 \text{Cos}\left[\frac{7}{2} (c+d x)\right]+2 \text{Cos}\left[\frac{9}{2} (c+d x)\right]\right) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{\text{Sec}[c+d x]}\right) \text{Sec}[c+d x]^{3/2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]^3$$

Problem 175: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+A \text{Sec}[c+d x]}{(a-a \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 152 leaves, 7 steps):

$$\frac{2 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a-a \text{Sec}[c+d x]}}\right]}{a^{5/2} d}-\frac{23 A \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a-a \text{Sec}[c+d x]}}\right]}{8 \sqrt{2} a^{5/2} d}-\frac{A \text{Tan}[c+d x]}{2 d (a-a \text{Sec}[c+d x])^{5/2}}-\frac{7 A \text{Tan}[c+d x]}{8 a d (a-a \text{Sec}[c+d x])^{3/2}}$$

Result (type 3, 421 leaves):

$$A\left(\left(e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\left(-16\,i\,d\,x+16\,\text{ArcSinh}\left[e^{i(c+dx)}\right]+23\sqrt{2}\,\text{Log}\left[1-e^{i(c+dx)}\right]+16\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-23\sqrt{2}\,\text{Log}\left[1+e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\text{Sec}[c+dx]^{5/2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\right)\Big/\left(2\sqrt{2}\,d\,(a-a\,\text{Sec}[c+dx])^{5/2}\right)+$$

$$\frac{1}{(a-a\,\text{Sec}[c+dx])^{5/2}}\text{Sec}[c+dx]^3\left(-\frac{11\,\text{Cos}\left[\frac{c}{2}\right]\text{Cos}\left[\frac{dx}{2}\right]}{d}+\frac{15\,\text{Cot}\left[\frac{c}{2}\right]\text{Csc}\left[\frac{c}{2}+\frac{dx}{2}\right]}{2\,d}-\frac{\text{Cot}\left[\frac{c}{2}\right]\text{Csc}\left[\frac{c}{2}+\frac{dx}{2}\right]^3}{d}-\frac{15\,\text{Csc}\left[\frac{c}{2}\right]\text{Csc}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Sin}\left[\frac{dx}{2}\right]}{2\,d}+\frac{\text{Csc}\left[\frac{c}{2}\right]\text{Csc}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sin}\left[\frac{dx}{2}\right]}{d}+\frac{11\,\text{Sin}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{d}\right)\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\right)$$

- **Problem 176: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Cos}[c+dx]\,(A+A\,\text{Sec}[c+dx])}{(a-a\,\text{Sec}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 184 leaves, 8 steps):

$$\frac{7\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a-a\,\text{Sec}[c+dx]}}\right]}{a^{5/2}\,d}-\frac{79\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{2}\sqrt{a-a\,\text{Sec}[c+dx]}}\right]}{8\sqrt{2}\,a^{5/2}\,d}-\frac{A\,\text{Sin}[c+dx]}{2\,d\,(a-a\,\text{Sec}[c+dx])^{5/2}}-\frac{11\,A\,\text{Sin}[c+dx]}{8\,a\,d\,(a-a\,\text{Sec}[c+dx])^{3/2}}+\frac{23\,A\,\text{Sin}[c+dx]}{8\,a^2\,d\sqrt{a-a\,\text{Sec}[c+dx]}}$$

Result (type 3, 298 leaves):

$$\frac{1}{4\,d\,(a-a\,\text{Sec}[c+dx])^{5/2}}A\left(\sqrt{2}\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\left(-56\,i\,d\,x+56\,\text{ArcSinh}\left[e^{i(c+dx)}\right]+79\sqrt{2}\,\text{Log}\left[1-e^{i(c+dx)}\right]+56\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-79\sqrt{2}\,\text{Log}\left[1+e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)+\frac{1}{4}\left(-12\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]+23\,\text{Cos}\left[\frac{3}{2}(c+dx)\right]-31\,\text{Cos}\left[\frac{5}{2}(c+dx)\right]+4\,\text{Cos}\left[\frac{7}{2}(c+dx)\right]\right)\text{Csc}\left[\frac{1}{2}(c+dx)\right]^4\sqrt{\text{Sec}[c+dx]}\right)\text{Sec}[c+dx]^{5/2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]^5$$

- **Problem 177: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Cos}[c+dx]^2\,(A+A\,\text{Sec}[c+dx])}{(a-a\,\text{Sec}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 236 leaves, 9 steps):

$$\frac{59\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{4\,a^{5/2}\,d}-\frac{167\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{8\,\sqrt{2}\,a^{5/2}\,d}-\frac{A\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,d\,(a-a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{15\,A\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{8\,a\,d\,(a-a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{49\,A\,\text{Sin}[c+d\,x]}{8\,a^2\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}+\frac{23\,A\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{8\,a^2\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 308 leaves):

$$\frac{1}{4\,d\,(a-a\,\text{Sec}[c+d\,x])^{5/2}}\,A\left(\sqrt{2}\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(-118\,i\,d\,x+118\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+167\,\sqrt{2}\,\text{Log}\left[1-e^{i\,(c+d\,x)}\right]+118\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-167\,\sqrt{2}\,\text{Log}\left[1+e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{4}\left(-19\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+54\,\text{Cos}\left[\frac{3}{2}\,(c+d\,x)\right]-62\,\text{Cos}\left[\frac{5}{2}\,(c+d\,x)\right]+10\,\text{Cos}\left[\frac{7}{2}\,(c+d\,x)\right]+\text{Cos}\left[\frac{9}{2}\,(c+d\,x)\right]\right)\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\sqrt{\text{Sec}[c+d\,x]}\right)\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$

- **Problem 178: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Cos}[c+d\,x]^3\,(A+A\,\text{Sec}[c+d\,x])}{(a-a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 280 leaves, 10 steps):

$$\frac{203\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{8\,a^{5/2}\,d}-\frac{287\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}\right]}{8\,\sqrt{2}\,a^{5/2}\,d}-\frac{A\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{2\,d\,(a-a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{19\,A\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{8\,a\,d\,(a-a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{21\,A\,\text{Sin}[c+d\,x]}{2\,a^2\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}+\frac{119\,A\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{24\,a^2\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}+\frac{77\,A\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{24\,a^2\,d\,\sqrt{a-a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 323 leaves):

$$\frac{1}{12\,d\,(a-a\,\mathrm{Sec}[c+d\,x])^{5/2}}\,A\,\Bigg(21\,\sqrt{2}\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}$$

$$\left(-29\,i\,d\,x+29\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+41\,\sqrt{2}\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}\right]+29\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-41\,\sqrt{2}\,\mathrm{Log}\left[1+e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$

$$\frac{1}{8}\left(-173\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+575\,\mathrm{Cos}\left[\frac{3}{2}\,(c+d\,x)\right]-625\,\mathrm{Cos}\left[\frac{5}{2}\,(c+d\,x)\right]+112\,\mathrm{Cos}\left[\frac{7}{2}\,(c+d\,x)\right]+13\,\mathrm{Cos}\left[\frac{9}{2}\,(c+d\,x)\right]+2\,\mathrm{Cos}\left[\frac{11}{2}\,(c+d\,x)\right]\right)$$

$$\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\sqrt{\mathrm{Sec}[c+d\,x]}\Bigg)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$

- **Problem 186: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 234 leaves, 9 steps) :

$$-\frac{4\,a^2\,(4\,A+3\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,d}+$$

$$\frac{4\,a^2\,(7\,A+6\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{21\,d}+\frac{4\,a^2\,(4\,A+3\,B)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d}+$$

$$\frac{4\,a^2\,(7\,A+6\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{21\,d}+\frac{2\,a^2\,(7\,A+9\,B)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{35\,d}+\frac{2\,B\,\mathrm{Sec}[c+d\,x]^{5/2}\,\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 731 leaves) :

$$-\frac{1}{5\,d\,(B+A\,\mathrm{Cos}[c+d\,x])}$$

$$2\sqrt{2}\,A\,e^{-i\,(2c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])-$$

$$\left(3\,B\,e^{-i\,(2c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\right)\Big/\left(5\sqrt{2}\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\right)+$$

$$\frac{A\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])}{3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^{5/2}}+$$

$$\frac{2\,B\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])}{7\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^{5/2}}+$$

$$\left(\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\right.$$

$$\left(\frac{(4A+3B)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]}{5\,d}+\frac{B\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}[d\,x]}{14\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(5\,B\,\mathrm{Sin}[c]+7\,A\,\mathrm{Sin}[d\,x]+14\,B\,\mathrm{Sin}[d\,x])}{70\,d}+\right.$$

$$\left.\left.\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(21\,A\,\mathrm{Sin}[c]+42\,B\,\mathrm{Sin}[c]+70\,A\,\mathrm{Sin}[d\,x]+60\,B\,\mathrm{Sin}[d\,x])}{210\,d}+\frac{(7A+6B)\,\mathrm{Tan}[c]}{21\,d}\right)\right)\Big/\left((B+A\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 187: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 199 leaves, 8 steps):

$$-\frac{4\,a^2\,(5A+4B)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,d}+\frac{4\,a^2\,(2A+B)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,d}+$$

$$\frac{4\,a^2\,(5A+4B)\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d}+\frac{2\,a^2\,(5A+7B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,d}+\frac{2\,B\,\mathrm{Sec}[c+d\,x]^{3/2}\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 685 leaves):

$$-\frac{1}{\sqrt{2}\, d\, (B + A \operatorname{Cos}[c + d x])}$$

$$A\, e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}}\, \operatorname{Cos}[c + d x]^3 \operatorname{Csc}[c] \left(1 + e^{2 i (c+d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)$$

$$\operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \operatorname{Sec}[c + d x])^2 (A + B \operatorname{Sec}[c + d x]) - \frac{1}{5 d (B + A \operatorname{Cos}[c + d x])}$$

$$2 \sqrt{2}\, B\, e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}}\, \operatorname{Cos}[c + d x]^3 \operatorname{Csc}[c] \left(1 + e^{2 i (c+d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)$$

$$\operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \operatorname{Sec}[c + d x])^2 (A + B \operatorname{Sec}[c + d x]) +$$

$$\frac{2 A \sqrt{\operatorname{Cos}[c + d x]}\, \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \operatorname{Sec}[c + d x])^2 (A + B \operatorname{Sec}[c + d x])}{3 d (B + A \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2}} +$$

$$\frac{B \sqrt{\operatorname{Cos}[c + d x]}\, \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \operatorname{Sec}[c + d x])^2 (A + B \operatorname{Sec}[c + d x])}{3 d (B + A \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2}} +$$

$$\left(\operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \operatorname{Sec}[c + d x])^2 (A + B \operatorname{Sec}[c + d x]) \left(\frac{(5 A + 4 B) \operatorname{Cos}[d x] \operatorname{Csc}[c]}{5 d} + \frac{B \operatorname{Sec}[c] \operatorname{Sec}[c + d x]^2 \operatorname{Sin}[d x]}{10 d} + \frac{\operatorname{Sec}[c] \operatorname{Sec}[c + d x] (3 B \operatorname{Sin}[c] + 5 A \operatorname{Sin}[d x] + 10 B \operatorname{Sin}[d x])}{30 d} + \frac{(A + 2 B) \operatorname{Tan}[c]}{6 d}\right)\right) \Big/ \left((B + A \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2}\right)$$

- **Problem 188: Result unnecessarily involves higher level functions.**

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^2 (A + B \operatorname{Sec}[c + d x])}{\sqrt{\operatorname{Sec}[c + d x]}}\, dx$$

Optimal (type 4, 160 leaves, 7 steps):

$$-\frac{4 a^2 B \sqrt{\operatorname{Cos}[c + d x]}\, \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{4 a^2 (3 A + 2 B) \sqrt{\operatorname{Cos}[c + d x]}\, \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{3 d} +$$

$$\frac{2 a^2 (3 A + 5 B) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{3 d} + \frac{2 B \sqrt{\operatorname{Sec}[c + d x]} \left(a^2 + a^2 \operatorname{Sec}[c + d x]\right) \operatorname{Sin}[c + d x]}{3 d}$$

Result (type 5, 313 leaves):

$$\frac{1}{12\,d\,(B+A\,\text{Cos}[c+d\,x])}\,a^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(1+\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(-\frac{1}{-1+e^{2\,i\,c}}4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^3\left(3\,B\,\left(1+e^{2\,i\,(c+d\,x)}\right)+3\,B\,\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+(3\,A+2\,B)\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\frac{-3\,(-A-4\,B+A\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]+6\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]+2\,B\,\text{Tan}[c+d\,x]}{\text{Sec}[c+d\,x]^{5/2}}\right)$$

- **Problem 189: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 158 leaves, 7 steps):

$$\frac{4\,a^2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{4\,a^2\,(2\,A+3\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}-\frac{2\,a^2\,(A-3\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 183 leaves):

$$\frac{1}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}a^2\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\left(-i\,\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(12\,A-\frac{24\,A\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}+\frac{8\,(2\,A+3\,B)\,e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}+2\,i\,A\,\text{Sin}[c+d\,x]+6\,i\,B\,\text{Tan}[c+d\,x]\right)$$

- **Problem 190: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 166 leaves, 7 steps):

$$\frac{4 a^2 (4 A + 5 B) \sqrt{\text{Cos}[c + d x]} \text{ EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{5 d} + \frac{4 a^2 (A + 2 B) \sqrt{\text{Cos}[c + d x]} \text{ EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{3 d} + \frac{2 a^2 (7 A + 5 B) \text{Sin}[c + d x]}{15 d \sqrt{\text{Sec}[c + d x]}} + \frac{2 A \left(a^2 + a^2 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{5 d \text{Sec}[c + d x]^{3/2}}$$

Result (type 5, 155 leaves) :

$$\frac{1}{30 d} a^2 \sqrt{\text{Sec}[c + d x]} \left(40 (A + 2 B) \sqrt{\text{Cos}[c + d x]} \text{ EllipticF}\left[\frac{1}{2} (c + d x), 2\right] + 24 i (4 A + 5 B) e^{-i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right] + 2 \text{Cos}[c + d x] (-12 i (4 A + 5 B) + 10 (2 A + B) \text{Sin}[c + d x] + 3 A \text{Sin}[2 (c + d x)])\right)$$

Problem 191: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \text{Sec}[c + d x])^2 (A + B \text{Sec}[c + d x])}{\text{Sec}[c + d x]^{7/2}} dx$$

Optimal (type 4, 201 leaves, 8 steps) :

$$\frac{4 a^2 (3 A + 4 B) \sqrt{\text{Cos}[c + d x]} \text{ EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{5 d} + \frac{4 a^2 (6 A + 7 B) \sqrt{\text{Cos}[c + d x]} \text{ EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{21 d} + \frac{2 a^2 (9 A + 7 B) \text{Sin}[c + d x]}{35 d \text{Sec}[c + d x]^{3/2}} + \frac{4 a^2 (6 A + 7 B) \text{Sin}[c + d x]}{21 d \sqrt{\text{Sec}[c + d x]}} + \frac{2 A \left(a^2 + a^2 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{7 d \text{Sec}[c + d x]^{5/2}}$$

Result (type 5, 207 leaves) :

$$\frac{1}{420 d} a^2 e^{-i (2 c+d x)} \sqrt{\text{Sec}[c + d x]} \left(80 (6 A + 7 B) \sqrt{\text{Cos}[c + d x]} \text{ EllipticF}\left[\frac{1}{2} (c + d x), 2\right] + 336 i (3 A + 4 B) e^{-i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right] + 2 \text{Cos}[c + d x] (-504 i A - 672 i B + 5 (51 A + 56 B) \text{Sin}[c + d x] + 42 (2 A + B) \text{Sin}[2 (c + d x)] + 15 A \text{Sin}[3 (c + d x)])\right) (\text{Cos}[2 c + d x] + i \text{Sin}[2 c + d x])$$

Problem 192: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \text{Sec}[c + d x])^2 (A + B \text{Sec}[c + d x])}{\text{Sec}[c + d x]^{9/2}} dx$$

Optimal (type 4, 234 leaves, 9 steps) :

$$\frac{4 a^2 (8 A+9 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+\frac{4 a^2 (5 A+6 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+$$
$$\frac{2 a^2 (11 A+9 B) \text{Sin}[c+d x]}{63 d\, \text{Sec}[c+d x]^{5/2}}+\frac{4 a^2 (8 A+9 B) \text{Sin}[c+d x]}{45 d\, \text{Sec}[c+d x]^{3/2}}+\frac{4 a^2 (5 A+6 B) \text{Sin}[c+d x]}{21 d \sqrt{\text{Sec}[c+d x]}}+\frac{2 A \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{9 d\, \text{Sec}[c+d x]^{7/2}}$$

Result (type 5, 231 leaves) :

$$\frac{1}{2520 d} a^2 e^{-i (2 c+d x)} \sqrt{\text{Sec}[c+d x]} \left(480 (5 A+6 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]+\right.$$
$$672 i (8 A+9 B) e^{-i (c+d x)} \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+$$
$$2 \text{Cos}[c+d x] (-2688 i A-3024 i B+30 (46 A+51 B) \text{Sin}[c+d x]+14 (37 A+36 B) \text{Sin}[2 (c+d x)]+$$
$$\left.180 A \text{Sin}[3 (c+d x)]+90 B \text{Sin}[3 (c+d x)]+35 A \text{Sin}[4 (c+d x)])\right) (\text{Cos}[2 c+d x]+i \text{Sin}[2 c+d x])$$

- **Problem 193: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 277 leaves, 10 steps) :

$$-\frac{4 a^3 (21 A+17 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+$$
$$\frac{4 a^3 (13 A+11 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+\frac{4 a^3 (21 A+17 B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 d}+$$
$$\frac{4 a^3 (13 A+11 B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{21 d}+\frac{4 a^3 (24 A+23 B) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{105 d}+$$
$$\frac{2 a B \text{Sec}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{9 d}+\frac{2 (9 A+13 B) \text{Sec}[c+d x]^{5/2} \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{63 d}$$

Result (type 5, 773 leaves) :

$$-\left(7\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\right)\Big/\left(10\,\sqrt{2}\,d\,(B+A\,\text{Cos}[c+d\,x])\right)-$$

$$\left(17\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\right)\Big/\left(30\,\sqrt{2}\,d\,(B+A\,\text{Cos}[c+d\,x])\right)+$$

$$\frac{13\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])}{42\,d\,(B+A\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{7/2}}+$$

$$\frac{11\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])}{42\,d\,(B+A\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{7/2}}+$$

$$\left(\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\left(\frac{(21\,A+17\,B)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{30\,d}+\frac{B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{36\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(7\,B\,\text{Sin}[c]+9\,A\,\text{Sin}[d\,x]+27\,B\,\text{Sin}[d\,x])}{252\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(45\,A\,\text{Sin}[c]+135\,B\,\text{Sin}[c]+189\,A\,\text{Sin}[d\,x]+238\,B\,\text{Sin}[d\,x])}{1260\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(189\,A\,\text{Sin}[c]+238\,B\,\text{Sin}[c]+390\,A\,\text{Sin}[d\,x]+330\,B\,\text{Sin}[d\,x])}{1260\,d}+\frac{(13\,A+11\,B)\,\text{Tan}[c]}{42\,d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)$$

- **Problem 194: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 244 leaves, 9 steps):

$$-\frac{4 a^3 (9 A+7 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+$$
$$\frac{4 a^3 (21 A+13 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+$$
$$\frac{4 a^3 (9 A+7 B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 d}+\frac{4 a^3 (42 A+41 B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{105 d}+$$
$$\frac{2 a B \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{7 d}+\frac{2 (7 A+11 B) \text{Sec}[c+d x]^{3/2} \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{35 d}$$

Result (type 5, 731 leaves) :

$$-\left(9 A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right) \Big/ \left(10 \sqrt{2} d (B+A \text{Cos}[c+d x])\right)-$$
$$\left(7 B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right) \Big/ \left(10 \sqrt{2} d (B+A \text{Cos}[c+d x])\right)+$$
$$\frac{A \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{2 d (B+A \text{Cos}[c+d x]) \text{Sec}[c+d x]^{7/2}}+$$
$$\frac{13 B \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{42 d (B+A \text{Cos}[c+d x]) \text{Sec}[c+d x]^{7/2}}+$$
$$\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right.$$
$$\left(\frac{(9 A+7 B) \text{Cos}[d x] \text{Csc}[c]}{10 d}+\frac{B \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{28 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (5 B \text{Sin}[c]+7 A \text{Sin}[d x]+21 B \text{Sin}[d x])}{140 d}+\right.$$
$$\frac{\text{Sec}[c] \text{Sec}[c+d x] (21 A \text{Sin}[c]+63 B \text{Sin}[c]+105 A \text{Sin}[d x]+130 B \text{Sin}[d x])}{420 d}+$$
$$\left.\left.\frac{(21 A+26 B) \text{Tan}[c]}{84 d}\right)\right) \Big/ \left((B+A \text{Cos}[c+d x]) \text{Sec}[c+d x]^{7/2}\right)$$

Problem 195: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a\,\mathrm{Sec}[c + d\,x])^3\,(A + B\,\mathrm{Sec}[c + d\,x])}{\sqrt{\mathrm{Sec}[c + d\,x]}}\,dx$$

Optimal (type 4, 211 leaves, 8 steps):

$$-\frac{4\,a^3\,(5\,A + 9\,B)\,\sqrt{\mathrm{Cos}[c + d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c + d\,x]}}{5\,d} + \frac{4\,a^3\,(5\,A + 3\,B)\,\sqrt{\mathrm{Cos}[c + d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c + d\,x]}}{3\,d} + \frac{4\,a^3\,(20\,A + 21\,B)\,\sqrt{\mathrm{Sec}[c + d\,x]}\;\mathrm{Sin}[c + d\,x]}{15\,d} + \frac{2\,a\,B\,\sqrt{\mathrm{Sec}[c + d\,x]}\,(a + a\,\mathrm{Sec}[c + d\,x])^2\,\mathrm{Sin}[c + d\,x]}{5\,d} + \frac{2\,(5\,A + 9\,B)\,\sqrt{\mathrm{Sec}[c + d\,x]}\,\left(a^3 + a^3\,\mathrm{Sec}[c + d\,x]\right)\,\mathrm{Sin}[c + d\,x]}{15\,d}$$

Result (type 5, 257 leaves):

$$\frac{1}{30\,d}a^3\,e^{-i\,(2\,c+d\,x)}\,\mathrm{Sec}[c + d\,x]^{5/2}\,\Big(90\,i\,A\,\mathrm{Cos}[c + d\,x] + 162\,i\,B\,\mathrm{Cos}[c + d\,x] + 30\,i\,A\,\mathrm{Cos}[3\,(c + d\,x)] + 54\,i\,B\,\mathrm{Cos}[3\,(c + d\,x)] + 40\,(5\,A + 3\,B)\,\mathrm{Cos}[c + d\,x]^{5/2}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right] - 6\,i\,(5\,A + 9\,B)\,e^{-3\,i\,(c+d\,x)}\,\left(1 + e^{2\,i\,(c+d\,x)}\right)^{5/2}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right] + 45\,A\,\mathrm{Sin}[c + d\,x] + 66\,B\,\mathrm{Sin}[c + d\,x] + 10\,A\,\mathrm{Sin}[2\,(c + d\,x)] + 30\,B\,\mathrm{Sin}[2\,(c + d\,x)] + 45\,A\,\mathrm{Sin}[3\,(c + d\,x)] + 54\,B\,\mathrm{Sin}[3\,(c + d\,x)]\Big)\,(\mathrm{Cos}[2\,c + d\,x] + i\,\mathrm{Sin}[2\,c + d\,x])$$

Problem 196: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a\,\mathrm{Sec}[c + d\,x])^3\,(A + B\,\mathrm{Sec}[c + d\,x])}{\mathrm{Sec}[c + d\,x]^{3/2}}\,dx$$

Optimal (type 4, 199 leaves, 8 steps):

$$\frac{4\,a^3\,(A - B)\,\sqrt{\mathrm{Cos}[c + d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c + d\,x]}}{d} + \frac{20\,a^3\,(A + B)\,\sqrt{\mathrm{Cos}[c + d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c + d\,x]}}{3\,d} + \frac{4\,a^3\,(A + 4\,B)\,\sqrt{\mathrm{Sec}[c + d\,x]}\;\mathrm{Sin}[c + d\,x]}{3\,d} + \frac{2\,a\,A\,(a + a\,\mathrm{Sec}[c + d\,x])^2\,\mathrm{Sin}[c + d\,x]}{3\,d\,\sqrt{\mathrm{Sec}[c + d\,x]}} - \frac{2\,(A - B)\,\sqrt{\mathrm{Sec}[c + d\,x]}\,\left(a^3 + a^3\,\mathrm{Sec}[c + d\,x]\right)\,\mathrm{Sin}[c + d\,x]}{3\,d}$$

Result (type 5, 226 leaves):

$$\frac{1}{6 d} a^3 e^{-i (2 c+d x)} \operatorname{Sec}[c+d x]^{3/2} \left(-12 i A+12 i B-12 i A \operatorname{Cos}[2 (c+d x)]+12 i B \operatorname{Cos}[2 (c+d x)]+40 (A+B) \operatorname{Cos}[c+d x]^{3/2} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]+ 12 i (A-B) e^{-2 i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{3/2} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+A \operatorname{Sin}[c+d x]+ 4 B \operatorname{Sin}[c+d x]+6 A \operatorname{Sin}[2 (c+d x)]+18 B \operatorname{Sin}[2 (c+d x)]+A \operatorname{Sin}[3 (c+d x)]\right) (\operatorname{Cos}[2 c+d x]+i \operatorname{Sin}[2 c+d x])$$

Problem 197: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \operatorname{Sec}[c+d x])^3 (A+B \operatorname{Sec}[c+d x])}{\operatorname{Sec}[c+d x]^{5/2}} dx$$

Optimal (type 4, 211 leaves, 8 steps):

$$\frac{4 a^3 (9 A+5 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{5 d}+\frac{4 a^3 (3 A+5 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{3 d}- \frac{4 a^3 (6 A-5 B) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{15 d}+\frac{2 a A (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}[c+d x]}{5 d \operatorname{Sec}[c+d x]^{3/2}}+\frac{2 (9 A+5 B) \left(a^3+a^3 \operatorname{Sec}[c+d x]\right) \operatorname{Sin}[c+d x]}{15 d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 5, 220 leaves):

$$\frac{1}{30 d} a^3 e^{-i (2 c+d x)} \sqrt{\operatorname{Sec}[c+d x]} \left(-216 i A \operatorname{Cos}[c+d x]-120 i B \operatorname{Cos}[c+d x]+40 (3 A+5 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]+ 24 i (9 A+5 B) e^{-i (c+d x)} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+3 A \operatorname{Sin}[c+d x]+ 60 B \operatorname{Sin}[c+d x]+30 A \operatorname{Sin}[2 (c+d x)]+10 B \operatorname{Sin}[2 (c+d x)]+3 A \operatorname{Sin}[3 (c+d x)]\right) (\operatorname{Cos}[2 c+d x]+i \operatorname{Sin}[2 c+d x])$$

Problem 198: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \operatorname{Sec}[c+d x])^3 (A+B \operatorname{Sec}[c+d x])}{\operatorname{Sec}[c+d x]^{7/2}} dx$$

Optimal (type 4, 211 leaves, 8 steps):

$$\frac{4 a^3 (7 A+9 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{5 d}+ \frac{4 a^3 (13 A+21 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{21 d}+\frac{4 a^3 (41 A+42 B) \operatorname{Sin}[c+d x]}{105 d \sqrt{\operatorname{Sec}[c+d x]}}+ \frac{2 a A (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Sin}[c+d x]}{7 d \operatorname{Sec}[c+d x]^{5/2}}+\frac{2 (11 A+7 B) \left(a^3+a^3 \operatorname{Sec}[c+d x]\right) \operatorname{Sin}[c+d x]}{35 d \operatorname{Sec}[c+d x]^{3/2}}$$

Result (type 5, 208 leaves):

$$\frac{1}{420\,d} a^3 e^{-i(2c+dx)} \sqrt{\text{Sec}[c+dx]} \left(80\,(13A+21B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]+ 336\,i\,(7A+9B)\,e^{-i(c+dx)}\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+2\,\text{Cos}[c+dx]\,(-168\,i\,(7A+9B)+5\,(107A+84B)\,\text{Sin}[c+dx]+42\,(3A+B)\,\text{Sin}[2(c+dx)]+15A\,\text{Sin}[3(c+dx)])\right)(\text{Cos}[2c+dx]+i\,\text{Sin}[2c+dx])$$

- **Problem 199: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\text{Sec}[c+dx])^3\,(A+B\,\text{Sec}[c+dx])}{\text{Sec}[c+dx]^{9/2}}\,dx$$

Optimal (type 4, 244 leaves, 9 steps):

$$\frac{4a^3(17A+21B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{15\,d}+\frac{4a^3(11A+13B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{21\,d}+\frac{4a^3(23A+24B)\,\text{Sin}[c+dx]}{105\,d\,\text{Sec}[c+dx]^{3/2}}+\frac{4a^3(11A+13B)\,\text{Sin}[c+dx]}{21\,d\sqrt{\text{Sec}[c+dx]}}+\frac{2aA\,(a+a\,\text{Sec}[c+dx])^2\,\text{Sin}[c+dx]}{9\,d\,\text{Sec}[c+dx]^{7/2}}+\frac{2\,(13A+9B)\left(a^3+a^3\,\text{Sec}[c+dx]\right)\text{Sin}[c+dx]}{63\,d\,\text{Sec}[c+dx]^{5/2}}$$

Result (type 5, 197 leaves):

$$\frac{1}{2520\,d} a^3 \sqrt{\text{Sec}[c+dx]} \left(480\,(11A+13B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]+ 672\,i\,(17A+21B)\,e^{-i(c+dx)}\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+2\,\text{Cos}[c+dx]\,(-5712\,i\,A-7056\,i\,B+ 30\,(97A+107B)\,\text{Sin}[c+dx]+14\,(73A+54B)\,\text{Sin}[2(c+dx)]+270A\,\text{Sin}[3(c+dx)]+90B\,\text{Sin}[3(c+dx)]+35A\,\text{Sin}[4(c+dx)])\right)$$

- **Problem 200: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+dx])^3\,(A+B\,\text{Sec}[c+dx])}{\text{Sec}[c+dx]^{11/2}}\,dx$$

Optimal (type 4, 277 leaves, 10 steps):

$$\frac{4 a^3 (15 A+17 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+$$

$$\frac{4 a^3 (105 A+121 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{231 d}+\frac{20 a^3 (21 A+22 B) \text{Sin}[c+d x]}{693 d\, \text{Sec}[c+d x]^{5/2}}+\frac{4 a^3 (15 A+17 B) \text{Sin}[c+d x]}{45 d\, \text{Sec}[c+d x]^{3/2}}+$$

$$\frac{4 a^3 (105 A+121 B) \text{Sin}[c+d x]}{231 d \sqrt{\text{Sec}[c+d x]}}+\frac{2 a A (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{11 d\, \text{Sec}[c+d x]^{9/2}}+\frac{2 (15 A+11 B) \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{99 d\, \text{Sec}[c+d x]^{7/2}}$$

Result (type 5, 864 leaves) :

$$\left(A\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right)\Big/\left(2 \sqrt{2}\ d\, (B+A \text{Cos}[c+d x])\right)+$$

$$\left(17 B\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right)\Big/\left(30 \sqrt{2}\ d\, (B+A \text{Cos}[c+d x])\right)+$$

$$\frac{5 A \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{22 d\, (B+A \text{Cos}[c+d x])\, \text{Sec}[c+d x]^{7/2}}+$$

$$\frac{11 B \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{42 d\, (B+A \text{Cos}[c+d x])\, \text{Sec}[c+d x]^{7/2}}+$$

$$\frac{1}{(B+A \text{Cos}[c+d x])\, \text{Sec}[c+d x]^{7/2}}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \left(-\frac{(645 A+743 B+795 A \text{Cos}[2 c]+889 B \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}[c]}{2880 d}+\right.$$

$$\frac{(4473 A+4664 B) \text{Cos}[2 d x] \text{Sin}[2 c]}{29568 d}+\frac{(165 A+151 B) \text{Cos}[3 d x] \text{Sin}[3 c]}{2880 d}+\frac{(49 A+33 B) \text{Cos}[4 d x] \text{Sin}[4 c]}{2464 d}+$$

$$\frac{(3 A+B) \text{Cos}[5 d x] \text{Sin}[5 c]}{576 d}+\frac{A \text{Cos}[6 d x] \text{Sin}[6 c]}{1408 d}+\frac{(795 A+889 B) \text{Cos}[c] \text{Sin}[d x]}{1440 d}+\frac{(4473 A+4664 B) \text{Cos}[2 c] \text{Sin}[2 d x]}{29568 d}+$$

$$\left.\frac{(165 A+151 B) \text{Cos}[3 c] \text{Sin}[3 d x]}{2880 d}+\frac{(49 A+33 B) \text{Cos}[4 c] \text{Sin}[4 d x]}{2464 d}+\frac{(3 A+B) \text{Cos}[5 c] \text{Sin}[5 d x]}{576 d}+\frac{A \text{Cos}[6 c] \text{Sin}[6 d x]}{1408 d}\right)$$

- **Problem 201: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d\,x]^{7/2}\,(A+B\,\text{Sec}[c+d\,x])}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 229 leaves, 9 steps):

$$\frac{3\,(5\,A-7\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,a\,d}+\frac{5\,(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a\,d}-\frac{3\,(5\,A-7\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,a\,d}+\frac{5\,(A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}-\frac{(5\,A-7\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}+\frac{(A-B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 794 leaves):

$$\left(3\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right](A+B\,\mathrm{Sec}[c+d\,x])\right)\Big/\left(\sqrt{2}\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])\right)-$$

$$\left(21\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right](A+B\,\mathrm{Sec}[c+d\,x])\right)\Big/\left(5\sqrt{2}\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])\right)+$$

$$\left(5\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}[c]\right)\Big/$$
$$(3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x]))-$$

$$\left(5\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}[c]\right)\Big/$$
$$(3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x]))+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])\left(\frac{3\,(-5\,A+7\,B)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5\,d}-\right.\right.$$

$$\frac{(-A+B)\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]\left(-\mathrm{Sin}\left[\frac{c}{2}\right]+5\,\mathrm{Sin}\left[\frac{3\,c}{2}\right]\right)}{3\,d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{4\,B\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[d\,x]}{5\,d}+$$

$$\left.\left.\frac{4\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(3\,B\,\mathrm{Sin}[c]+5\,A\,\mathrm{Sin}[d\,x]-5\,B\,\mathrm{Sin}[d\,x])}{15\,d}\right)\right)\Big/\left((B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])\right)$$

- **Problem 202: Result unnecessarily involves higher level functions.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 192 leaves, 8 steps):

$$-\frac{3\,(A-B)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a\,d}-\frac{(3\,A-5\,B)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,a\,d}+$$

$$\frac{3\,(A-B)\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{a\,d}-\frac{(3\,A-5\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,a\,d}+\frac{(A-B)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])}$$

Result (type 5, 371 leaves) :

$$-\frac{1}{3\,a\,d\,\left(1+e^{2\,i\,(c+d\,x)}\right)\,(B+A\,Cos[c+d\,x])\,(1+Sec[c+d\,x])}$$
$$e^{-\frac{3}{2}\,i\,(c+d\,x)}\,Cos\left[\frac{1}{2}\,(c+d\,x)\right]\,\left((3\,A-5\,B)\,e^{i\,(c+d\,x)}\,\left(1+e^{i\,(c+d\,x)}+e^{2\,i\,(c+d\,x)}+e^{3\,i\,(c+d\,x)}\right)\,\sqrt{Cos[c+d\,x]}\,EllipticF\left[\frac{1}{2}\,(c+d\,x),\,2\right]-\right.$$
$$i\,\left(9\,A-9\,B+6\,A\,e^{i\,(c+d\,x)}-4\,B\,e^{i\,(c+d\,x)}+12\,A\,e^{2\,i\,(c+d\,x)}-10\,B\,e^{2\,i\,(c+d\,x)}+6\,A\,e^{3\,i\,(c+d\,x)}-8\,B\,e^{3\,i\,(c+d\,x)}+3\,A\,e^{4\,i\,(c+d\,x)}-5\,B\,e^{4\,i\,(c+d\,x)}-9\,(A-B)\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(1+e^{i\,(c+d\,x)}+e^{2\,i\,(c+d\,x)}+e^{3\,i\,(c+d\,x)}\right)\,Hypergeometric2F1\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)\right)\,\sqrt{Sec[c+d\,x]}\,(A+B\,Sec[c+d\,x])$$

- **Problem 203: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{Sec[c+d\,x]^{3/2}\,(A+B\,Sec[c+d\,x])}{a+a\,Sec[c+d\,x]}\,dx$$

Optimal (type 4, 153 leaves, 7 steps) :

$$\frac{(A-3\,B)\,\sqrt{Cos[c+d\,x]}\,EllipticE\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{Sec[c+d\,x]}}{a\,d}+$$
$$\frac{(A-B)\,\sqrt{Cos[c+d\,x]}\,EllipticF\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{Sec[c+d\,x]}}{a\,d}-\frac{(A-3\,B)\,\sqrt{Sec[c+d\,x]}\,Sin[c+d\,x]}{a\,d}+\frac{(A-B)\,Sec[c+d\,x]^{3/2}\,Sin[c+d\,x]}{d\,(a+a\,Sec[c+d\,x])}$$

Result (type 5, 705 leaves) :

$$\left(A\, e^{-i(2c+dx)} \sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\right.$$
$$\left.\operatorname{Sec}\left[\frac{c}{2}\right](A+B\operatorname{Sec}[c+dx])\right) \Big/ \left(\sqrt{2}\, d\,(B+A\operatorname{Cos}[c+dx])\,(a+a\operatorname{Sec}[c+dx])\right) -$$
$$\left(3B\, e^{-i(2c+dx)} \sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\right.$$
$$\left.\operatorname{Sec}\left[\frac{c}{2}\right](A+B\operatorname{Sec}[c+dx])\right) \Big/ \left(\sqrt{2}\, d\,(B+A\operatorname{Cos}[c+dx])\,(a+a\operatorname{Sec}[c+dx])\right) +$$
$$\left(A\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \sqrt{\operatorname{Cos}[c+dx]}\operatorname{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\sqrt{\operatorname{Sec}[c+dx]}\,(A+B\operatorname{Sec}[c+dx])\operatorname{Sin}[c]\right) \Big/$$
$$(d\,(B+A\operatorname{Cos}[c+dx])\,(a+a\operatorname{Sec}[c+dx])) -$$
$$\left(B\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \sqrt{\operatorname{Cos}[c+dx]}\operatorname{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\sqrt{\operatorname{Sec}[c+dx]}\,(A+B\operatorname{Sec}[c+dx])\operatorname{Sin}[c]\right) \Big/$$
$$(d\,(B+A\operatorname{Cos}[c+dx])\,(a+a\operatorname{Sec}[c+dx])) + \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\operatorname{Sec}[c+dx]}\,(A+B\operatorname{Sec}[c+dx])\left(\frac{(-A+3B)\operatorname{Cos}[dx]\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]}{d} -\right.\right.$$
$$\left.\left.\frac{2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-A\operatorname{Sin}\left[\frac{dx}{2}\right]+B\operatorname{Sin}\left[\frac{dx}{2}\right]\right)}{d} - \frac{2(-A+B)\operatorname{Tan}\left[\frac{c}{2}\right]}{d}\right)\right) \Big/ ((B+A\operatorname{Cos}[c+dx])\,(a+a\operatorname{Sec}[c+dx]))$$

- **Problem 204: Result unnecessarily involves higher level functions.**

$$\int \frac{\sqrt{\operatorname{Sec}[c+dx]}\,(A+B\operatorname{Sec}[c+dx])}{a+a\operatorname{Sec}[c+dx]}\,dx$$

Optimal (type 4, 123 leaves, 6 steps):

$$-\frac{(A-B)\sqrt{\operatorname{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\operatorname{Sec}[c+dx]}}{a\,d} + \frac{(A+B)\sqrt{\operatorname{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\operatorname{Sec}[c+dx]}}{a\,d} + \frac{(A-B)\sqrt{\operatorname{Sec}[c+dx]}\operatorname{Sin}[c+dx]}{d\,(a+a\operatorname{Sec}[c+dx])}$$

Result (type 5, 207 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\left(\frac{4(A+B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{d}+1\Big/\left(d\left(1+e^{i(c+dx)}\right)\right)4\,i\,(A-B)\right.\right.$$
$$\left.e^{-i(c+dx)}\left(1+e^{2i(c+dx)}-\left(1+e^{i(c+dx)}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\sqrt{\text{Sec}[c+dx]}\right)$$
$$\left.(A+B\,\text{Sec}[c+dx])\right)\Big/\left(2a(B+A\,\text{Cos}[c+dx])(1+\text{Sec}[c+dx])\right)$$

- **Problem 205: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]}{\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])}\,dx$$

Optimal (type 4, 128 leaves, 6 steps):

$$\frac{(3A-B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}-$$
$$\frac{(A-B)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}-\frac{(A-B)\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 5, 425 leaves):

$$\frac{1}{2ad(B+A\,\text{Cos}[c+dx])(1+\text{Sec}[c+dx])}\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2$$
$$\left(6\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)-\right.$$
$$2\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)-$$
$$\frac{2\left((2A-B)\,\text{Cos}\left[\frac{1}{2}(c-dx)\right]+A\,\text{Cos}\left[\frac{1}{2}(3c+dx)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\text{Sec}[c+dx]}}-$$
$$\left.4A\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+4B\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}\right)(A+B\,\text{Sec}[c+dx])$$

Problem 206: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\mathrm{Sec}[c+d\,x]}{\mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 164 leaves, 7 steps):

$$-\frac{3\,(A-B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a\,d}+\frac{(5\,A-3\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,a\,d}+\frac{(5\,A-3\,B)\,\mathrm{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}-\frac{(A-B)\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])}$$

Result (type 5, 479 leaves):

$$\frac{1}{6\,a\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(A+B\,\mathrm{Sec}[c+d\,x])$$
$$\left(-18\,\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\right.$$
$$18\,\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+$$
$$20\,A\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}-12\,B\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}+$$
$$2\,\sqrt{\mathrm{Sec}[c+d\,x]}\left(3\,(A-B)\,(2+\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]+2\,A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]-\right.$$
$$\left.\left.6\,(A-B)\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]-12\,(A-B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]+2\,A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]-6\,(A-B)\,\mathrm{Tan}\left[\frac{c}{2}\right]\right)\right)$$

Problem 207: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\mathrm{Sec}[c+d\,x]}{\mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 197 leaves, 8 steps):

$$\frac{3\,(7\,A-5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,a\,d}-\frac{5\,(A-B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,a\,d}+\frac{(7\,A-5\,B)\,\mathrm{Sin}[c+d\,x]}{5\,a\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}-\frac{5\,(A-B)\,\mathrm{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}-\frac{(A-B)\,\mathrm{Sin}[c+d\,x]}{d\,\mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])}$$

Result (type 5, 520 leaves):

$$\frac{1}{60\,a\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(A+B\,\mathrm{Sec}[c+d\,x])\left(252\,\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-180\,\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-200\,A\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}+200\,B\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}+\sqrt{\mathrm{Sec}[c+d\,x]}\left(-3\,(51\,A-40\,B+(33\,A-20\,B)\,\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]-40\,(A-B)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]+12\,A\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]+120\,(A-B)\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]+12\,(33\,A-20\,B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]-40\,(A-B)\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]+12\,A\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]+120\,(A-B)\,\mathrm{Tan}\left[\frac{c}{2}\right]\right)\right)$$

- **Problem 208: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\mathrm{Sec}[c+d\,x]}{\mathrm{Sec}[c+d\,x]^{7/2}\,(a+a\,\mathrm{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 230 leaves, 9 steps):

$$-\frac{21\,(A-B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,a\,d}+\frac{5\,(9\,A-7\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{21\,a\,d}+\frac{(9\,A-7\,B)\,\mathrm{Sin}[c+d\,x]}{7\,a\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}-\frac{7\,(A-B)\,\mathrm{Sin}[c+d\,x]}{5\,a\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{5\,(9\,A-7\,B)\,\mathrm{Sin}[c+d\,x]}{21\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}-\frac{(A-B)\,\mathrm{Sin}[c+d\,x]}{d\,\mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])}$$

Result (type 5, 864 leaves):

$$-\left(21\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d x])\right)\Big/\left(5\sqrt{2}\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])\right)+$$

$$\left(21\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d x])\right)\Big/\left(5\sqrt{2}\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])\right)+$$

$$\left(15\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\ (A+B\,\text{Sec}[c+d x])\,\text{Sin}[c]\right)\Big/$$
$$(7\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x]))-$$

$$\left(5\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\ (A+B\,\text{Sec}[c+d x])\,\text{Sin}[c]\right)\Big/$$
$$(3\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x]))+$$

$$\frac{1}{(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])}\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Sec}[c+d x]}\ (A+B\,\text{Sec}[c+d x])\left(-\frac{3\,(-A+B)\,(17+11\,\text{Cos}[2\,c])\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{20\,d}-\right.$$

$$\frac{(-27\,A+14\,B)\,\text{Cos}[2\,d x]\,\text{Sin}[2\,c]}{21\,d}+\frac{(-A+B)\,\text{Cos}[3\,d x]\,\text{Sin}[3\,c]}{5\,d}+\frac{A\,\text{Cos}[4\,d x]\,\text{Sin}[4\,c]}{14\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$

$$\left.\frac{33\,(-A+B)\,\text{Cos}[c]\,\text{Sin}[d x]}{5\,d}-\frac{(-27\,A+14\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d x]}{21\,d}+\frac{(-A+B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d x]}{5\,d}+\frac{A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d x]}{14\,d}+\frac{2\,(-A+B)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)$$

- **Problem 209: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^{7/2}\,(A+B\,\text{Sec}[c+d x])}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 237 leaves, 9 steps) :

$$-\frac{(4A-7B)\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{a^2 d}-\frac{5(A-2B)\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{3a^2 d}+\frac{(4A-7B)\sqrt{\mathrm{Sec}[c+dx]}\ \mathrm{Sin}[c+dx]}{a^2 d}-\frac{5(A-2B)\mathrm{Sec}[c+dx]^{3/2}\mathrm{Sin}[c+dx]}{3a^2 d}+\frac{(4A-7B)\mathrm{Sec}[c+dx]^{5/2}\mathrm{Sin}[c+dx]}{3a^2 d(1+\mathrm{Sec}[c+dx])}+\frac{(A-B)\mathrm{Sec}[c+dx]^{7/2}\mathrm{Sin}[c+dx]}{3d(a+a\,\mathrm{Sec}[c+dx])^2}$$

Result (type 5, 841 leaves) :

$$-\left(4\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+\left(7\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(20\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\left(-\frac{2\,(-4A+7B)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\right.\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-5\,A\,\text{Sin}\left[\frac{dx}{2}\right]+8\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{8\,B\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{3d}+$$

$$\left.\left.\frac{4\,(2B-5A\,\text{Cos}[c]+10\,B\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 210: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 204 leaves, 8 steps) :

$$\frac{(A-4B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a^2 d}+\frac{(2A-5B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3a^2 d}-\frac{(A-4B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{a^2 d}+\frac{(2A-5B)\text{Sec}[c+dx]^{3/2}\text{Sin}[c+dx]}{3a^2 d(1+\text{Sec}[c+dx])}+\frac{(A-B)\text{Sec}[c+dx]^{5/2}\text{Sin}[c+dx]}{3d(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 5, 811 leaves):

$$\left(\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx](A+B\,\text{Sec}[c+dx])\right)\Big/$$

$$\left(d(B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2\right)-\left(4\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx](A+B\,\text{Sec}[c+dx])\right)\Big/\left(d(B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3d(B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(10B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3d(B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\left(\frac{2(-A+4B)\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\right.\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-2A\,\text{Sin}\left[\frac{dx}{2}\right]+5B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-$$

$$\left.\left.\frac{4(-2A+5B)\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{2(-A+B)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2\right)$$

■ **Problem 211: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 161 leaves, 7 steps):

$$\frac{B\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{(A+2\,B)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{B\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Sec}[c+d\,x])}+\frac{(A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 617 leaves):

$$\left(\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\right)\Big/\left(d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\right.$$
$$\left(-\frac{2\,B\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\right.$$
$$\left.\left.\frac{4\,(A+2\,B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

■ **Problem 212: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 168 leaves, 7 steps):

$$-\frac{A\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+$$
$$\frac{(2\,A+B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}+\frac{(2\,A+B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}+\frac{(A-B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 618 leaves) :

$$-\left(\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\right)\Big/\left(d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(4\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\right.$$
$$\left(\frac{2\,A\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\right.$$
$$\left.\left.\frac{4\,(-4\,A+B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 213: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\sqrt{\text{Sec}[c+d\,x]}\ (a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 177 leaves, 7 steps) :

$$\frac{(4\,A-B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}-$$
$$\frac{(5\,A-2\,B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{(5\,A-2\,B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 830 leaves) :

$$\left(4\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/\left(3\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/\left(3\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\left(-\frac{2\,(3A-B+A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\right.\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-7\,A\,\text{Sin}\left[\frac{dx}{2}\right]+4\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+$$
$$\left.\left.\frac{8\,A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}-\frac{4\,(-7A+4B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 214: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]}{\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 211 leaves, 8 steps) :

$$-\frac{(7A-4B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a^2 d}+\frac{5(2A-B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3a^2 d}+$$
$$\frac{5(2A-B)\text{Sin}[c+dx]}{3a^2 d\sqrt{\text{Sec}[c+dx]}}-\frac{(7A-4B)\text{Sin}[c+dx]}{3a^2 d\sqrt{\text{Sec}[c+dx]}\ (1+\text{Sec}[c+dx])}-\frac{(A-B)\text{Sin}[c+dx]}{3d\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])^2}$$

Result (type 5, 875 leaves) :

$$-\left(7\sqrt{2}\ A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\ (A+B\,\text{Sec}[c+dx])\right)\Big/$$
$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+\left(4\sqrt{2}\ B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\ (A+B\,\text{Sec}[c+dx])\right)\Big/\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$
$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$
$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])\left(-\frac{2(-5A+3B-2A\,\text{Cos}[2c]+B\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}-\right.\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-10A\,\text{Sin}\left[\frac{dx}{2}\right]+7B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{8(-2A+B)\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+$$
$$\left.\left.\frac{4A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}+\frac{4(-10A+7B)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{2(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 215: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + B\,\text{Sec}[c + d\,x]}{\text{Sec}[c + d\,x]^{5/2}\,(a + a\,\text{Sec}[c + d\,x])^2}\,dx$$

Optimal (type 4, 244 leaves, 9 steps):

$$\frac{7\,(8\,A - 5\,B)\,\sqrt{\text{Cos}[c + d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{5\,a^2\,d} - \frac{5\,(3\,A - 2\,B)\,\sqrt{\text{Cos}[c + d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,a^2\,d} + \frac{7\,(8\,A - 5\,B)\,\text{Sin}[c + d\,x]}{15\,a^2\,d\,\text{Sec}[c + d\,x]^{3/2}} - \frac{5\,(3\,A - 2\,B)\,\text{Sin}[c + d\,x]}{3\,a^2\,d\,\sqrt{\text{Sec}[c + d\,x]}} - \frac{(3\,A - 2\,B)\,\text{Sin}[c + d\,x]}{a^2\,d\,\text{Sec}[c + d\,x]^{3/2}\,(1 + \text{Sec}[c + d\,x])} - \frac{(A - B)\,\text{Sin}[c + d\,x]}{3\,d\,\text{Sec}[c + d\,x]^{3/2}\,(a + a\,\text{Sec}[c + d\,x])^2}$$

Result (type 5, 924 leaves):

$$\left(56\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])\right)\Big/$$

$$\left(5\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)-\left(7\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])\right)\Big/\left(d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)-$$

$$\left(10\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^{3/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+$$

$$\left(20\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^{3/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+\frac{1}{(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2}$$

$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Sec}[c+d\,x]^{3/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\left(\frac{(-151\,A+100\,B-73\,A\,\mathrm{Cos}[2\,c]+40\,B\,\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{10\,d}+\right.$$

$$\frac{4\,(-2\,A+B)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{5\,d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-13\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+10\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{2\,(-73\,A+40\,B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{5\,d}+$$

$$\left.\frac{4\,(-2\,A+B)\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{5\,d}-\frac{4\,(-13\,A+10\,B)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{2\,(-A+B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

- **Problem 216: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{9/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 292 leaves, 10 steps) :

$$-\frac{7\,(7\,A-17\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}-\frac{(13\,A-33\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}+$$
$$\frac{7\,(7\,A-17\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,a^3\,d}-\frac{(13\,A-33\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{6\,a^3\,d}+$$
$$\frac{(A-B)\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{(A-2\,B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{7\,(7\,A-17\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{30\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 933 leaves) :

$$-\left(49\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+dx]^2\,(A+B\,\mathrm{Sec}[c+dx])\right)\Big/$$

$$\left(5d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)+\left(119\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+dx]^2\,(A+B\,\mathrm{Sec}[c+dx])\right)\Big/\left(5d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)-$$

$$\left(26\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+dx]^{5/2}\,(A+B\,\mathrm{Sec}[c+dx])\,\mathrm{Sin}[c]\right)\Big/$$

$$\left(3d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)+$$

$$\left(22\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+dx]^{5/2}\,(A+B\,\mathrm{Sec}[c+dx])\,\mathrm{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(B+A\,\mathrm{Cos}[c+dx])\,(a+a\,\mathrm{Sec}[c+dx])^3}\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Sec}[c+dx]^{5/2}\,(A+B\,\mathrm{Sec}[c+dx])\left(-\frac{14\,(-7A+17B)\,\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5d}+\right.$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(-A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-8A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+13B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-13A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+29B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{16\,B\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]\,\mathrm{Sin}[dx]}{3d}+$$

$$\left.\frac{4\,(4B-13A\,\mathrm{Cos}[c]+33B\,\mathrm{Cos}[c])\,\mathrm{Sec}[c]\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4\,(-8A+13B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{2\,(-A+B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 217: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+dx]^{7/2}\,(A+B\,\mathrm{Sec}[c+dx])}{(a+a\,\mathrm{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 261 leaves, 9 steps):

$$\frac{(9\,A-49\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+$$

$$\frac{(3\,A-13\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-\frac{(9\,A-49\,B)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{10\,a^3\,d}+$$

$$\frac{(A-B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{(3\,A-8\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{(3\,A-13\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 904 leaves) :

$$\left(9\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\,(A+B\,\text{Sec}[c+d x])\right)\Big/$$

$$\left(5\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)-\left(49\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\,(A+B\,\text{Sec}[c+d x])\right)\Big/\left(5\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)+$$

$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^{5/2}\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\left(26\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^{5/2}\,(A+B\,\text{Sec}[c+d x])\,\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Sec}[c+d x]^{5/2}\,(A+B\,\text{Sec}[c+d x])\left(\frac{2\,(-9A+49B)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5 d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}-\right.\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-3A\,\text{Sin}\left[\frac{d x}{2}\right]+8B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(-3A\,\text{Sin}\left[\frac{d x}{2}\right]+13B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}-\frac{4\,(-3A+13B)\,\text{Tan}\left[\frac{c}{2}\right]}{3 d}-$$

$$\left.\left.\frac{4\,(-3A+8B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15 d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)$$

- **Problem 218: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^{5/2}\,(A+B\,\text{Sec}[c+d x])}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 220 leaves, 8 steps) :

$$\frac{(A+9B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(A+3B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}+$$

$$\frac{(A-B)\,\text{Sec}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Sec}[c+dx])^3}+\frac{(A-6B)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Sec}[c+dx])^2}-\frac{(A+9B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{10d\left(a^3+a^3\,\text{Sec}[c+dx]\right)}$$

Result (type 5, 899 leaves):

$$\left(\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/$$

$$\left(5d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(9\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(5d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(2A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(2B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\left(-\frac{2(A+9B)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\right.\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+3B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(2A\,\text{Sin}\left[\frac{dx}{2}\right]+3B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+\frac{4(A+3B)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+$$

$$\left.\left.\frac{4(2A+3B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{2(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)$$

Problem 219: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 216 leaves, 8 steps):

$$-\frac{(A-B) \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{10 a^3 d}+\frac{(A+B) \sqrt{\text{Cos}[c+d x]} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{6 a^3 d}+$$
$$\frac{(A-B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}-\frac{(A+4 B) \sqrt{\text{Sec}[c+d x]} \, \text{Sin}[c+d x]}{15 a d (a+a \text{Sec}[c+d x])^2}+\frac{(A+B) \sqrt{\text{Sec}[c+d x]} \, \text{Sin}[c+d x]}{6 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 5, 898 leaves):

$$-\left(\sqrt{2}\, A\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B\,\text{Sec}[c+d x])\right) \Big/ \left(5 d\, (B+A\,\text{Cos}[c+d x])\, (a+a\,\text{Sec}[c+d x])^3\right)+$$

$$\left(\sqrt{2}\, B\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B\,\text{Sec}[c+d x])\right) \Big/ \left(5 d\, (B+A\,\text{Cos}[c+d x])\, (a+a\,\text{Sec}[c+d x])^3\right)+$$

$$\left(2 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{5/2} (A+B\,\text{Sec}[c+d x])\, \text{Sin}[c]\right) \Big/$$
$$\left(3 d\, (B+A\,\text{Cos}[c+d x])\, (a+a\,\text{Sec}[c+d x])^3\right)+$$
$$\left(2 B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{5/2} (A+B\,\text{Sec}[c+d x])\, \text{Sin}[c]\right) \Big/$$
$$\left(3 d\, (B+A\,\text{Cos}[c+d x])\, (a+a\,\text{Sec}[c+d x])^3\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[c+d x]^{5/2} (A+B\,\text{Sec}[c+d x]) \left(-\frac{2(-A+B)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5 d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}+\right.\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-7 A\,\text{Sin}\left[\frac{d x}{2}\right]+2 B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+\frac{4(A+B)\,\text{Tan}\left[\frac{c}{2}\right]}{3 d}+$$
$$\left.\left.\frac{4(-7A+2B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15 d}-\frac{2(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right) \Big/ \left((B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)$$

- **Problem 220: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Sec}[c+d x]}\,(A+B\,\text{Sec}[c+d x])}{(a+a\,\text{Sec}[c+d x])^3}\, dx$$

Optimal (type 4, 222 leaves, 8 steps):

$$-\frac{(9 A+B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{10 a^3 d}+\frac{(3 A+B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{6 a^3 d}+$$

$$\frac{(A-B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 d\ (a+a\ \text{Sec}[c+d x])^3}+\frac{(3 A+2 B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 a d\ (a+a\ \text{Sec}[c+d x])^2}+\frac{(3 A+B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{6 d \left(a^3+a^3\ \text{Sec}[c+d x]\right)}$$

Result (type 5, 899 leaves) :

$$-\left(9 \sqrt{2}\ A\ e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B\ \text{Sec}[c+d x])\right) \Big/ \left(5 d\ (B+A\ \text{Cos}[c+d x])\ (a+a\ \text{Sec}[c+d x])^3\right)-$$

$$\left(\sqrt{2}\ B\ e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B\ \text{Sec}[c+d x])\right) \Big/ \left(5 d\ (B+A\ \text{Cos}[c+d x])\ (a+a\ \text{Sec}[c+d x])^3\right)+$$

$$\left(2 A\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{5/2} (A+B\ \text{Sec}[c+d x])\ \text{Sin}[c]\right) \Big/ \left(d\ (B+A\ \text{Cos}[c+d x])\ (a+a\ \text{Sec}[c+d x])^3\right)+$$

$$\left(2 B\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{5/2} (A+B\ \text{Sec}[c+d x])\ \text{Sin}[c]\right) \Big/ \left(3 d\ (B+A\ \text{Cos}[c+d x])\ (a+a\ \text{Sec}[c+d x])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[c+d x]^{5/2} (A+B\ \text{Sec}[c+d x]) \left(\frac{2 (9 A+B)\ \text{Cos}[d x]\ \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{5 d}+\frac{4\ \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(-9 A\ \text{Sin}\left[\frac{d x}{2}\right]+B\ \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\right.\right.$$

$$\frac{2\ \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(-A\ \text{Sin}\left[\frac{d x}{2}\right]+B\ \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}-\frac{4\ \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(-12 A\ \text{Sin}\left[\frac{d x}{2}\right]+7 B\ \text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+\frac{4 (-9 A+B)\ \text{Tan}\left[\frac{c}{2}\right]}{3 d}-$$

$$\left.\left.\frac{4 (-12 A+7 B)\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{15 d}+\frac{2 (-A+B)\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right) \Big/ \left((B+A\ \text{Cos}[c+d x])\ (a+a\ \text{Sec}[c+d x])^3\right)$$

- **Problem 221: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + B\,\text{Sec}[c + d\,x]}{\sqrt{\text{Sec}[c + d\,x]}\,\left(a + a\,\text{Sec}[c + d\,x]\right)^3}\,dx$$

Optimal (type 4, 228 leaves, 8 steps):

$$\frac{(49\,A - 9\,B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{10\,a^3\,d} - \frac{(13\,A - 3\,B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{6\,a^3\,d} - \frac{(A - B)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{5\,d\,(a + a\,\text{Sec}[c + d\,x])^3} - \frac{(8\,A - 3\,B)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{15\,a\,d\,(a + a\,\text{Sec}[c + d\,x])^2} - \frac{(13\,A - 3\,B)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{6\,d\,\left(a^3 + a^3\,\text{Sec}[c + d\,x]\right)}$$

Result (type 5, 923 leaves):

$$\left(49\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/$$

$$\left(5d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(9\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(5d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(26\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])$$

$$\left(-\frac{2\,(39A-9B+10A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}-\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-23A\,\text{Sin}\left[\frac{dx}{2}\right]+9B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-17A\,\text{Sin}\left[\frac{dx}{2}\right]+12B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+$$

$$\left.\frac{16A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}-\frac{4\,(-23A+9B)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4\,(-17A+12B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 222: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]}{\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 261 leaves, 9 steps) :

$$-\frac{7\,(17\,A-7\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+$$

$$\frac{(33\,A-13\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}+\frac{(33\,A-13\,B)\,\text{Sin}[c+d\,x]}{6\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{(A-B)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{(2\,A-B)\,\text{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{7\,(17\,A-7\,B)\,\text{Sin}[c+d\,x]}{30\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 968 leaves) :

$$-\left(119\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/$$

$$\left(5\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(49\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(5\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(22\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(26\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\frac{1}{(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\left(-\frac{2\,(-89\,A+39\,B-30\,A\,\text{Cos}[2c]+10\,B\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}+\right.$$

$$\frac{8\,A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-22\,A\,\text{Sin}\left[\frac{dx}{2}\right]+17\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15\,d}+$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-43\,A\,\text{Sin}\left[\frac{dx}{2}\right]+23\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+\frac{16\,(-3\,A+B)\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{8\,A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3\,d}+$$

$$\left.\frac{4\,(-43\,A+23\,B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-\frac{4\,(-22\,A+17\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 223: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]}{\text{Sec}[c+dx]^{5/2}\,(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 294 leaves, 10 steps):

$$\frac{7\,(33\,A-17\,B)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}-\frac{(21\,A-11\,B)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a^3\,d}+\frac{7\,(33\,A-17\,B)\,\text{Sin}[c+d\,x]}{30\,a^3\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{(21\,A-11\,B)\,\text{Sin}[c+d\,x]}{2\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{(12\,A-7\,B)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{3\,(21\,A-11\,B)\,\text{Sin}[c+d\,x]}{10\,d\,\text{Sec}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 1012 leaves):

$$\left(231\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/$$

$$\left(5d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(119\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^2\,(A+B\,\text{Sec}[c+dx])\right)\Big/\left(5d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(42\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(22\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])\,\text{Sin}[c]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(B+A\,\text{Cos}[c+dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])$$

$$\left(\frac{(-329A+178B-133A\,\text{Cos}[2c]+60B\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{8(-3A+B)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}+\frac{4A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5d}-\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(-27A\,\text{Sin}\left[\frac{dx}{2}\right]+22B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-69A\,\text{Sin}\left[\frac{dx}{2}\right]+43B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{4(-133A+60B)\,\text{Cos}[c]\,\text{Sin}[dx]}{5d}+\frac{8(-3A+B)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}+$$

$$\left.\frac{4A\,\text{Cos}[3c]\,\text{Sin}[3dx]}{5d}-\frac{4(-69A+43B)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4(-27A+22B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{2(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 224: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+dx]^{5/2}\sqrt{a+a\,\text{Sec}[c+dx]}\,(A+B\,\text{Sec}[c+dx])\,dx$$

Optimal (type 3, 176 leaves, 5 steps):

$$\frac{\sqrt{a}\,(6A+5B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8 d}+\frac{a\,(6A+5B)\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{8 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a\,(6A+5B)\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{12 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a\,B\,\text{Sec}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{3 d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 1184 leaves):

$$-\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((18+6i)A+6\sqrt{2}A+(15+5i)B+5\sqrt{2}B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+d x]}\right)-$$
$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-18+6i)A+6\sqrt{2}A-(15-5i)B+5\sqrt{2}B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\frac{\left(12A+6i\sqrt{2}A+10B+5i\sqrt{2}B\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}}{32\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+d x]}}-$$
$$\left(\left(\frac{1}{128}-\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)\left((18+6i)A+6\sqrt{2}A+(15+5i)B+5\sqrt{2}B\right)\right.$$
$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\left(\left(\frac{1}{128}+\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-18+6i)A+6\sqrt{2}A-(15-5i)B+5\sqrt{2}B\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}}{12 d\sqrt{\text{Sec}[c+d x]}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{(6A+5B)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}}{16 d\sqrt{\text{Sec}[c+d x]}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$
$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}}{12 d\sqrt{\text{Sec}[c+d x]}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-6 A-5 B) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\operatorname{Sec}[c+d x])}}{16 d \sqrt{\operatorname{Sec}[c+d x]}\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\operatorname{Sec}[c+d x])}\left(2 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{8 d \sqrt{\operatorname{Sec}[c+d x]}\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\operatorname{Sec}[c+d x])}\left(2 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{8 d \sqrt{\operatorname{Sec}[c+d x]}\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}$$

- **Problem 225: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]^{3/2} \sqrt{a+a \operatorname{Sec}[c+d x]}\,(A+B \operatorname{Sec}[c+d x])\, dx$$

Optimal (type 3, 131 leaves, 4 steps):

$$\frac{\sqrt{a}\,(4 A+3 B) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{4 d}+\frac{a(4 A+3 B) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{4 d \sqrt{a+a \operatorname{Sec}[c+d x]}}+\frac{a B \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{2 d \sqrt{a+a \operatorname{Sec}[c+d x]}}$$

Result (type 3, 1002 leaves):

$$-\left(\left(\frac{1}{32}+\frac{i}{32}\right)\left((-1+i)+\sqrt{2}\right)\left((12+4i)A+4\sqrt{2}A+(9+3i)B+3\sqrt{2}B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+dx]}\right)-$$
$$\left(\left(\frac{1}{32}-\frac{i}{32}\right)\left((1+i)+\sqrt{2}\right)\left((-12+4i)A+4\sqrt{2}A-(9-3i)B+3\sqrt{2}B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+dx]}\right)+$$
$$\frac{\left(8A+4i\sqrt{2}A+6B+3i\sqrt{2}B\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}}{16\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+dx]}}-$$
$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((12+4i)A+4\sqrt{2}A+(9+3i)B+3\sqrt{2}B\right)\right.$$
$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+dx]}\right)+$$
$$\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-12+4i)A+4\sqrt{2}A-(9-3i)B+3\sqrt{2}B\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{\text{Sec}[c+dx]}\right)+$$
$$\frac{(4A+3B)\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}}{8d\sqrt{\text{Sec}[c+dx]}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+\frac{(-4A-3B)\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}}{8d\sqrt{\text{Sec}[c+dx]}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+$$
$$\frac{B\sqrt{a(1+\text{Sec}[c+dx])}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{4d\sqrt{\text{Sec}[c+dx]}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+$$
$$\frac{B\sqrt{a(1+\text{Sec}[c+dx])}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{4d\sqrt{\text{Sec}[c+dx]}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}$$

- **Problem 226: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}\,(A+B\,\text{Sec}[c+dx])\,dx$$

Optimal (type 3, 78 leaves, 3 steps):

$$\frac{\sqrt{a}\,(2A+B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{a\,B\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 522 leaves):

$$\frac{1}{d\sqrt{\text{Sec}[c+d x]}}\left(\frac{1}{32}+\frac{i}{32}\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\left(\frac{2\,i\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2A+B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]}{i+\sqrt{2}}-\right.$$

$$\frac{2\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2A+B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]}{i+\sqrt{2}}+$$

$$\frac{(4+4\,i)\left(-2\,i+\sqrt{2}\right)(2A+B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{i+\sqrt{2}}+$$

$$\frac{i\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2A+B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{i+\sqrt{2}}+$$

$$\frac{\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2A+B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{i+\sqrt{2}}+$$

$$\left.\frac{(8-8\,i)\,B}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}-\frac{(8-8\,i)\,B}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

- **Problem 227: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d x]}\,(A+B\,\text{Sec}[c+d x])}{\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 76 leaves, 3 steps):

$$\frac{2\sqrt{a}\,B\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2\,a\,A\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 321 leaves):

$$\frac{1}{4\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\left(-2\,i\,\sqrt{2}\,B\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-2\,i\,\sqrt{2}\,B\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+2\sqrt{2}\,B\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\sqrt{2}\,B\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\sqrt{2}\,B\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+8\,A\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 231: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 227 leaves, 6 steps):

$$\frac{a^{3/2}\,(88\,A+75\,B)\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{64\,d}+\frac{a^2\,(88\,A+75\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{a^2\,(88\,A+75\,B)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{a^2\,(8\,A+9\,B)\,\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{a\,B\,\mathrm{Sec}[c+d\,x]^{7/2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 1376 leaves):

$$-\left(\left(\frac{1}{1024}+\frac{i}{1024}\right)\left((-1+i)+\sqrt{2}\right)\left((264+88\,i)\,A+88\sqrt{2}\,A+(225+75\,i)\,B+75\sqrt{2}\,B\right)\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,\mathrm{Sec}[c+d\,x]^{3/2}\right)-\left(\left(\frac{1}{1024}-\frac{i}{1024}\right)\left((1+i)+\sqrt{2}\right)\left((-264+88\,i)\,A+88\sqrt{2}\,A-(225-75\,i)\,B+75\sqrt{2}\,B\right)\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,\mathrm{Sec}[c+d\,x]^{3/2}\right)+\left(\left(176\,A+88\,i\sqrt{2}\,A+150\,B+75\,i\sqrt{2}\,B\right)\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\right)\Big/$$

$$\left(512 \left(i+\sqrt{2}\right) d \,\text{Sec}[c+d x]^{3/2}\right) -$$

$$\left(\left(\frac{1}{2048}-\frac{i}{2048}\right)\left((-1+i)+\sqrt{2}\right)\left((264+88 i) A+88 \sqrt{2} A+(225+75 i) B+75 \sqrt{2} B\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2} \,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d \,\text{Sec}[c+d x]^{3/2}\right) +$$

$$\left(\left(\frac{1}{2048}+\frac{i}{2048}\right)\left((1+i)+\sqrt{2}\right)\left((-264+88 i) A+88 \sqrt{2} A-(225-75 i) B+75 \sqrt{2} B\right) \text{Log}\left[2+\sqrt{2} \,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d \,\text{Sec}[c+d x]^{3/2}\right) +$$

$$\frac{(8 A+15 B) \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}}{192 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{(88 A+75 B) \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}}{256 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{(-8 A-15 B) \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}}{192 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-88 A-75 B) \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}}{256 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2} \left(24 A \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+19 B \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{128 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2} \left(24 A \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+19 B \,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{128 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{B \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a (1+\text{Sec}[c+d x]))^{3/2} \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{32 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$

$$\frac{B \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a (1+\text{Sec}[c+d x]))^{3/2} \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{32 d \,\text{Sec}[c+d x]^{3/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}$$

- **Problem 232: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2} (a+a \,\text{Sec}[c+d x])^{3/2} (A+B \,\text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 180 leaves, 5 steps):

$$\frac{a^{3/2}\,(14\,A+11\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d}+\frac{a^2\,(14\,A+11\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(6\,A+7\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,B\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 1208 leaves) :

$$-\left(\left(\frac{1}{128}+\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)\left((42+14\,i)\,A+14\,\sqrt{2}\,A+(33+11\,i)\,B+11\,\sqrt{2}\,B\right)\right.$$
$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)\Big/$$
$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,\text{Sec}[c+d\,x]^{3/2}\right)-\left(\left(\frac{1}{128}-\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-42+14\,i)\,A+14\,\sqrt{2}\,A-(33-11\,i)\,B+11\,\sqrt{2}\,B\right)\text{ArcTan}\left[\right.\right.$$
$$\left.\left.\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,\text{Sec}[c+d\,x]^{3/2}\right)+$$
$$\left(\left(28\,A+14\,i\,\sqrt{2}\,A+22\,B+11\,i\,\sqrt{2}\,B\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)\Big/$$
$$\left(64\,\left(i+\sqrt{2}\right)\,d\,\text{Sec}[c+d\,x]^{3/2}\right)-$$
$$\left(\left(\frac{1}{256}-\frac{i}{256}\right)\left((-1+i)+\sqrt{2}\right)\left((42+14\,i)\,A+14\,\sqrt{2}\,A+(33+11\,i)\,B+11\,\sqrt{2}\,B\right)\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,\text{Sec}[c+d\,x]^{3/2}\right)+$$
$$\left(\left(\frac{1}{256}+\frac{i}{256}\right)\left((1+i)+\sqrt{2}\right)\left((-42+14\,i)\,A+14\,\sqrt{2}\,A-(33-11\,i)\,B+11\,\sqrt{2}\,B\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,\text{Sec}[c+d\,x]^{3/2}\right)+$$
$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}{24\,d\,\text{Sec}[c+d\,x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+\frac{(14\,A+11\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}{32\,d\,\text{Sec}[c+d\,x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}-$$
$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}{24\,d\,\text{Sec}[c+d\,x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(-14 A - 11 B) \operatorname{Sec}\left[\frac{1}{2}(c + d x)\right]^3 (a (1 + \operatorname{Sec}[c + d x]))^{3/2}}{32 d \operatorname{Sec}[c + d x]^{3/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)} +$$

$$\frac{\operatorname{Sec}\left[\frac{1}{2}(c + d x)\right]^3 (a (1 + \operatorname{Sec}[c + d x]))^{3/2} \left(2 A \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right] + 3 B \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)}{16 d \operatorname{Sec}[c + d x]^{3/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^2} +$$

$$\frac{\operatorname{Sec}\left[\frac{1}{2}(c + d x)\right]^3 (a (1 + \operatorname{Sec}[c + d x]))^{3/2} \left(2 A \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right] + 3 B \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)}{16 d \operatorname{Sec}[c + d x]^{3/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^2}$$

- **Problem 233: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{\operatorname{Sec}[c + d x]} (a + a \operatorname{Sec}[c + d x])^{3/2} (A + B \operatorname{Sec}[c + d x]) \, dx$$

Optimal (type 3, 133 leaves, 4 steps) :

$$\frac{a^{3/2} (12 A + 7 B) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{4 d} + \frac{a^2 (4 A + 5 B) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{4 d \sqrt{a + a \operatorname{Sec}[c + d x]}} + \frac{a B \operatorname{Sec}[c + d x]^{3/2} \sqrt{a + a \operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{2 d}$$

Result (type 3, 1040 leaves) :

$$-\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((36+12 i) A+12\sqrt{2} A+(21+7 i) B+7\sqrt{2} B\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\, \text{Sec}[c+d x]^{3/2}\right) -$$

$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-36+12 i) A+12\sqrt{2} A-(21-7 i) B+7\sqrt{2} B\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\, \text{Sec}[c+d x]^{3/2}\right) +$$

$$\left(\left(24 A+12 i\sqrt{2} A+14 B+7 i\sqrt{2} B\right) \text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(32\left(i+\sqrt{2}\right) d\, \text{Sec}[c+d x]^{3/2}\right) -$$

$$\left(\left(\frac{1}{128}-\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)\left((36+12 i) A+12\sqrt{2} A+(21+7 i) B+7\sqrt{2} B\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\, \text{Sec}[c+d x]^{3/2}\right) +$$

$$\left(\left(\frac{1}{128}+\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-36+12 i) A+12\sqrt{2} A-(21-7 i) B+7\sqrt{2} B\right) \text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\, \text{Sec}[c+d x]^{3/2}\right) +$$

$$\frac{(4 A+7 B)\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}}{16 d\, \text{Sec}[c+d x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+\frac{(-4 A-7 B)\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}}{16 d\, \text{Sec}[c+d x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{B\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a(1+\text{Sec}[c+d x]))^{3/2}\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{8 d\, \text{Sec}[c+d x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{B\, \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a(1+\text{Sec}[c+d x]))^{3/2}\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{8 d\, \text{Sec}[c+d x]^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}$$

- **Problem 234: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^{3/2}\,(A+B\,\text{Sec}[c+d x])}{\sqrt{\text{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 124 leaves, 4 steps):

$$\frac{a^{3/2}\,(2\,A+3\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^2\,(2\,A-B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,B\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 603 leaves):

$$\frac{1}{d\,\text{Sec}[c+d\,x]^{3/2}}\left(\frac{1}{64}+\frac{i}{64}\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$
$$\left(\frac{1}{i+\sqrt{2}}2\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\,\left((1+i)+\sqrt{2}\right)\,(2\,A+3\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$
$$\frac{1}{i+\sqrt{2}}2\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\,\left((3+i)+\sqrt{2}\right)\,(2\,A+3\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$\frac{(4+4\,i)\,\left(-2\,i+\sqrt{2}\right)\,(2\,A+3\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}$$
$$i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\,\left((3+i)+\sqrt{2}\right)\,(2\,A+3\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$\frac{1}{i+\sqrt{2}}\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\,\left((1+i)+\sqrt{2}\right)\,(2\,A+3\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]-$$
$$\left.\frac{(8-8\,i)\,B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}+(32-32\,i)\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{(8-8\,i)\,B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

Problem 235: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 125 leaves, 4 steps):

$$\frac{2\,a^{3/2}\,B\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,(4\,A+3\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 348 leaves):

$$\frac{1}{12\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}\,a\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}$$
$$\left(-6\,i\,\sqrt{2}\,B\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-6\,i\,\sqrt{2}\,B\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+\right.$$
$$6\,\sqrt{2}\,B\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-3\,\sqrt{2}\,B\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\left.3\,\sqrt{2}\,B\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+36\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+24\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,A\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)$$

Problem 239: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 274 leaves, 7 steps):

$$\frac{a^{5/2}\,(326\,A+283\,B)\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{128\,d}+\frac{a^3\,(326\,A+283\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+$$
$$\frac{a^3\,(326\,A+283\,B)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{a^3\,(170\,A+157\,B)\,\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(10\,A+13\,B)\,\mathrm{Sec}[c+d\,x]^{7/2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{40\,d}+\frac{a\,B\,\mathrm{Sec}[c+d\,x]^{7/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 1544 leaves):

$$-\left(\left(\frac{1}{4096}+\frac{i}{4096}\right)\,\left((-1+i)+\sqrt{2}\right)\,\left((978+326\,i)\,A+326\,\sqrt{2}\,A+(849+283\,i)\,B+283\,\sqrt{2}\,B\right)\,\mathrm{ArcTan}\left[\right.\right.$$
$$\left.\left.\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,\mathrm{Sec}[c+d\,x]^{5/2}\right)-$$
$$\left(\left(\frac{1}{4096}-\frac{i}{4096}\right)\,\left((1+i)+\sqrt{2}\right)\,\left((-978+326\,i)\,A+326\,\sqrt{2}\,A-(849-283\,i)\,B+283\,\sqrt{2}\,B\right)\,\mathrm{ArcTan}\left[\right.\right.$$
$$\left.\left.\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,\mathrm{Sec}[c+d\,x]^{5/2}\right)+$$
$$\left(\left(652\,A+326\,i\,\sqrt{2}\,A+566\,B+283\,i\,\sqrt{2}\,B\right)\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\right)\Big/$$

$$\left(2048\left(\mathrm{i}+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(\left(\frac{1}{8192}-\frac{\mathrm{i}}{8192}\right)\left((-1+\mathrm{i})+\sqrt{2}\right)\left((978+326\,\mathrm{i})\,A+326\sqrt{2}\,A+(849+283\,\mathrm{i})\,B+283\sqrt{2}\,B\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(\left(\frac{1}{8192}+\frac{\mathrm{i}}{8192}\right)\left((1+\mathrm{i})+\sqrt{2}\right)\left((-978+326\,\mathrm{i})\,A+326\sqrt{2}\,A-(849-283\,\mathrm{i})\,B+283\sqrt{2}\,B\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{160\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5}+\frac{(46\,A+59\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{768\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(326\,A+283\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{1024\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}-$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{160\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5}+$$

$$\frac{(-46\,A-59\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{768\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(-326\,A-283\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{1024\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(2\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+5\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}{128\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(2\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+5\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}{128\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(86\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+75\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}{512\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(86\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+75\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}{512\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}$$

Problem 240: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^{5/2} (A+B \text{Sec}[c+d x])\, dx$$

Optimal (type 3, 227 leaves, 6 steps):

$$\frac{a^{5/2} (200 A+163 B) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^3 (200 A+163 B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{64 d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{a^3 (104 A+95 B) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{96 d \sqrt{a+a \text{Sec}[c+d x]}}+$$
$$\frac{a^2 (8 A+11 B) \text{Sec}[c+d x]^{5/2} \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{24 d}+\frac{a B \text{Sec}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{4 d}$$

Result (type 3, 1376 leaves):

$$-\left(\left(\frac{1}{2048}+\frac{i}{2048}\right) \left((-1+i)+\sqrt{2}\right) \left((600+200 i) A+200 \sqrt{2} A+(489+163 i) B+163 \sqrt{2} B\right) \text{ArcTan}\Big[\right.$$
$$\left.\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{-\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\sqrt{2} \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\Big] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d \text{Sec}[c+d x]^{5/2}\right)-$$
$$\left(\left(\frac{1}{2048}-\frac{i}{2048}\right) \left((1+i)+\sqrt{2}\right) \left((-600+200 i) A+200 \sqrt{2} A-(489-163 i) B+163 \sqrt{2} B\right) \text{ArcTan}\Big[\right.$$
$$\left.\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\text{Sin}\left[\frac{1}{4} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\sqrt{2} \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\Big] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d \text{Sec}[c+d x]^{5/2}\right)+$$
$$\left(\left(400 A+200 i \sqrt{2} A+326 B+163 i \sqrt{2} B\right) \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\right) \Big/$$
$$\left(1024 \left(i+\sqrt{2}\right) d \text{Sec}[c+d x]^{5/2}\right)-$$
$$\left(\left(\frac{1}{4096}-\frac{i}{4096}\right) \left((-1+i)+\sqrt{2}\right) \left((600+200 i) A+200 \sqrt{2} A+(489+163 i) B+163 \sqrt{2} B\right)\right.$$
$$\left.\text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d \text{Sec}[c+d x]^{5/2}\right)+$$
$$\left(\left(\frac{1}{4096}+\frac{i}{4096}\right) \left((1+i)+\sqrt{2}\right) \left((-600+200 i) A+200 \sqrt{2} A-(489-163 i) B+163 \sqrt{2} B\right) \text{Log}\left[2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right.$$
$$\left.\text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d \text{Sec}[c+d x]^{5/2}\right)+$$
$$\frac{(8 A+23 B) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}}{384 d \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{(200 A+163 B) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}}{512 d \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+$$

$$\frac{(-8\,A-23\,B)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{384\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$

$$\frac{(-200\,A-163\,B)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{512\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(40\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+43\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{256\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(40\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+43\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{256\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{64\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{64\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}$$

- **Problem 241: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 180 leaves, 5 steps):

$$\frac{a^{5/2}\,(38\,A+25\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d}+\frac{a^3\,(54\,A+49\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^2\,(2\,A+3\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,B\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 1208 leaves):

$$-\left(\left(\frac{1}{256}+\frac{i}{256}\right)\left((-1+i)+\sqrt{2}\right)\left((114+38\,i)\,A+38\,\sqrt{2}\,A+(75+25\,i)\,B+25\,\sqrt{2}\,B\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)-\left(\left(\frac{1}{256}-\frac{i}{256}\right)\left((1+i)+\sqrt{2}\right)\left((-114+38\,i)\,A+38\sqrt{2}\,A-(75-25\,i)\,B+25\sqrt{2}\,B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(\left(76\,A+38\,i\sqrt{2}\,A+50\,B+25\,i\sqrt{2}\,B\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(128\left(i+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(\left(\frac{1}{512}-\frac{i}{512}\right)\left((-1+i)+\sqrt{2}\right)\left((114+38\,i)\,A+38\sqrt{2}\,A+(75+25\,i)\,B+25\sqrt{2}\,B\right)\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(\left(\frac{1}{512}+\frac{i}{512}\right)\left((1+i)+\sqrt{2}\right)\left((-114+38\,i)\,A+38\sqrt{2}\,A-(75-25\,i)\,B+25\sqrt{2}\,B\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{48\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+\frac{(22\,A+25\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{64\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}-$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{48\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(-22\,A-25\,B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}{64\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(2\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+5\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}{32\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(2\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+5\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}{32\,d\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}$$

- **Problem 242: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 180 leaves, 5 steps) :

$$\frac{a^{5/2}\,(20\,A+19\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,d}+\frac{a^3\,(4\,A-9\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^2\,(4\,A+7\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,B\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 1094 leaves) :

$$-\left(\left(\frac{1}{128}+\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)\left((60+20 i) A+20 \sqrt{2} A+(57+19 i) B+19 \sqrt{2} B\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,\text{Sec}[c+d x]^{5/2}\right)-\left(\left(\frac{1}{128}-\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-60+20 i) A+20 \sqrt{2} A-(57-19 i) B+19 \sqrt{2} B\right) \text{ArcTan}\left[\right.\right.$$

$$\left.\left.\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,\text{Sec}[c+d x]^{5/2}\right)+$$

$$\left(\left(40 A+20 i \sqrt{2} A+38 B+19 i \sqrt{2} B\right) \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\right)\Big/$$

$$\left(64\left(i+\sqrt{2}\right) d\,\text{Sec}[c+d x]^{5/2}\right)-$$

$$\left(\left(\frac{1}{256}-\frac{i}{256}\right)\left((-1+i)+\sqrt{2}\right)\left((60+20 i) A+20 \sqrt{2} A+(57+19 i) B+19 \sqrt{2} B\right) \text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,\text{Sec}[c+d x]^{5/2}\right)+$$

$$\left(\left(\frac{1}{256}+\frac{i}{256}\right)\left((1+i)+\sqrt{2}\right)\left((-60+20 i) A+20 \sqrt{2} A-(57-19 i) B+19 \sqrt{2} B\right) \text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,\text{Sec}[c+d x]^{5/2}\right)+$$

$$\frac{(4 A+11 B) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{32 d\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+\frac{(-4 A-11 B) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}}{32 d\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{A\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{2 d\,\text{Sec}[c+d x]^{5/2}}+$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{16 d\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{B\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{16 d\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}$$

Problem 243: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 177 leaves, 5 steps):

$$\frac{a^{5/2}\,(2\,A+5\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^3\,(14\,A+3\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{a^2\,(2\,A-3\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,A\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 635 leaves):

$$\frac{1}{d\,\text{Sec}[c+d\,x]^{5/2}}\left(\frac{1}{384}+\frac{i}{384}\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left(\frac{1}{i+\sqrt{2}}6\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2\,A+5\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$
$$\frac{1}{i+\sqrt{2}}6\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2\,A+5\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$\frac{(12+12\,i)\left(-2\,i+\sqrt{2}\right)(2\,A+5\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}$$
$$3\,i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2\,A+5\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{i+\sqrt{2}}$$
$$3\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2\,A+5\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]+(16-16\,i)\,A$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]-\frac{(24-24\,i)\,B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}+(48-48\,i)\,(5\,A+2\,B)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{(24-24\,i)\,B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}\right)$$

Problem 244: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 172 leaves, 5 steps):

$$\frac{2\,a^{5/2}\,B\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^3\,(32\,A+35\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,a^2\,(8\,A+5\,B)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a\,A\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}$$

Result (type 3, 376 leaves) :

$$\frac{1}{60\,d\,\sqrt{\text{Sec}[c+d\,x]}}\,a^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left(-30\,i\,\sqrt{2}\,B\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-30\,i\,\sqrt{2}\,B\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+\right.$$

$$30\,\sqrt{2}\,B\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-15\,\sqrt{2}\,B\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$

$$15\,\sqrt{2}\,B\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+300\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\left.300\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+50\,A\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+20\,B\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+6\,A\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]\right)$$

- **Problem 248: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 190 leaves, 7 steps) :

$$-\frac{(4\,A-7\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+$$

$$\frac{(4\,A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{B\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 684 leaves) :

$$\frac{1}{d\sqrt{a\,(1+\text{Sec}[c+d\,x])}}\left(\frac{1}{64}+\frac{i}{64}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\left(\frac{2\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(4\,A-7\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]}{-1+i\sqrt{2}}+\right.$$

$$\frac{2\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(4\,A-7\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]}{i+\sqrt{2}}-$$

$$(64-64\,i)\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+(64-64\,i)\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]-$$

$$\frac{(4+4\,i)\left(-2\,i+\sqrt{2}\right)(4\,A-7\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{i+\sqrt{2}}+$$

$$\frac{\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(4\,A-7\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{-1+i\sqrt{2}}-$$

$$\frac{\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(4\,A-7\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{i+\sqrt{2}}+\frac{(8-8\,i)\,(4\,A-B)}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}+$$

$$\left.\frac{(16-16\,i)\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{(16-16\,i)\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{(8-8\,i)\,(-4\,A+B)}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}\right)$$

- **Problem 249: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 141 leaves, 6 steps):

$$\frac{(2\,A-B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{B\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 596 leaves):

$$\frac{1}{d\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}}\left(\frac{1}{16}+\frac{i}{16}\right)\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{2\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2\,A-B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]}{i+\sqrt{2}}-\right.$$

$$\frac{2\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2\,A-B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]}{i+\sqrt{2}}+$$

$$(16-16\,i)\,(A-B)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]-(16-16\,i)\,(A-B)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]+$$

$$\frac{(4+4\,i)\left(-2\,i+\sqrt{2}\right)(2\,A-B)\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{i+\sqrt{2}}+$$

$$\frac{i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2\,A-B)\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{i+\sqrt{2}}+$$

$$\frac{\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2\,A-B)\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{i+\sqrt{2}}+$$

$$\left.\frac{(8-8\,i)\,B}{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{(8-8\,i)\,B}{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

- **Problem 250: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$\frac{2\,B\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}$$

Result (type 3, 412 leaves):

$$\frac{1}{2\,d\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]$$
$$\left(-2\,\mathrm{i}\,\sqrt{2}\,B\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-2\,\mathrm{i}\,\sqrt{2}\,B\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-\right.$$
$$4\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]+4\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]+$$
$$4\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]-4\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]+2\,\sqrt{2}\,B\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\left.\sqrt{2}\,B\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\sqrt{2}\,B\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)\,\sqrt{\text{Sec}[c+d\,x]}$$

- **Problem 255: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{7/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 247 leaves, 8 steps):

$$-\frac{(12\,A-19\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,a^{3/2}\,d}+\frac{(9\,A-13\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}+$$
$$\frac{(A-B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{(6\,A-7\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{(A-2\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 1318 leaves):

$$-\left(\left(\frac{1}{8}+\frac{\mathrm{i}}{8}\right)\,\left((-1+\mathrm{i})+\sqrt{2}\right)\,\left((-36-12\,\mathrm{i})\,A-12\,\sqrt{2}\,A+(57+19\,\mathrm{i})\,B+19\,\sqrt{2}\,B\right)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\right.$$
$$\left.\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Sec}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{2}\,\left(\mathrm{i}+\sqrt{2}\right)\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)-$$
$$\left(\left(\frac{1}{8}-\frac{\mathrm{i}}{8}\right)\,\left((1+\mathrm{i})+\sqrt{2}\right)\,\left((36-12\,\mathrm{i})\,A-12\,\sqrt{2}\,A-(57-19\,\mathrm{i})\,B+19\,\sqrt{2}\,B\right)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\right.$$
$$\left.\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Sec}[c+d\,x]^{3/2}\right)\Big/\left(\sqrt{2}\,\left(\mathrm{i}+\sqrt{2}\right)\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)+$$

$$\frac{(-9A+13B)\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{4}(c+dx)\right]-\text{Sin}\left[\tfrac{1}{4}(c+dx)\right]\right]\,\text{Sec}[c+dx]^{3/2}}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}}+$$

$$\frac{(9A-13B)\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{4}(c+dx)\right]+\text{Sin}\left[\tfrac{1}{4}(c+dx)\right]\right]\,\text{Sec}[c+dx]^{3/2}}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}}+$$

$$\frac{\left(-24A-12\,i\,\sqrt{2}\,A+38B+19\,i\,\sqrt{2}\,B\right)\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]\right]\,\text{Sec}[c+dx]^{3/2}}{4\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}}-$$

$$\left(\left(\frac{1}{16}-\frac{i}{16}\right)\left((-1+i)+\sqrt{2}\right)\left((-36-12\,i)\,A-12\sqrt{2}\,A+(57+19\,i)\,B+19\sqrt{2}\,B\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\right.$$
$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(\left(\frac{1}{16}+\frac{i}{16}\right)\left((1+i)+\sqrt{2}\right)\left((36-12\,i)\,A-12\sqrt{2}\,A-(57-19\,i)\,B+19\sqrt{2}\,B\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\right.$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\frac{(A-B)\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Sec}[c+dx]^{3/2}}{2\,d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\tfrac{1}{4}(c+dx)\right]-\text{Sin}\left[\tfrac{1}{4}(c+dx)\right]\right)^2}+\frac{(-A+B)\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Sec}[c+dx]^{3/2}}{2\,d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\tfrac{1}{4}(c+dx)\right]+\text{Sin}\left[\tfrac{1}{4}(c+dx)\right]\right)^2}+$$

$$\frac{(4A-5B)\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Sec}[c+dx]^{3/2}}{2\,d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]-\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]\right)}+$$

$$\frac{B\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]-\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]\right)^2}+$$

$$\frac{B\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]+\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]\right)^2}+$$

$$\frac{(-4A+5B)\,\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]^3\,\text{Sec}[c+dx]^{3/2}}{2\,d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\tfrac{1}{2}(c+dx)\right]+\text{Sin}\left[\tfrac{1}{2}(c+dx)\right]\right)}$$

- **Problem 256: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx])}{(a+a\,\text{Sec}[c+dx])^{3/2}}\,dx$$

Optimal (type 3, 197 leaves, 7 steps):

$$\frac{(2A-3B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{3/2}\,d}-\frac{(5A-9B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}+$$

$$\frac{(A-B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}-\frac{(A-3B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 1157 leaves) :

$$-\left(\left(\frac{1}{2}-\frac{i}{2}\right)\left((1+i)-i\sqrt{2}\right)\left((-6-2i)A-2\sqrt{2}A+(9+3i)B+3\sqrt{2}B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Sec}[c+dx]^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(\left(\frac{1}{2}-\frac{i}{2}\right)\left((1+i)+\sqrt{2}\right)\left((6-2i)A-2\sqrt{2}A-(9-3i)B+3\sqrt{2}B\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Sec}[c+dx]^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\frac{(5A-9B)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}}+$$

$$\frac{(-5A+9B)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}}+$$

$$\frac{\left(4A+2i\sqrt{2}A-6B-3i\sqrt{2}B\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}}{\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}}+$$

$$\left(\left(\frac{1}{4}+\frac{i}{4}\right)\left((1+i)-i\sqrt{2}\right)\left((-6-2i)A-2\sqrt{2}A+(9+3i)B+3\sqrt{2}B\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)-$$

$$\left(\left(\frac{1}{4}+\frac{i}{4}\right)\left((1+i)+\sqrt{2}\right)\left((6-2i)A-2\sqrt{2}A-(9-3i)B+3\sqrt{2}B\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^{3/2}\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\frac{(-A+B)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Sec}[c+dx]^{3/2}}{2d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right)^2}+\frac{(A-B)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Sec}[c+dx]^{3/2}}{2d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right)^2}+$$

$$\frac{2B\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Sec}[c+dx]^{3/2}}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-$$

$$\frac{2B\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Sec}[c+dx]^{3/2}}{d\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}$$

Problem 257: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{(a+a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 145 leaves, 6 steps):

$$\frac{2 B \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{a^{3/2} d}+\frac{(A-5 B) \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \text{Sec}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}+\frac{(A-B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{2 d (a+a \text{Sec}[c+d x])^{3/2}}$$

Result (type 3, 430 leaves):

$$\frac{1}{2 d (a (1+\text{Sec}[c+d x]))^{3/2}} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \text{Sec}[c+d x]^{3/2}$$
$$\left(-4 i \sqrt{2} B \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(-1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]-4 i \sqrt{2} B \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(-1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]-\right.$$
$$2 (A-5 B) \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]+2 (A-5 B) \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]+$$
$$4 \sqrt{2} B \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-2 \sqrt{2} B \text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-$$
$$\left.2 \sqrt{2} B \text{Log}\left[2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{A-B}{\left(\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right)^2}+\frac{-A+B}{\left(\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right)^2}\right)$$

Problem 262: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^{7/2} (A+B \text{Sec}[c+d x])}{(a+a \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 246 leaves, 8 steps):

$$\frac{(2 A-5 B) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{a^{5/2} d}-\frac{(43 A-115 B) \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \text{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}+$$
$$\frac{(A-B) \text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{4 d (a+a \text{Sec}[c+d x])^{5/2}}+\frac{(7 A-15 B) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{16 a d (a+a \text{Sec}[c+d x])^{3/2}}-\frac{(11 A-35 B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{16 a^2 d \sqrt{a+a \text{Sec}[c+d x]}}$$

Result (type 3, 1304 leaves):

$$-\left((1-i) \left((1+i)-i \sqrt{2}\right) \left((-6-2 i) A-2 \sqrt{2} A+(15+5 i) B+5 \sqrt{2} B\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{-\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\sqrt{2} \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left((1-i)\left((1+i)+\sqrt{2}\right)\left((6-2 i) A-2\sqrt{2} A-(15-5 i) B+5\sqrt{2} B\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\frac{(43 A-115 B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \text{Sec}[c+d x]^{5/2}}{4 d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{(-43 A+115 B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \text{Sec}[c+d x]^{5/2}}{4 d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\frac{2\left(4 A+2 i\sqrt{2} A-10 B-5 i\sqrt{2} B\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}[c+d x]^{5/2}}{\left(i+\sqrt{2}\right) d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}+$$

$$\left(\left(\frac{1}{2}+\frac{i}{2}\right)\left((1+i)-i\sqrt{2}\right)\left((-6-2 i) A-2\sqrt{2} A+(15+5 i) B+5\sqrt{2} B\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}[c+d x]^{5/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)-$$

$$\left(\left(\frac{1}{2}+\frac{i}{2}\right)\left((1+i)+\sqrt{2}\right)\left((6-2 i) A-2\sqrt{2} A-(15-5 i) B+5\sqrt{2} B\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}[c+d x]^{5/2}\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\frac{(-A+B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}}{8 d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4}+\frac{(-11 A+19 B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}}{8 d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2}+$$

$$\frac{(A-B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}}{8 d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4}+$$

$$\frac{(11 A-19 B)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}}{8 d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2}+$$

$$\frac{4 B\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$

$$\frac{4\,B\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\mathrm{Sec}[c+d\,x]^{5/2}}{d\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}$$

- **Problem 263: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[c+d\,x]^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 194 leaves, 7 steps):

$$\frac{2\,B\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(3\,A-43\,B)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}+$$
$$\frac{(A-B)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{4\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}}+\frac{(3\,A-11\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 988 leaves):

$$-\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}2\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)B$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}-\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$

$$2\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)B\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}+$$

$$\frac{(-3\,A+43\,B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\frac{(3\,A-43\,B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\frac{4\sqrt{2}\,B\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$

$$i\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)B\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}+$$

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$

$$i\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)B\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}[c+d\,x]^{5/2}+$$

$$\frac{(A-B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^4}+\frac{(3\,A-11\,B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2}+$$

$$\frac{(-A+B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^4}+\frac{(-3\,A+11\,B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2}$$

- **Problem 266: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 203 leaves, 5 steps):

$$-\frac{(75 A-19 B) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-\frac{(A-B) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d (a+a \operatorname{Sec}[c+d x])^{5/2}}-\frac{(13 A-5 B) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Sec}[c+d x])^{3/2}}+\frac{(49 A-9 B) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{16 a^2 d \sqrt{a+a \operatorname{Sec}[c+d x]}}$$

Result (type 3, 491 leaves) :

$$\frac{(75 A-19 B) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4} (c+d x)\right]\right] \operatorname{Sec}[c+d x]^{5/2}}{4 d (a (1+\operatorname{Sec}[c+d x]))^{5/2}}+\frac{(-75 A+19 B) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4} (c+d x)\right]\right] \operatorname{Sec}[c+d x]^{5/2}}{4 d (a (1+\operatorname{Sec}[c+d x]))^{5/2}}+\frac{(-A+B) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Sec}[c+d x]^{5/2}}{8 d (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4} (c+d x)\right]\right)^4}+\frac{(21 A-13 B) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Sec}[c+d x]^{5/2}}{8 d (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4} (c+d x)\right]\right)^2}+\frac{(A-B) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Sec}[c+d x]^{5/2}}{8 d (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4} (c+d x)\right]\right)^4}+\frac{(-21 A+13 B) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Sec}[c+d x]^{5/2}}{8 d (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4} (c+d x)\right]\right)^2}+\frac{16 A \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (a (1+\operatorname{Sec}[c+d x]))^{5/2}}$$

- **Problem 267: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B \operatorname{Sec}[c+d x]}{\operatorname{Sec}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 250 leaves, 6 steps) :

$$\frac{(163 A-75 B) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-\frac{(A-B) \operatorname{Sin}[c+d x]}{4 d \sqrt{\operatorname{Sec}[c+d x]} (a+a \operatorname{Sec}[c+d x])^{5/2}}-\frac{(17 A-9 B) \operatorname{Sin}[c+d x]}{16 a d \sqrt{\operatorname{Sec}[c+d x]} (a+a \operatorname{Sec}[c+d x])^{3/2}}+\frac{(95 A-39 B) \operatorname{Sin}[c+d x]}{48 a^2 d \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+a \operatorname{Sec}[c+d x]}}-\frac{(299 A-147 B) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{48 a^2 d \sqrt{a+a \operatorname{Sec}[c+d x]}}$$

Result (type 3, 551 leaves) :

$$\frac{(-163\,A+75\,B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]\,\text{Sec}[c+d\,x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\frac{(163\,A-75\,B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]\,\text{Sec}[c+d\,x]^{5/2}}{4\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\frac{(A-B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^4}+\frac{(-29\,A+21\,B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2}+$$

$$\frac{(-A+B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^4}+\frac{(29\,A-21\,B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^{5/2}}{8\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2}+$$

$$\frac{8\,(-5\,A+2\,B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+\frac{8\,A\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]}{3\,d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$

- **Problem 268: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 297 leaves, 7 steps):

$$-\frac{(283\,A-163\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{(21\,A-13\,B)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{(157\,A-85\,B)\,\text{Sin}[c+d\,x]}{80\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{(787\,A-475\,B)\,\text{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{(2671\,A-1495\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 609 leaves):

$$\frac{(283 A - 163 B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\cos\left[\frac{1}{4}(c+d x)\right]-\sin\left[\frac{1}{4}(c+d x)\right]\right] \sec[c+d x]^{5/2}}{4 d (a (1+\sec[c+d x]))^{5/2}}+$$

$$\frac{(-283 A + 163 B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\cos\left[\frac{1}{4}(c+d x)\right]+\sin\left[\frac{1}{4}(c+d x)\right]\right] \sec[c+d x]^{5/2}}{4 d (a (1+\sec[c+d x]))^{5/2}}+$$

$$\frac{(-A+B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2}}{8 d (a (1+\sec[c+d x]))^{5/2} \left(\cos\left[\frac{1}{4}(c+d x)\right]-\sin\left[\frac{1}{4}(c+d x)\right]\right)^4}+$$

$$\frac{(37 A - 29 B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2}}{8 d (a (1+\sec[c+d x]))^{5/2} \left(\cos\left[\frac{1}{4}(c+d x)\right]-\sin\left[\frac{1}{4}(c+d x)\right]\right)^2}+\frac{(A-B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2}}{8 d (a (1+\sec[c+d x]))^{5/2} \left(\cos\left[\frac{1}{4}(c+d x)\right]+\sin\left[\frac{1}{4}(c+d x)\right]\right)^4}+$$

$$\frac{(-37 A + 29 B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2}}{8 d (a (1+\sec[c+d x]))^{5/2} \left(\cos\left[\frac{1}{4}(c+d x)\right]+\sin\left[\frac{1}{4}(c+d x)\right]\right)^2}-\frac{40 (-2 A + B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2} \sin\left[\frac{1}{2}(c+d x)\right]}{d (a (1+\sec[c+d x]))^{5/2}}+$$

$$\frac{4 (-5 A + 2 B) \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2} \sin\left[\frac{3}{2}(c+d x)\right]}{3 d (a (1+\sec[c+d x]))^{5/2}}+\frac{4 A \cos\left[\frac{1}{2}(c+d x)\right]^5 \sec[c+d x]^{5/2} \sin\left[\frac{5}{2}(c+d x)\right]}{5 d (a (1+\sec[c+d x]))^{5/2}}$$

Problem 269: Result more than twice size of optimal antiderivative.

$$\int (a + a \sec[c+d x])^{2/3} (A + B \sec[c+d x])\, dx$$

Optimal (type 6, 406 leaves, 9 steps):

$$\frac{3 \sqrt{2} A \operatorname{AppellF1}\left[\frac{7}{6}, \frac{1}{2}, 1, \frac{13}{6}, \frac{1}{2}(1+\sec[c+d x]), 1+\sec[c+d x]\right] (a+a \sec[c+d x])^{2/3} \tan[c+d x]}{7 d \sqrt{1-\sec[c+d x]}}+$$

$$\frac{3 B (a+a \sec[c+d x])^{2/3} \tan[c+d x]}{2 d (1+\sec[c+d x])}-\left(3^{3/4} B \operatorname{EllipticF}\left[\operatorname{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\sec[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\sec[c+d x])^{1/3}}\right], \frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(a+a \sec[c+d x])^{2/3} \left(2^{1/3}-(1+\sec[c+d x])^{1/3}\right) \sqrt{\frac{2^{2/3}+2^{1/3}(1+\sec[c+d x])^{1/3}+(1+\sec[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\sec[c+d x])^{1/3}\right)^2}} \tan[c+d x]\right) \Big/$$

$$\left(2 \times 2^{1/3} d (1-\sec[c+d x]) (1+\sec[c+d x]) \sqrt{-\frac{(1+\sec[c+d x])^{1/3}\left(2^{1/3}-(1+\sec[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\sec[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7123 leaves): Display of huge result suppressed!

Problem 270: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{(a + a \operatorname{Sec}[c + d x])^{1/3}} \, dx$$

Optimal (type 6, 354 leaves, 8 steps):

$$\frac{3 \sqrt{2} \, A \, \text{AppellF1}\left[\frac{1}{6}, \frac{1}{2}, 1, \frac{7}{6}, \frac{1}{2} (1 + \operatorname{Sec}[c + d x]), 1 + \operatorname{Sec}[c + d x]\right] \operatorname{Tan}[c + d x]}{d \sqrt{1 - \operatorname{Sec}[c + d x]} \, (a + a \operatorname{Sec}[c + d x])^{1/3}} -$$

$$\left(3^{3/4} B \, \text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3} - \left(1 - \sqrt{3}\right) (1 + \operatorname{Sec}[c + d x])^{1/3}}{2^{1/3} - \left(1 + \sqrt{3}\right) (1 + \operatorname{Sec}[c + d x])^{1/3}}\right], \frac{1}{4} \left(2 + \sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3} - (1 + \operatorname{Sec}[c + d x])^{1/3}\right) \sqrt{\frac{2^{2/3} + 2^{1/3} (1 + \operatorname{Sec}[c + d x])^{1/3} + (1 + \operatorname{Sec}[c + d x])^{2/3}}{\left(2^{1/3} - \left(1 + \sqrt{3}\right) (1 + \operatorname{Sec}[c + d x])^{1/3}\right)^2}} \operatorname{Tan}[c + d x]\right) \Big/$$

$$\left(2^{1/3} d \, (1 - \operatorname{Sec}[c + d x]) \, (a + a \operatorname{Sec}[c + d x])^{1/3} \sqrt{-\frac{(1 + \operatorname{Sec}[c + d x])^{1/3} \left(2^{1/3} - (1 + \operatorname{Sec}[c + d x])^{1/3}\right)}{\left(2^{1/3} - \left(1 + \sqrt{3}\right) (1 + \operatorname{Sec}[c + d x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7136 leaves): Display of huge result suppressed!

Problem 271: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{(a + a \operatorname{Sec}[c + d x])^{4/3}} \, dx$$

Optimal (type 6, 415 leaves, 9 steps):

$$\frac{3\,B\,\text{Tan}[c+d\,x]}{5\,a\,d\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}-\frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[-\frac{5}{6},\frac{1}{2},1,\frac{1}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\text{Tan}[c+d\,x]}{5\,a\,d\,\sqrt{1-\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}-$$

$$\left(3^{3/4}\,B\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(5\times2^{1/3}\,a\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7385 leaves) : Display of huge result suppressed!

- **Problem 272: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^{4/3}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 6, 787 leaves, 11 steps) :

$$\frac{3\,a\,B\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{4\,d}+\frac{1}{11\,d\,\sqrt{1-\mathrm{Sec}[c+d\,x]}}$$

$$3\sqrt{2}\,a\,A\,\mathrm{AppellF1}\left[\frac{11}{6},\frac{1}{2},1,\frac{17}{6},\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),1+\mathrm{Sec}[c+d\,x]\right]\,(1+\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]-$$

$$\frac{15\left(1+\sqrt{3}\right)\,a\,B\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{4\,d\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(15\times 3^{1/4}\,a\,B\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(2\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(5\times 3^{3/4}\left(1-\sqrt{3}\right)\,a\,B\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(4\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 5276 leaves) : Display of huge result suppressed !

- **Problem 273: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 6, 739 leaves, 10 steps) :

$$\frac{3\sqrt{2}\,A\,\text{AppellF1}\left[\frac{5}{6},\frac{1}{2},1,\frac{11}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right](a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{5\,d\,\sqrt{1-\text{Sec}[c+d\,x]}}-$$

$$\frac{3\left(1+\sqrt{3}\right)B\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{d\,(1+\text{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 2^{1/3}\,3^{1/4}\,B\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)B\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(2^{2/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 4726 leaves) :

$$\left(3\,B\,\text{Cos}[c+d\,x]\,((1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x])^{1/3}\,(a\,(1+\text{Sec}[c+d\,x]))^{1/3}\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{1/3}\right)+\left(2^{1/3}\,\text{Cos}[c+d\,x]^2\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}(a\,(1+\text{Sec}[c+d\,x]))^{1/3}\right.$$

$$(A+B\,\text{Sec}[c+d\,x])\left(A\,(1+\text{Sec}[c+d\,x])^{1/3}+B\,(1+\text{Sec}[c+d\,x])^{1/3}-3\,B\,\text{Cos}[c+d\,x]\,(1+\text{Sec}[c+d\,x])^{1/3}\right)$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\left(9\,(2\,A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\right/$$

$$\left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(-9 \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\operatorname{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$B\left(-3-\left(5 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \Big/ \left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.\right.$$

$$\left(-15 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3 \operatorname{AppellF1}\left[\frac{5}{2}, \frac{1}{3}, 2, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\operatorname{AppellF1}\left[\frac{5}{2}, \frac{4}{3}, 1, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\right)\right) \Big/$$

$$\left(d\,(B+A \operatorname{Cos}[c+d x])\,(1+\operatorname{Sec}[c+d x])^{1/3}\left(\frac{1}{2^{2/3}} \operatorname{Cos}[c+d x] \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x]\right)^{1/3}\right.\right.$$

$$\left(\left(9\,(2 A-B) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \Big/ \left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.\right.$$

$$\left(-9 \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\operatorname{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$B\left(-3-\left(5 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \Big/ \left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.\right.$$

$$\left(-15 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3 \operatorname{AppellF1}\left[\frac{5}{2}, \frac{1}{3}, 2, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\operatorname{AppellF1}\left[\frac{5}{2}, \frac{4}{3}, 1, \frac{7}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\right)-$$

$$2^{1/3}\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x]\right)^{1/3} \operatorname{Sin}[c+d x] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\left(\left(9\,(2 A-B) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2},\right.\right.\right.$$

$$\left.\left.\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \Big/ \left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left(-9 \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{3}, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left(3 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\operatorname{AppellF1}\left[\frac{3}{2}, \frac{4}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$B\left(-3-\left(5 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{3}, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \Big/ \left(\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.\right.$$

$$\left(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)+$$

$$2^{1/3}\,\text{Cos}[c+d\,x]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\right)^{1/3}\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-\left(9\,(2\,A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right.$$

$$\left(-9\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)+$$

$$\left(9\,(2\,A-B)\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{9}\text{AppellF1}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left(-9\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left(3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$\left(9\,(2\,A-B)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(2\left(3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$9\left(-\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\frac{1}{9}\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\frac{4}{5}\text{AppellF1}\left[\frac{5}{2},\frac{7}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$3\left(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{5}\text{AppellF1}\left[\frac{5}{2},\right.\right.$$

$$\left.\left.\left.\left.\left.\frac{4}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\Big/\left(\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\Big(-9\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{3},1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\Big(3\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\text{AppellF1}\left[\frac{3}{2},\frac{4}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2\Big)+$$

$$B\,\Bigg(\Big(5\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3\Big)\Big/\Big(\Big(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)^2$$

$$\Big(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\Big(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)-$$

$$\Big(5\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big/\Big(\Big(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)$$

$$\Big(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\,\Big(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)-$$

$$\Big(5\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{5}\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big/$$

$$\Big(\Big(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big(-15\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+$$

$$2\,\Big(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Big)+\Big(5\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{3},1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big(2\,\Big(3\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]-$$

$$\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\Big)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$15\,\Big(-\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{3},2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$\frac{1}{5}\text{AppellF1}\left[\frac{5}{2},\frac{4}{3},1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)+$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Big(\frac{5}{7}\text{AppellF1}\left[\frac{7}{2},\frac{4}{3},2,\frac{9}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$\frac{20}{21}\,\text{AppellF1}[\tfrac{7}{2},\tfrac{7}{3},1,\tfrac{9}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d x)]+$$

$$3\,(-\frac{10}{7}\,\text{AppellF1}[\tfrac{7}{2},\tfrac{1}{3},3,\tfrac{9}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d x)]+$$

$$\frac{5}{21}\,\text{AppellF1}[\tfrac{7}{2},\tfrac{4}{3},2,\tfrac{9}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d x)])))))\Big/$$

$$((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2)\,(-15\,\text{AppellF1}[\tfrac{3}{2},\tfrac{1}{3},1,\tfrac{5}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]+$$

$$2\,(3\,\text{AppellF1}[\tfrac{5}{2},\tfrac{1}{3},2,\tfrac{7}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]-\text{AppellF1}[\tfrac{5}{2},\tfrac{4}{3},1,\tfrac{7}{2},$$

$$\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2])\,\text{Tan}[\tfrac{1}{2}(c+d x)]^2)^2)))+\frac{1}{3\,(\text{Cos}[\frac{1}{2}(c+d x)]^2\,\text{Sec}[c+d x])^{2/3}}$$

$$2^{1/3}\,\text{Cos}[c+d x]\,\text{Tan}[\tfrac{1}{2}(c+d x)]\,(((9\,(2A-B)\,\text{AppellF1}[\tfrac{1}{2},\tfrac{1}{3},1,\tfrac{3}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2])\Big/$$

$$((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2)\,(-9\,\text{AppellF1}[\tfrac{1}{2},\tfrac{1}{3},1,\tfrac{3}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]+2$$

$$(3\,\text{AppellF1}[\tfrac{3}{2},\tfrac{1}{3},2,\tfrac{5}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]-$$

$$\text{AppellF1}[\tfrac{3}{2},\tfrac{4}{3},1,\tfrac{5}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2])\,\text{Tan}[\tfrac{1}{2}(c+d x)]^2))+$$

$$B\,(-3-(5\,\text{AppellF1}[\tfrac{3}{2},\tfrac{1}{3},1,\tfrac{5}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]\,\text{Tan}[\tfrac{1}{2}(c+d x)]^2)\Big/((-1+\text{Tan}[\tfrac{1}{2}(c+d x)]^2)$$

$$(-15\,\text{AppellF1}[\tfrac{3}{2},\tfrac{1}{3},1,\tfrac{5}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]+2\,(3\,\text{AppellF1}[\tfrac{5}{2},\tfrac{1}{3},2,\tfrac{7}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,$$

$$-\text{Tan}[\tfrac{1}{2}(c+d x)]^2]-\text{AppellF1}[\tfrac{5}{2},\tfrac{4}{3},1,\tfrac{7}{2},\text{Tan}[\tfrac{1}{2}(c+d x)]^2,-\text{Tan}[\tfrac{1}{2}(c+d x)]^2])\,\text{Tan}[\tfrac{1}{2}(c+d x)]^2))))$$

$$(-\text{Cos}[\tfrac{1}{2}(c+d x)]\,\text{Sec}[c+d x]\,\text{Sin}[\tfrac{1}{2}(c+d x)]+\text{Cos}[\tfrac{1}{2}(c+d x)]^2\,\text{Sec}[c+d x]\,\text{Tan}[c+d x])))$$

- **Problem 274: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d x]}{(a+a\,\text{Sec}[c+d x])^{2/3}}\,dx$$

Optimal (type 6, 764 leaves, 11 steps):

$$\frac{3\,B\,\mathrm{Tan}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}-\frac{3\sqrt{2}\,A\,\mathrm{AppellF1}\left[-\frac{1}{6},\frac{1}{2},1,\frac{5}{6},\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),1+\mathrm{Sec}[c+d\,x]\right]\mathrm{Tan}[c+d\,x]}{d\sqrt{1-\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}+$$

$$\frac{3\left(1+\sqrt{3}\right)B\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}-$$

$$\left(3\times 2^{1/3}\,3^{1/4}\,B\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](1+\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\;\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(d\,(1-\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)-$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)B\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right](1+\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\;\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 5254 leaves) : Display of huge result suppressed!

- **Problem 275: Result more than twice size of optimal antiderivative.**

$$\int (c\,\mathrm{Sec}[e+f\,x])^n\,(a+a\,\mathrm{Sec}[e+f\,x])^m\,(A+B\,\mathrm{Sec}[e+f\,x])\,dx$$

Optimal (type 6, 197 leaves, 7 steps) :

$$-\frac{1}{f\,n\,\sqrt{1-\text{Sec}[e+f\,x]}}\text{B AppellF1}\left[n,\frac{1}{2},-\frac{1}{2}-m,1+n,\text{Sec}[e+f\,x],-\text{Sec}[e+f\,x]\right]$$

$$(c\,\text{Sec}[e+f\,x])^n\,(1+\text{Sec}[e+f\,x])^{-\frac{1}{2}-m}\,(a+a\,\text{Sec}[e+f\,x])^m\,\text{Tan}[e+f\,x]-\frac{1}{f\,n\,\sqrt{1-\text{Sec}[e+f\,x]}}$$

$$(A-B)\,\text{AppellF1}\left[n,\frac{1}{2},\frac{1}{2}-m,1+n,\text{Sec}[e+f\,x],-\text{Sec}[e+f\,x]\right]\,(c\,\text{Sec}[e+f\,x])^n\,(1+\text{Sec}[e+f\,x])^{-\frac{1}{2}-m}\,(a+a\,\text{Sec}[e+f\,x])^m\,\text{Tan}[e+f\,x]$$

Result (type 6, 4897 leaves) :

$$\Bigg(2^{1+m}\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^n\text{Sec}[e+f\,x]^{-1-n}\,(c\,\text{Sec}[e+f\,x])^n\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\right)^{m+n}(1+\text{Sec}[e+f\,x])^{-m}$$

$$(a\,(1+\text{Sec}[e+f\,x]))^m\,(A+B\,\text{Sec}[e+f\,x])\,\left(A\,\text{Sec}[e+f\,x]^n\,(1+\text{Sec}[e+f\,x])^m+B\,\text{Sec}[e+f\,x]^{1+n}\,(1+\text{Sec}[e+f\,x])^m\right)$$

$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]\Bigg(-\left(3\,A\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}[e+f\,x]\right)\Big/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)-$$

$$\left(B\,\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\Big/\Bigg(\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\frac{2}{3}\Bigg(n\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+$$

$$(1+m+n)\,\text{AppellF1}\left[\frac{3}{2},2+m+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(f\,(B+A\,\text{Cos}[e+f\,x])\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\Bigg(-\frac{1}{\left(-1+\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2}2^{1+m}\left(\text{Sec}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\right)^{m+n}$$

$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg(-\left(3\,A\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}[e+f\,x]\right)\Big/\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},\right.$$

$$m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Big]+2\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)-$$

$$\left(B\,\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\Big/\Bigg(\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\frac{2}{3}\Bigg(n\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+$$

$$(1+m+n)\,\text{AppellF1}\left[\frac{3}{2},2+m+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)+$$

$$\frac{1}{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\,2^m\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{1+n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}$$

$$\Big(-\Big(3\,A\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-$$

$$\Big(B\,\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\Big/\Big(\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\Big(n\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(1+m+n)\,\text{AppellF1}\left[\frac{3}{2},2+m+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)\Big)+$$

$$\frac{1}{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\,2^{1+m}\,n\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Big(-\Big(3\,A\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2},m+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-$$

$$\Big(B\,\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\Big/\Big(\text{AppellF1}\left[\frac{1}{2},1+m+n,-n,\frac{3}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\frac{2}{3}\Big(n\,\text{AppellF1}\left[\frac{3}{2},1+m+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(1+m+n)\,\text{AppellF1}\left[\frac{3}{2},2+m+n,-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)\Big)+$$

$$\frac{1}{-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\,2^{1+m}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^{n}\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{m+n}\text{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\Big(\Big(3\,A\,\text{AppellF1}\left[\frac{1}{2},m+n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sin}[e+f x]\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) -$$

$$\left(3\,A\,\text{Cos}[e+f x]\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right] +\right.\right.$$

$$\left.\left.\frac{1}{3}(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) -$$

$$\left(B\left(\frac{1}{3}\,n\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right] +\right.\right.$$

$$\left.\left.\frac{1}{3}(1+m+n)\,\text{AppellF1}\left[\frac{3}{2}, 2+m+n, -n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\Big/$$

$$\left(\text{AppellF1}\left[\frac{1}{2}, 1+m+n, -n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + \frac{2}{3}\left(n\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + (1+m+n)\,\text{AppellF1}\left[\frac{3}{2}, 2+m+n, -n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right) +$$

$$\left(3\,A\,\text{AppellF1}\left[\frac{1}{2}, m+n, 1-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cos}[e+f x]\right.$$

$$\left(2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.\right.$$

$$\left.(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$3\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2}, m+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right] +\right.$$

$$\left.\frac{1}{3}(m+n)\,\text{AppellF1}\left[\frac{3}{2}, 1+m+n, 1-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) +$$

$$2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left((-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2}, m+n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{3}{5}(m+n)\,\text{AppellF1}\left[\frac{5}{2}, 1+m+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) + (m+n)\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2}, 1+m+n, 2-n, \frac{7}{2},\right.\right.$$

$$\text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)] + \frac{3}{5}(1+m+n)$$

$$\text{AppellF1}[\tfrac{5}{2}, 2+m+n, 1-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}[\tfrac{1}{2}, m+n, 1-n, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2] + 2\Big((-1+n)\,\text{AppellF1}[\tfrac{3}{2}, m+n, 2-n, \tfrac{5}{2},$$

$$\text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2] + (m+n)\,\text{AppellF1}[\tfrac{3}{2}, 1+m+n, 1-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\Big)$$

$$\text{Tan}[\tfrac{1}{2}(e+f x)]^2\Big)^2 + \Big(B\,\text{AppellF1}[\tfrac{1}{2}, 1+m+n, -n, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]$$

$$\Big(\frac{1}{3}n\,\text{AppellF1}[\tfrac{3}{2}, 1+m+n, 1-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)] +$$

$$\frac{1}{3}(1+m+n)\,\text{AppellF1}[\tfrac{3}{2}, 2+m+n, -n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)] +$$

$$\frac{2}{3}\Big(n\,\text{AppellF1}[\tfrac{3}{2}, 1+m+n, 1-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2] + (1+m+n)\,\text{AppellF1}[\tfrac{3}{2}, 2+m+n, -n, \tfrac{5}{2},$$

$$\text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\Big)\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)] + \frac{2}{3}\text{Tan}[\tfrac{1}{2}(e+f x)]^2\Big(n\Big(-\frac{3}{5}(1-n)\,\text{AppellF1}[$$

$$\tfrac{5}{2}, 1+m+n, 2-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)] + \frac{3}{5}(1+m+n)$$

$$\text{AppellF1}[\tfrac{5}{2}, 2+m+n, 1-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)]\Big) + (1+m+n)$$

$$\Big(\frac{3}{5}n\,\text{AppellF1}[\tfrac{5}{2}, 2+m+n, 1-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)] + \frac{3}{5}(2+$$

$$m+n)\,\text{AppellF1}[\tfrac{5}{2}, 3+m+n, -n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Sec}[\tfrac{1}{2}(e+f x)]^2\,\text{Tan}[\tfrac{1}{2}(e+f x)]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\text{AppellF1}[\tfrac{1}{2}, 1+m+n, -n, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2] + \frac{2}{3}\Big(n\,\text{AppellF1}[\tfrac{3}{2}, 1+m+n, 1-n,$$

$$\tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2] +$$

$$(1+m+n)\,\text{AppellF1}[\tfrac{3}{2}, 2+m+n, -n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\Big)\,\text{Tan}[\tfrac{1}{2}(e+f x)]^2\Big)^2\Big) +$$

$$\frac{1}{-1+\text{Tan}[\frac{1}{2}(e+f x)]^2}\,2^{1+m}(m+n)\Big(\text{Sec}[\tfrac{1}{2}(e+f x)]^2\Big)^n\Big(\text{Cos}[\tfrac{1}{2}(e+f x)]^2\,\text{Sec}[e+f x]\Big)^{-1+m+n}\,\text{Tan}[\tfrac{1}{2}(e+f x)]$$

$$\Big(-\Big(3\,A\,\text{AppellF1}[\tfrac{1}{2}, m+n, 1-n, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(e+f x)]^2, -\text{Tan}[\tfrac{1}{2}(e+f x)]^2]\,\text{Cos}[e+f x]\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,m+n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,m+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(m+n)\,\text{AppellF1}\left[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)-$$
$$\left(B\,\text{AppellF1}\left[\frac{1}{2},\,1+m+n,\,-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\Big/\left(\text{AppellF1}\left[\frac{1}{2},\,1+m+n,\,-n,\,\frac{3}{2},\right.\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\frac{2}{3}\left(n\,\text{AppellF1}\left[\frac{3}{2},\,1+m+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+\right.$$
$$\left.\left.(1+m+n)\,\text{AppellF1}\left[\frac{3}{2},\,2+m+n,\,-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)$$
$$\left.\left.\left(-\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\text{Sec}[e+f\,x]\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]+\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]\right)\right)\right)$$

- **Problem 277: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 114 leaves, 6 steps):

$$\frac{(4\,a\,A+3\,b\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(A\,b+a\,B)\,\text{Tan}[c+d\,x]}{d}+$$
$$\frac{(4\,a\,A+3\,b\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{b\,B\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{(A\,b+a\,B)\,\text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 403 leaves):

$$-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{3\,b\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+$$
$$\frac{3\,b\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{a\,A}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{3\,b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-\frac{a\,A}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-$$
$$\frac{3\,b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,A\,b\,\text{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,B\,\text{Tan}[c+d\,x]}{3\,d}+\frac{A\,b\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

- **Problem 279: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 61 leaves, 5 steps):

$$\frac{(2 a A + b B) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{(A b + a B) \text{Tan}[c + d x]}{d} + \frac{b B \text{Sec}[c + d x] \text{Tan}[c + d x]}{2 d}$$

Result (type 3, 164 leaves):

$$\frac{1}{4 d}\left(-2 (2 a A + b B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 4 a A \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 2 b B \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \frac{b B}{\left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} - \frac{b B}{\left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} + 4 (A b + a B) \text{Tan}[c + d x]\right)$$

- **Problem 280: Result more than twice size of optimal antiderivative.**

$$\int (a + b \text{Sec}[c + d x]) (A + B \text{Sec}[c + d x]) \, dx$$

Optimal (type 3, 35 leaves, 4 steps):

$$a A x + \frac{(A b + a B) \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{b B \text{Tan}[c + d x]}{d}$$

Result (type 3, 159 leaves):

$$a A x - \frac{A b \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} - \frac{a B \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{A b \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a B \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{b B \text{Tan}[c + d x]}{d}$$

- **Problem 281: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d x] (a + b \text{Sec}[c + d x]) (A + B \text{Sec}[c + d x]) \, dx$$

Optimal (type 3, 35 leaves, 3 steps):

$$(A b + a B) x + \frac{b B \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{a A \text{Sin}[c + d x]}{d}$$

Result (type 3, 104 leaves):

$$A b x + a B x - \frac{b B \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{b B \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a A \text{Cos}[d x] \text{Sin}[c]}{d} + \frac{a A \text{Cos}[c] \text{Sin}[d x]}{d}$$

Problem 286: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^2 (a+b\,\text{Sec}[c+d x])^2 (A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 179 leaves, 7 steps):

$$\frac{\left(8 a A b+4 a^2 B+3 b^2 B\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{\left(4 a^2 A b+4 A b^3-a^3 B+8 a b^2 B\right) \text{Tan}[c+d x]}{6 b d}+\frac{\left(8 a A b-2 a^2 B+9 b^2 B\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{24 d}+\frac{(4 A b-a B) (a+b\,\text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{12 b d}+\frac{B (a+b\,\text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{4 b d}$$

Result (type 3, 457 leaves):

$$\frac{1}{48 d}\left(-6\left(8 a A b+4 a^2 B+3 b^2 B\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+6\left(8 a A b+4 a^2 B+3 b^2 B\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$\frac{3 b^2 B}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{12 a^2 B+8 a b (3 A+B)+b^2 (4 A+9 B)}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{8 b (A b+2 a B) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{16\left(3 a^2 A+2 A b^2+4 a b B\right) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}-\frac{3 b^2 B}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$
$$\left.\frac{8 b (A b+2 a B) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}-\frac{12 a^2 B+8 a b (3 A+B)+b^2 (4 A+9 B)}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{16\left(3 a^2 A+2 A b^2+4 a b B\right) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

Problem 287: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (a+b\,\text{Sec}[c+d x])^2 (A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 3, 116 leaves, 6 steps):

$$\frac{\left(2 a^2 A+A b^2+2 a b B\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{2\left(3 a A b+a^2 B+b^2 B\right) \text{Tan}[c+d x]}{3 d}+\frac{b (3 A b+2 a B) \text{Sec}[c+d x] \text{Tan}[c+d x]}{6 d}+\frac{B (a+b\,\text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 239 leaves):

$$\frac{1}{6\,d}\,\text{Sec}[c+d\,x]^3\left(-\frac{9}{4}\left(2\,a^2\,A+A\,b^2+2\,a\,b\,B\right)\text{Cos}[c+d\,x]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-\right.$$
$$\frac{3}{4}\left(2\,a^2\,A+A\,b^2+2\,a\,b\,B\right)\text{Cos}[3\,(c+d\,x)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$
$$\left.\left(6\,a\,A\,b+3\,a^2\,B+4\,b^2\,B+3\,b\,(A\,b+2\,a\,B)\,\text{Cos}[c+d\,x]+\left(6\,a\,A\,b+3\,a^2\,B+2\,b^2\,B\right)\text{Cos}[2\,(c+d\,x)]\right)\text{Sin}[c+d\,x]\right)$$

Problem 288: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 86 leaves, 5 steps):

$$a^2\,A\,x+\frac{\left(4\,a\,A\,b+2\,a^2\,B+b^2\,B\right)\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{b\,(2\,A\,b+3\,a\,B)\,\text{Tan}[c+d\,x]}{2\,d}+\frac{b\,B\,(a+b\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 345 leaves):

$$\frac{1}{4\,d}\,\text{Sec}[c+d\,x]^2\left(2\,a^2\,A\,c+2\,a^2\,A\,d\,x-4\,a\,A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-2\,a^2\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\right.$$
$$b^2\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+4\,a\,A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$2\,a^2\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+b^2\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$\text{Cos}[2\,(c+d\,x)]\left(2\,a^2\,A\,(c+d\,x)-\left(4\,a\,A\,b+2\,a^2\,B+b^2\,B\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$\left.\left.\left(4\,a\,A\,b+2\,a^2\,B+b^2\,B\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+2\,b^2\,B\,\text{Sin}[c+d\,x]+2\,A\,b^2\,\text{Sin}[2\,(c+d\,x)]+4\,a\,b\,B\,\text{Sin}[2\,(c+d\,x)]\right)$$

Problem 295: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 180 leaves, 7 steps):

$$\frac{\left(8\,a^3\,A+12\,a\,A\,b^2+12\,a^2\,b\,B+3\,b^3\,B\right)\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{\left(16\,a^2\,A\,b+4\,A\,b^3+3\,a^3\,B+12\,a\,b^2\,B\right)\text{Tan}[c+d\,x]}{6\,d}+$$
$$\frac{b\left(20\,a\,A\,b+6\,a^2\,B+9\,b^2\,B\right)\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{24\,d}+\frac{(4\,A\,b+3\,a\,B)\,(a+b\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]}{12\,d}+\frac{B\,(a+b\,\text{Sec}[c+d\,x])^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 1179 leaves):

$$\left(\left(-8 a^3 A-12 a A b^2-12 a^2 b B-3 b^3 B\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right) \Big/ \left(8 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x])\right)+$$

$$\left(\left(8 a^3 A+12 a A b^2+12 a^2 b B+3 b^3 B\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right) \Big/ \left(8 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x])\right)+\frac{b^3 B \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{16 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{\left(36 a A b^2+4 A b^3+36 a^2 b B+12 a b^2 B+9 b^3 B\right) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{48 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-$$

$$\frac{b^3 B \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{16 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{\left(-36 a A b^2-4 A b^3-36 a^2 b B-12 a b^2 B-9 b^3 B\right) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{48 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{\text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \left(A b^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a b^2 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}{6 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \left(A b^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a b^2 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}{6 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\left(\text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3\right.$$

$$\left.(A+B \text{Sec}[c+d x]) \left(9 a^2 A b \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 A b^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+6 a b^2 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$

$$\left(3 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)+\left(\text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3\right.$$

$$\left.(A+B \text{Sec}[c+d x]) \left(9 a^2 A b \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 A b^3 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+6 a b^2 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$

$$\left(3 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)$$

Problem 296: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 137 leaves, 6 steps):

$$a^3 A x + \frac{\left(6 a^2 A b + A b^3 + 2 a^3 B + 3 a b^2 B\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d} + \frac{b \left(9 a A b + 8 a^2 B + 2 b^2 B\right) \text{Tan}[c+d x]}{3 d} + \frac{b^2 (3 A b + 5 a B) \text{Sec}[c+d x] \text{Tan}[c+d x]}{6 d} + \frac{b B (a + b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 968 leaves) :

$$\frac{a^3 A (c+d x) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x])} +$$
$$\left(\left(-6 a^2 A b - A b^3 - 2 a^3 B - 3 a b^2 B\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right) \Big/$$
$$\left(2 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x])\right) +$$
$$\left(\left(6 a^2 A b + A b^3 + 2 a^3 B + 3 a b^2 B\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])\right) \Big/$$
$$\left(2 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x])\right) + \frac{\left(3 A b^3 + 9 a b^2 B + b^3 B\right) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{12 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2} +$$
$$\frac{b^3 B \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3} +$$
$$\frac{b^3 B \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3} +$$
$$\frac{\left(-3 A b^3 - 9 a b^2 B - b^3 B\right) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x])}{12 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2} +$$
$$\left(\text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \left(9 a A b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right] + 9 a^2 b B \text{Sin}\left[\frac{1}{2} (c+d x)\right] + 2 b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(3 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) +$$
$$\left(\text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \left(9 a A b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right] + 9 a^2 b B \text{Sin}\left[\frac{1}{2} (c+d x)\right] + 2 b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(3 d (b+a \text{Cos}[c+d x])^3 (B+A \text{Cos}[c+d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)$$

- **Problem 297: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^3 (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 3, 119 leaves, 6 steps) :

$$a^2 (3 A b + a B) x + \frac{b (6 a A b + 6 a^2 B + b^2 B) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{a^2 (2 a A - b B) \text{Sin}[c + d x]}{2 d} + \frac{b B (a + b \text{Sec}[c + d x])^2 \text{Sin}[c + d x]}{2 d} + \frac{b^2 (A b + 2 a B) \text{Tan}[c + d x]}{d}$$

Result (type 3, 399 leaves) :

$$\frac{1}{4 d} \text{Sec}[c + d x]^2 \Big(6 a^2 A b c + 2 a^3 B c + 6 a^2 A b d x + 2 a^3 B d x - 6 a A b^2 \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] - \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] - 6 a^2 b B \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] - \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] - b^3 B \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] - \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] + 6 a A b^2 \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] + \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] + 6 a^2 b B \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] + \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] + b^3 B \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] + \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] + \text{Cos}[2 (c + d x)] \Big(2 a^2 (3 A b + a B) (c + d x) - b (6 a A b + 6 a^2 B + b^2 B) \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] - \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big] + b (6 a A b + 6 a^2 B + b^2 B) \text{Log}\Big[\text{Cos}\Big[\frac{1}{2} (c + d x)\Big] + \text{Sin}\Big[\frac{1}{2} (c + d x)\Big]\Big]\Big) + (a^3 A + 2 b^3 B) \text{Sin}[c + d x] + 2 A b^3 \text{Sin}[2 (c + d x)] + 6 a b^2 B \text{Sin}[2 (c + d x)] + a^3 A \text{Sin}[3 (c + d x)]\Big)$$

Problem 304: Result more than twice size of optimal antiderivative.

$$\int (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \, dx$$

Optimal (type 3, 200 leaves, 7 steps) :

$$a^4 A x + \frac{(32 a^3 A b + 16 a A b^3 + 8 a^4 B + 24 a^2 b^2 B + 3 b^4 B) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{b (34 a^2 A b + 4 A b^3 + 19 a^3 B + 16 a b^2 B) \text{Tan}[c + d x]}{6 d} + \frac{b^2 (32 a A b + 26 a^2 B + 9 b^2 B) \text{Sec}[c + d x] \text{Tan}[c + d x]}{24 d} + \frac{b (4 A b + 7 a B) (a + b \text{Sec}[c + d x])^2 \text{Tan}[c + d x]}{12 d} + \frac{b B (a + b \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{4 d}$$

Result (type 3, 455 leaves) :

$$\frac{1}{96\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,(B+A\,\mathrm{Cos}[c+d\,x])}$$

$$\mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\,(A+B\,\mathrm{Sec}[c+d\,x])\,\Big(36\,a^4\,A\,(c+d\,x)+48\,a^4\,A\,(c+d\,x)\,\mathrm{Cos}[2\,(c+d\,x)]+12\,a^4\,A\,(c+d\,x)\,\mathrm{Cos}[4\,(c+d\,x)]-$$
$$12\,\left(32\,a^3\,A\,b+16\,a\,A\,b^3+8\,a^4\,B+24\,a^2\,b^2\,B+3\,b^4\,B\right)\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Log}\Big[\mathrm{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\mathrm{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]+$$
$$12\,\left(32\,a^3\,A\,b+16\,a\,A\,b^3+8\,a^4\,B+24\,a^2\,b^2\,B+3\,b^4\,B\right)\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Log}\Big[\mathrm{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\mathrm{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]+$$
$$48\,a\,A\,b^3\,\mathrm{Sin}[c+d\,x]+72\,a^2\,b^2\,B\,\mathrm{Sin}[c+d\,x]+33\,b^4\,B\,\mathrm{Sin}[c+d\,x]+144\,a^2\,A\,b^2\,\mathrm{Sin}[2\,(c+d\,x)]+32\,A\,b^4\,\mathrm{Sin}[2\,(c+d\,x)]+$$
$$96\,a^3\,b\,B\,\mathrm{Sin}[2\,(c+d\,x)]+128\,a\,b^3\,B\,\mathrm{Sin}[2\,(c+d\,x)]+48\,a\,A\,b^3\,\mathrm{Sin}[3\,(c+d\,x)]+72\,a^2\,b^2\,B\,\mathrm{Sin}[3\,(c+d\,x)]+$$
$$9\,b^4\,B\,\mathrm{Sin}[3\,(c+d\,x)]+72\,a^2\,A\,b^2\,\mathrm{Sin}[4\,(c+d\,x)]+8\,A\,b^4\,\mathrm{Sin}[4\,(c+d\,x)]+48\,a^3\,b\,B\,\mathrm{Sin}[4\,(c+d\,x)]+32\,a\,b^3\,B\,\mathrm{Sin}[4\,(c+d\,x)]\Big)$$

- **Problem 305: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 195 leaves, 7 steps) :

$$a^3\,(4\,A\,b+a\,B)\,x+\frac{b\,\left(12\,a^2\,A\,b+A\,b^3+8\,a^3\,B+4\,a\,b^2\,B\right)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+$$
$$\frac{a\,A\,(a+b\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Sin}[c+d\,x]}{d}-\frac{b\,\left(6\,a^3\,A-12\,a\,A\,b^2-17\,a^2\,b\,B-2\,b^3\,B\right)\,\mathrm{Tan}[c+d\,x]}{3\,d}-$$
$$\frac{b^2\,\left(6\,a^2\,A-3\,A\,b^2-8\,a\,b\,B\right)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{6\,d}-\frac{b\,(3\,a\,A-b\,B)\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1051 leaves) :

$$\frac{a^3 (4 A b + a B) (c + d x) \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])}{d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x])} +$$

$$\left(\left(-12 a^2 A b^2 - A b^4 - 8 a^3 b B - 4 a b^3 B\right) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])\right) \Big/ \left(2 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x])\right) +$$

$$\left(\left(12 a^2 A b^2 + A b^4 + 8 a^3 b B + 4 a b^3 B\right) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])\right) \Big/ \left(2 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x])\right) + \frac{\left(3 A b^4 + 12 a b^3 B + b^4 B\right) \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])}{12 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} +$$

$$\frac{b^4 B \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}\left[\frac{1}{2} (c + d x)\right]}{6 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^3} +$$

$$\frac{b^4 B \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}\left[\frac{1}{2} (c + d x)\right]}{6 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^3} +$$

$$\frac{\left(-3 A b^4 - 12 a b^3 B - b^4 B\right) \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x])}{12 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} +$$

$$\left(2 \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \left(6 a A b^3 \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 9 a^2 b^2 B \text{Sin}\left[\frac{1}{2} (c + d x)\right] + b^4 B \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) \Big/ \left(3 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) +$$

$$\left(2 \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \left(6 a A b^3 \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 9 a^2 b^2 B \text{Sin}\left[\frac{1}{2} (c + d x)\right] + b^4 B \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) \Big/ \left(3 d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) +$$

$$\frac{a^4 A \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^4 (A + B \text{Sec}[c + d x]) \text{Sin}[c + d x]}{d (b + a \text{Cos}[c + d x])^4 (B + A \text{Cos}[c + d x])}$$

- **Problem 311: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c + d x]^4 (A + B \text{Sec}[c + d x])}{a + b \text{Sec}[c + d x]} \, dx$$

Optimal (type 3, 187 leaves, 8 steps) :

$$\frac{\left(2 a^2+b^2\right) (A b-a B) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 b^4 d}-\frac{2 a^3 (A b-a B) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\, b^4 \sqrt{a+b}\, d}-\frac{\left(3 a A b-3 a^2 B-2 b^2 B\right) \text{Tan}[c+d x]}{3 b^3 d}+\frac{(A b-a B) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b^2 d}+\frac{B \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 b d}$$

Result (type 3, 422 leaves) :

$$\frac{1}{12 b^4 d}\left(\frac{24 a^3 (A b-a B) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}}+6\left(2 a^2+b^2\right) (-A b+a B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$

$$6\left(2 a^2+b^2\right) (-A b+a B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{b^2 (3 A b+(-3 a+b) B)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{2 b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{4 b \left(-3 a A b+3 a^2 B+2 b^2 B\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}+$$

$$\left.\frac{2 b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-\frac{b^2 (3 A b+(-3 a+b) B)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 b \left(-3 a A b+3 a^2 B+2 b^2 B\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}\right)$$

- **Problem 312: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^3 (A+B \text{Sec}[c+d x])}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 143 leaves, 7 steps) :

$$-\frac{\left(2 a A b-2 a^2 B-b^2 B\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 b^3 d}+\frac{2 a^2 (A b-a B) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\, b^3 \sqrt{a+b}\, d}+\frac{(A b-a B) \text{Tan}[c+d x]}{b^2 d}+\frac{B \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b d}$$

Result (type 3, 300 leaves) :

$$\frac{1}{4 b^3 d}\left(\frac{8 a^2 (-A b + a B) \operatorname{ArcTanh}\left[\frac{(-a+b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}} - 2\left(-2 a A b + 2 a^2 B + b^2 B\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] + \right.$$

$$2\left(-2 a A b + 2 a^2 B + b^2 B\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] + \frac{b^2 B}{\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} +$$

$$\left.\frac{4 b (A b - a B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]} - \frac{b^2 B}{\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} + \frac{4 b (A b - a B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

- **Problem 341: Result more than twice size of optimal antiderivative.**

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{(a + b \operatorname{Sec}[c + d x])^4} \, dx$$

Optimal (type 3, 292 leaves, 7 steps):

$$\frac{A x}{a^4} - \frac{\left(8 a^6 A b - 8 a^4 A b^3 + 7 a^2 A b^5 - 2 A b^7 - 2 a^7 B - 3 a^5 b^2 B\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^4 (a-b)^{7/2} (a+b)^{7/2} d} + \frac{b (A b - a B) \operatorname{Tan}[c + d x]}{3 a \left(a^2 - b^2\right) d (a + b \operatorname{Sec}[c + d x])^3} +$$

$$\frac{b \left(8 a^2 A b - 3 A b^3 - 5 a^3 B\right) \operatorname{Tan}[c + d x]}{6 a^2 \left(a^2 - b^2\right)^2 d (a + b \operatorname{Sec}[c + d x])^2} + \frac{b \left(26 a^4 A b - 17 a^2 A b^3 + 6 A b^5 - 11 a^5 B - 4 a^3 b^2 B\right) \operatorname{Tan}[c + d x]}{6 a^3 \left(a^2 - b^2\right)^3 d (a + b \operatorname{Sec}[c + d x])}$$

Result (type 3, 769 leaves):

$$\frac{1}{24 a^4 d (B + A \text{Cos}[c + d x]) (a + b \text{Sec}[c + d x])^4} (b + a \text{Cos}[c + d x]) \text{Sec}[c + d x]^3 (A + B \text{Sec}[c + d x])$$

$$\left(-\frac{1}{(a^2 - b^2)^{7/2}} 24 \left(-8 a^6 A b + 8 a^4 A b^3 - 7 a^2 A b^5 + 2 A b^7 + 2 a^7 B + 3 a^5 b^2 B\right) \text{ArcTanh}\left[\frac{(-a + b) \text{Tan}\left[\frac{1}{2} (c + d x)\right]}{\sqrt{a^2 - b^2}}\right] (b + a \text{Cos}[c + d x])^3 + \right.$$

$$\frac{1}{(a^2 - b^2)^3} \left(36 a^8 A b c - 84 a^6 A b^3 c + 36 a^4 A b^5 c + 36 a^2 A b^7 c - 24 A b^9 c + 36 a^8 A b d x - 84 a^6 A b^3 d x + 36 a^4 A b^5 d x + 36 a^2 A b^7 d x - 24 A b^9 d x + \right.$$

$$18 a A \left(a^2 - b^2\right)^3 \left(a^2 + 4 b^2\right) (c + d x) \text{Cos}[c + d x] + 36 a^2 A b \left(a^2 - b^2\right)^3 (c + d x) \text{Cos}[2 (c + d x)] + 6 a^9 A c \text{Cos}[3 (c + d x)] - 18 a^7 A b^2 c$$

$$\text{Cos}[3 (c + d x)] + 18 a^5 A b^4 c \text{Cos}[3 (c + d x)] - 6 a^3 A b^6 c \text{Cos}[3 (c + d x)] + 6 a^9 A d x \text{Cos}[3 (c + d x)] - 18 a^7 A b^2 d x \text{Cos}[3 (c + d x)] +$$

$$18 a^5 A b^4 d x \text{Cos}[3 (c + d x)] - 6 a^3 A b^6 d x \text{Cos}[3 (c + d x)] + 36 a^7 A b^2 \text{Sin}[c + d x] + 72 a^5 A b^4 \text{Sin}[c + d x] - 57 a^3 A b^6 \text{Sin}[c + d x] +$$

$$24 a A b^8 \text{Sin}[c + d x] - 18 a^8 b B \text{Sin}[c + d x] - 39 a^6 b^3 B \text{Sin}[c + d x] - 18 a^4 b^5 B \text{Sin}[c + d x] + 120 a^6 A b^3 \text{Sin}[2 (c + d x)] -$$

$$90 a^4 A b^5 \text{Sin}[2 (c + d x)] + 30 a^2 A b^7 \text{Sin}[2 (c + d x)] - 54 a^7 b^2 B \text{Sin}[2 (c + d x)] - 6 a^5 b^4 B \text{Sin}[2 (c + d x)] + 36 a^7 A b^2 \text{Sin}[3 (c + d x)] -$$

$$\left.\left. 32 a^5 A b^4 \text{Sin}[3 (c + d x)] + 11 a^3 A b^6 \text{Sin}[3 (c + d x)] - 18 a^8 b B \text{Sin}[3 (c + d x)] + 5 a^6 b^3 B \text{Sin}[3 (c + d x)] - 2 a^4 b^5 B \text{Sin}[3 (c + d x)]\right)\right)$$

Problem 342: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c + d x] (A + B \text{Sec}[c + d x])}{(a + b \text{Sec}[c + d x])^4} \, dx$$

Optimal (type 3, 411 leaves, 8 steps):

$$-\frac{(4 A b - a B) x}{a^5} + \frac{1}{a^5 (a - b)^{7/2} (a + b)^{7/2} d}$$

$$b \left(20 a^6 A b - 35 a^4 A b^3 + 28 a^2 A b^5 - 8 A b^7 - 8 a^7 B + 8 a^5 b^2 B - 7 a^3 b^4 B + 2 a b^6 B\right) \text{ArcTanh}\left[\frac{\sqrt{a - b} \text{Tan}\left[\frac{1}{2} (c + d x)\right]}{\sqrt{a + b}}\right] +$$

$$\frac{\left(6 a^6 A - 65 a^4 A b^2 + 68 a^2 A b^4 - 24 A b^6 + 26 a^5 b B - 17 a^3 b^3 B + 6 a b^5 B\right) \text{Sin}[c + d x]}{6 a^4 \left(a^2 - b^2\right)^3 d} + \frac{b (A b - a B) \text{Sin}[c + d x]}{3 a \left(a^2 - b^2\right) d (a + b \text{Sec}[c + d x])^3} +$$

$$\frac{b \left(9 a^2 A b - 4 A b^3 - 6 a^3 B + a b^2 B\right) \text{Sin}[c + d x]}{6 a^2 \left(a^2 - b^2\right)^2 d (a + b \text{Sec}[c + d x])^2} + \frac{b \left(12 a^4 A b - 11 a^2 A b^3 + 4 A b^5 - 6 a^5 B + 2 a^3 b^2 B - a b^4 B\right) \text{Sin}[c + d x]}{2 a^3 \left(a^2 - b^2\right)^3 d (a + b \text{Sec}[c + d x])}$$

Result (type 3, 1372 leaves):

$$-\left(b\left(-20 a^6 A b+35 a^4 A b^3-28 a^2 A b^5+8 A b^7+8 a^7 B-8 a^5 b^2 B+7 a^3 b^4 B-2 a b^6 B\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]\right.$$
$$\left.(b+a \text{Cos}[c+d x])^4 \text{Sec}[c+d x]^3 (A+B \text{Sec}[c+d x])\right) \Big/ \left(a^5 \sqrt{a^2-b^2}\left(-a^2+b^2\right)^3 d (B+A \text{Cos}[c+d x])(a+b \text{Sec}[c+d x])^4\right)+$$
$$\frac{1}{24 a^5\left(a^2-b^2\right)^3 d (B+A \text{Cos}[c+d x])(a+b \text{Sec}[c+d x])^4}(b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^3 (A+B \text{Sec}[c+d x])$$
$$\left(-144 a^8 A b^2 (c+d x)+336 a^6 A b^4 (c+d x)-144 a^4 A b^6 (c+d x)-144 a^2 A b^8 (c+d x)+96 A b^{10} (c+d x)+36 a^9 b B (c+d x)-84 a^7 b^3 B (c+d x)+\right.$$
$$36 a^5 b^5 B (c+d x)+36 a^3 b^7 B (c+d x)-24 a b^9 B (c+d x)-72 a^9 A b (c+d x) \text{Cos}[c+d x]-72 a^7 A b^3 (c+d x) \text{Cos}[c+d x]+$$
$$648 a^5 A b^5 (c+d x) \text{Cos}[c+d x]-792 a^3 A b^7 (c+d x) \text{Cos}[c+d x]+288 a A b^9 (c+d x) \text{Cos}[c+d x]+18 a^{10} B (c+d x) \text{Cos}[c+d x]+$$
$$18 a^8 b^2 B (c+d x) \text{Cos}[c+d x]-162 a^6 b^4 B (c+d x) \text{Cos}[c+d x]+198 a^4 b^6 B (c+d x) \text{Cos}[c+d x]-72 a^2 b^8 B (c+d x) \text{Cos}[c+d x]-$$
$$144 a^8 A b^2 (c+d x) \text{Cos}[2(c+d x)]+432 a^6 A b^4 (c+d x) \text{Cos}[2(c+d x)]-432 a^4 A b^6 (c+d x) \text{Cos}[2(c+d x)]+$$
$$144 a^2 A b^8 (c+d x) \text{Cos}[2(c+d x)]+36 a^9 b B (c+d x) \text{Cos}[2(c+d x)]-108 a^7 b^3 B (c+d x) \text{Cos}[2(c+d x)]+$$
$$108 a^5 b^5 B (c+d x) \text{Cos}[2(c+d x)]-36 a^3 b^7 B (c+d x) \text{Cos}[2(c+d x)]-24 a^9 A b (c+d x) \text{Cos}[3(c+d x)]+$$
$$72 a^7 A b^3 (c+d x) \text{Cos}[3(c+d x)]-72 a^5 A b^5 (c+d x) \text{Cos}[3(c+d x)]+24 a^3 A b^7 (c+d x) \text{Cos}[3(c+d x)]+$$
$$6 a^{10} B (c+d x) \text{Cos}[3(c+d x)]-18 a^8 b^2 B (c+d x) \text{Cos}[3(c+d x)]+18 a^6 b^4 B (c+d x) \text{Cos}[3(c+d x)]-6 a^4 b^6 B (c+d x) \text{Cos}[3(c+d x)]+$$
$$18 a^9 A b \text{Sin}[c+d x]-90 a^7 A b^3 \text{Sin}[c+d x]-135 a^5 A b^5 \text{Sin}[c+d x]+228 a^3 A b^7 \text{Sin}[c+d x]-96 a A b^9 \text{Sin}[c+d x]+$$
$$36 a^8 b^2 B \text{Sin}[c+d x]+72 a^6 b^4 B \text{Sin}[c+d x]-57 a^4 b^6 B \text{Sin}[c+d x]+24 a^2 b^8 B \text{Sin}[c+d x]+6 a^{10} A \text{Sin}[2(c+d x)]+$$
$$18 a^8 A b^2 \text{Sin}[2(c+d x)]-300 a^6 A b^4 \text{Sin}[2(c+d x)]+336 a^4 A b^6 \text{Sin}[2(c+d x)]-120 a^2 A b^8 \text{Sin}[2(c+d x)]+$$
$$120 a^7 b^3 B \text{Sin}[2(c+d x)]-90 a^5 b^5 B \text{Sin}[2(c+d x)]+30 a^3 b^7 B \text{Sin}[2(c+d x)]+18 a^9 A b \text{Sin}[3(c+d x)]-114 a^7 A b^3 \text{Sin}[3(c+d x)]+$$
$$125 a^5 A b^5 \text{Sin}[3(c+d x)]-44 a^3 A b^7 \text{Sin}[3(c+d x)]+36 a^8 b^2 B \text{Sin}[3(c+d x)]-32 a^6 b^4 B \text{Sin}[3(c+d x)]+$$
$$\left.11 a^4 b^6 B \text{Sin}[3(c+d x)]+3 a^{10} A \text{Sin}[4(c+d x)]-9 a^8 A b^2 \text{Sin}[4(c+d x)]+9 a^6 A b^4 \text{Sin}[4(c+d x)]-3 a^4 A b^6 \text{Sin}[4(c+d x)]\right)$$

- **Problem 343: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^2 (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^4} \, dx$$

Optimal (type 3, 538 leaves, 9 steps) :

$$\frac{\left(a^2 A+20 A b^2-8 a b B\right) x}{2 a^6}-\frac{1}{a^6 (a-b)^{7/2} (a+b)^{7/2} d}$$

$$b^2 \left(40 a^6 A b-84 a^4 A b^3+69 a^2 A b^5-20 A b^7-20 a^7 B+35 a^5 b^2 B-28 a^3 b^4 B+8 a b^6 B\right) \text{ArcTanh}\left[\frac{\sqrt{a-b}\ \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]-$$

$$\frac{\left(24 a^6 A b-146 a^4 A b^3+167 a^2 A b^5-60 A b^7-6 a^7 B+65 a^5 b^2 B-68 a^3 b^4 B+24 a b^6 B\right) \text{Sin}[c+d x]}{6 a^5 \left(a^2-b^2\right)^3 d}+$$

$$\frac{\left(a^6 A-23 a^4 A b^2+27 a^2 A b^4-10 A b^6+12 a^5 b B-11 a^3 b^3 B+4 a b^5 B\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a^4 \left(a^2-b^2\right)^3 d}+$$

$$\frac{b (A b-a B) \text{Cos}[c+d x] \text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^3}+\frac{b \left(10 a^2 A b-5 A b^3-7 a^3 B+2 a b^2 B\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{6 a^2 \left(a^2-b^2\right)^2 d (a+b \text{Sec}[c+d x])^2}+$$

$$\frac{b \left(48 a^4 A b-53 a^2 A b^3+20 A b^5-27 a^5 B+20 a^3 b^2 B-8 a b^4 B\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{6 a^3 \left(a^2-b^2\right)^3 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 1578 leaves) :

$$\frac{1}{a^6 \sqrt{a^2-b^2} \left(-a^2+b^2\right)^3 d} b^2 \left(-40 a^6 A b+84 a^4 A b^3-69 a^2 A b^5+20 A b^7+20 a^7 B-35 a^5 b^2 B+28 a^3 b^4 B-8 a b^6 B\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right]+$$

$$\frac{1}{96 a^6 \left(a^2-b^2\right)^3 d (b+a \text{Cos}[c+d x])^3}$$
$$\big(72 a^{10} A b (c+d x)+1272 a^8 A b^3 (c+d x)-3288 a^6 A b^5 (c+d x)+1512 a^4 A b^7 (c+d x)+1392 a^2 A b^9 (c+d x)-$$
$$960 A b^{11} (c+d x)-576 a^9 b^2 B (c+d x)+1344 a^7 b^4 B (c+d x)-576 a^5 b^6 B (c+d x)-576 a^3 b^8 B (c+d x)+384 a b^{10} B (c+d x)+$$
$$36 a^{11} A (c+d x) \text{Cos}[c+d x]+756 a^9 A b^2 (c+d x) \text{Cos}[c+d x]+396 a^7 A b^4 (c+d x) \text{Cos}[c+d x]-6084 a^5 A b^6 (c+d x) \text{Cos}[c+d x]+$$
$$7776 a^3 A b^8 (c+d x) \text{Cos}[c+d x]-2880 a A b^{10} (c+d x) \text{Cos}[c+d x]-288 a^{10} b B (c+d x) \text{Cos}[c+d x]-288 a^8 b^3 B (c+d x) \text{Cos}[c+d x]+$$
$$2592 a^6 b^5 B (c+d x) \text{Cos}[c+d x]-3168 a^4 b^7 B (c+d x) \text{Cos}[c+d x]+1152 a^2 b^9 B (c+d x) \text{Cos}[c+d x]+72 a^{10} A b (c+d x) \text{Cos}[2 (c+d x)]+$$
$$1224 a^8 A b^3 (c+d x) \text{Cos}[2 (c+d x)]-4104 a^6 A b^5 (c+d x) \text{Cos}[2 (c+d x)]+4248 a^4 A b^7 (c+d x) \text{Cos}[2 (c+d x)]-$$
$$1440 a^2 A b^9 (c+d x) \text{Cos}[2 (c+d x)]-576 a^9 b^2 B (c+d x) \text{Cos}[2 (c+d x)]+1728 a^7 b^4 B (c+d x) \text{Cos}[2 (c+d x)]-$$
$$1728 a^5 b^6 B (c+d x) \text{Cos}[2 (c+d x)]+576 a^3 b^8 B (c+d x) \text{Cos}[2 (c+d x)]+12 a^{11} A (c+d x) \text{Cos}[3 (c+d x)]+$$
$$204 a^9 A b^2 (c+d x) \text{Cos}[3 (c+d x)]-684 a^7 A b^4 (c+d x) \text{Cos}[3 (c+d x)]+708 a^5 A b^6 (c+d x) \text{Cos}[3 (c+d x)]-$$
$$240 a^3 A b^8 (c+d x) \text{Cos}[3 (c+d x)]-96 a^{10} b B (c+d x) \text{Cos}[3 (c+d x)]+288 a^8 b^3 B (c+d x) \text{Cos}[3 (c+d x)]-$$
$$288 a^6 b^5 B (c+d x) \text{Cos}[3 (c+d x)]+96 a^4 b^7 B (c+d x) \text{Cos}[3 (c+d x)]+6 a^{11} A \text{Sin}[c+d x]-270 a^9 A b^2 \text{Sin}[c+d x]+$$
$$750 a^7 A b^4 \text{Sin}[c+d x]+1086 a^5 A b^6 \text{Sin}[c+d x]-2232 a^3 A b^8 \text{Sin}[c+d x]+960 a A b^{10} \text{Sin}[c+d x]+72 a^{10} b B \text{Sin}[c+d x]-$$
$$360 a^8 b^3 B \text{Sin}[c+d x]-540 a^6 b^5 B \text{Sin}[c+d x]+912 a^4 b^7 B \text{Sin}[c+d x]-384 a^2 b^9 B \text{Sin}[c+d x]-60 a^{10} A b \text{Sin}[2 (c+d x)]-$$
$$372 a^8 A b^3 \text{Sin}[2 (c+d x)]+2772 a^6 A b^5 \text{Sin}[2 (c+d x)]-3300 a^4 A b^7 \text{Sin}[2 (c+d x)]+1200 a^2 A b^9 \text{Sin}[2 (c+d x)]+$$
$$24 a^{11} B \text{Sin}[2 (c+d x)]+72 a^9 b^2 B \text{Sin}[2 (c+d x)]-1200 a^7 b^4 B \text{Sin}[2 (c+d x)]+1344 a^5 b^6 B \text{Sin}[2 (c+d x)]-$$
$$480 a^3 b^8 B \text{Sin}[2 (c+d x)]+9 a^{11} A \text{Sin}[3 (c+d x)]-279 a^9 A b^2 \text{Sin}[3 (c+d x)]+1143 a^7 A b^4 \text{Sin}[3 (c+d x)]-$$
$$1253 a^5 A b^6 \text{Sin}[3 (c+d x)]+440 a^3 A b^8 \text{Sin}[3 (c+d x)]+72 a^{10} b B \text{Sin}[3 (c+d x)]-456 a^8 b^3 B \text{Sin}[3 (c+d x)]+$$
$$500 a^6 b^5 B \text{Sin}[3 (c+d x)]-176 a^4 b^7 B \text{Sin}[3 (c+d x)]-30 a^{10} A b \text{Sin}[4 (c+d x)]+90 a^8 A b^3 \text{Sin}[4 (c+d x)]-$$
$$90 a^6 A b^5 \text{Sin}[4 (c+d x)]+30 a^4 A b^7 \text{Sin}[4 (c+d x)]+12 a^{11} B \text{Sin}[4 (c+d x)]-36 a^9 b^2 B \text{Sin}[4 (c+d x)]+36 a^7 b^4 B \text{Sin}[4 (c+d x)]-$$
$$12 a^5 b^6 B \text{Sin}[4 (c+d x)]+3 a^{11} A \text{Sin}[5 (c+d x)]-9 a^9 A b^2 \text{Sin}[5 (c+d x)]+9 a^7 A b^4 \text{Sin}[5 (c+d x)]-3 a^5 A b^6 \text{Sin}[5 (c+d x)]\big)$$

- **Problem 348: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d x]^4 \sqrt{a+b \text{Sec}[c+d x]} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 485 leaves, 7 steps) :

$$-\frac{1}{315\,b^5\,d}2\,(a-b)\,\sqrt{a+b}\,\left(24\,a^3\,A\,b+57\,a\,A\,b^3-16\,a^4\,B-24\,a^2\,b^2\,B+147\,b^4\,B\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{315\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(3\,b^3\,(25\,A-49\,B)+18\,a\,b^2\,(A-2\,B)+12\,a^2\,b\,(2\,A-B)-16\,a^3\,B\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{2\,\left(12\,a^2\,A\,b-75\,A\,b^3-8\,a^3\,B-13\,a\,b^2\,B\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b^3\,d}+\frac{2\,\left(9\,a\,A\,b-6\,a^2\,B+49\,b^2\,B\right)\text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}+$$

$$\frac{2\,(9\,A\,b+a\,B)\,\text{Sec}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{63\,b\,d}+\frac{2\,B\,\text{Sec}[c+d\,x]^3\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 349: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^3\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 397 leaves, 6 steps) :

$$\frac{1}{105\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(14\,a^2\,A\,b-63\,A\,b^3-8\,a^3\,B-19\,a\,b^2\,B\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,b^3\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,\left(b^2\,(63\,A-25\,B)+2\,a\,b\,(7\,A-3\,B)-8\,a^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(7\,a\,A\,b-4\,a^2\,B+25\,b^2\,B\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b^2\,d}+$$

$$\frac{2\,(7\,A\,b+a\,B)\,\text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{35\,b\,d}+\frac{2\,B\,\text{Sec}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{7\,d}$$

Result (type 1, 1 leaves) :

???

Problem 350: Unable to integrate problem.

$$\int \text{Sec}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 314 leaves, 5 steps):

$$-\frac{1}{15 b^3 d}2 (a-b) \sqrt{a+b} \left(5 a A b-2 a^2 B+9 b^2 B\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{15 b^2 d} 2 (a-b) \sqrt{a+b} (5 A b-2 a B-9 b B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 (5 A b-2 a B) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{15 b d} + \frac{2 B (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{5 b d}$$

Result (type 8, 35 leaves):

$$\int \text{Sec}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} (A+B \text{Sec}[c+d x]) \, dx$$

Problem 351: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 256 leaves, 4 steps):

$$-\frac{1}{3 b^2 d}2 (a-b) \sqrt{a+b} (3 A b+a B) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 b d}2 (a-b) \sqrt{a+b} (3 A-B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 B \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3 d}$$

Result (type 1, 1 leaves):

???

Problem 352: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a+b \text{Sec}[c+d x]} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 320 leaves, 5 steps) :

$$-\frac{1}{b\,d}2\,(a-b)\,\sqrt{a+b}\;B\,\text{Cot}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{b\,d}$$

$$2\,\sqrt{a+b}\;(A\,b+(a-b)\,B)\,\text{Cot}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\;-$$

$$\frac{2\,A\,\sqrt{a+b}\;\text{Cot}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{d}$$

Result (type 4, 913 leaves) :

$$\frac{2\,B\,\mathrm{Cos}[c+d\,x]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{d\,(B+A\,\mathrm{Cos}[c+d\,x])}+$$

$$\left(2\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,(A+B\,\mathrm{Sec}[c+d\,x])\left(a\sqrt{\frac{-a+b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\sqrt{\frac{-a+b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\sqrt{\frac{-a+b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+\right.\right.$$

$$a\sqrt{\frac{-a+b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-b\sqrt{\frac{-a+b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+2\,i\,a\,A\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,a\,A\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i\,(a-b)\,B\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$i\,(a-b)\,(A-B)\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,(B+A\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^{3/2}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 353: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]\right)\,dx$$

Optimal (type 4, 344 leaves, 6 steps):

$$\frac{A\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{b\,d}+$$

$$\frac{\sqrt{a+b}\,(A+2\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{d}-\frac{1}{a\,d}$$

$$\sqrt{a+b}\,(A\,b+2\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 1107 leaves):

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(a\,A\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-2\,a\,A\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+a\,A\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-\right.$$

$$A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-2\,i\,A\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-4\,i\,a\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$2\,\mathrm{i}\,A\,b\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}}\;-4\,\mathrm{i}\,a\,B\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}}\;-$$

$$\mathrm{i}\,A\,(a-b)\,\text{EllipticE}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}\,\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}}\;+2\,\mathrm{i}\,(a-b)\,B\,\text{EllipticF}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}\,\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{a+b}}\;\Bigg)\Bigg)\Big/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{1+\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}{1-\text{Tan}\big[\frac{1}{2}(c+d\,x)\big]^2}}\,\Big(b-b\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^4+a\,\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Big)^2\Big)\right)$$

- **Problem 354: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 429 leaves, 7 steps) :

$$\frac{1}{4\,a\,b\,d}(a-b)\sqrt{a+b}\,(A\,b+4\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{4\,a\,d}\sqrt{a+b}\,(A\,b+2\,a\,(A+2\,B))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{4\,a^2\,d}\sqrt{a+b}\,\left(4\,a^2\,A-A\,b^2+4\,a\,b\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{a},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(A\,b+4\,a\,B)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,a\,d}+\frac{A\,\text{Cos}[c+d\,x]\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1161 leaves):

$$\frac{A\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,d}+\Bigg(\sqrt{a+b\,\text{Sec}[c+d\,x]}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\Bigg(a\,A\,b\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+A\,b^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+4\,a^2\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+4\,a\,b\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-2\,a\,A\,b\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3-$$

$$8\,a^2\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3+a\,A\,b\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-A\,b^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+4\,a^2\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-4\,a\,b\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-$$

$$8\,a^2\,A\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,A\,b^2\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,a\,b\,B\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,a^2\,A\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-8\,a\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\,(A\,b+4\,a\,B)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,a\,(2\,a\,A-A\,b+4\,b\,B)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\,a\,d\sqrt{b+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Sec}[c+d\,x]}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 355: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\sqrt{a+b\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 509 leaves, 8 steps) :

$$\frac{1}{24 a^2 b d}(a-b)\sqrt{a+b}\left(16 a^2 A-3 A b^2+6 a b B\right)\operatorname{Cot}[c+d x]\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{24 a^2 d}\sqrt{a+b}(2 a+b)(8 a A-3 A b+6 a B)\operatorname{Cot}[c+d x]$$
$$\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{8 a^3 d}$$
$$\sqrt{a+b}\left(4 a^2 A b+A b^3+8 a^3 B-2 a b^2 B\right)\operatorname{Cot}[c+d x]\operatorname{EllipticPi}\left[\frac{a+b}{a},\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{\left(16 a^2 A-3 A b^2+6 a b B\right)\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{24 a^2 d}+$$
$$\frac{(A b+6 a B)\operatorname{Cos}[c+d x]\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{12 a d}+\frac{A\operatorname{Cos}[c+d x]^2\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{3 d}$$

Result (type 4, 1565 leaves):

$$\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}\left(\frac{1}{12}A\operatorname{Sin}[c+d x]+\frac{(A b+6 a B)\operatorname{Sin}[2(c+d x)]}{24 a}+\frac{1}{12}A\operatorname{Sin}[3(c+d x)]\right)}{d}+$$
$$\left(\sqrt{a+b\operatorname{Sec}[c+d x]}\sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$
$$\left(-16 a^3 A\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-16 a^2 A b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a A b^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+3 A b^3\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-6 a^2 b B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$
$$6 a b^2 B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+32 a^3 A\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-6 a A b^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+12 a^2 b B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-16 a^3 A\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$
$$16 a^2 A b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+3 a A b^2\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 A b^3\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-6 a^2 b B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+6 a b^2 B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$
$$24 a^2 A b\operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$48\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$48\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-12\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$(a+b)\,\left(16\,a^2\,A-3\,A\,b^2+6\,a\,b\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+2\,a\,\left(-A\,b^2+2\,a\,b\,(7\,A-3\,B)+12\,a^2\,B\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(24 a^2 d \sqrt{b+a\,\mathrm{Cos}[c+d x]}\sqrt{\mathrm{Sec}[c+d x]}\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 356: Attempted integration timed out after 120 seconds.**

$$\int \mathrm{Sec}[c+d x]^3\,(a+b\,\mathrm{Sec}[c+d x])^{3/2}\,(A+B\,\mathrm{Sec}[c+d x])\,dx$$

Optimal (type 4, 475 leaves, 7 steps):

$$\frac{1}{315 b^4 d}2(a-b)\sqrt{a+b}\left(18 a^3 A b-246 a A b^3-8 a^4 B-33 a^2 b^2 B-147 b^4 B\right)$$
$$\mathrm{Cot}[c+d x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}-$$
$$\frac{1}{315 b^3 d}2(a-b)\sqrt{a+b}\left(3 b^3(25 A-49 B)-3 a b^2(57 A-13 B)-6 a^2 b(3 A-B)+8 a^3 B\right)\mathrm{Cot}[c+d x]$$
$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}-$$
$$\frac{2\left(18 a^2 A b-75 A b^3-8 a^3 B-39 a b^2 B\right)\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{315 b^2 d}-\frac{2\left(18 a A b-8 a^2 B-49 b^2 B\right)(a+b\,\mathrm{Sec}[c+d x])^{3/2}\,\mathrm{Tan}[c+d x]}{315 b^2 d}+$$
$$\frac{2(9 A b-4 a B)(a+b\,\mathrm{Sec}[c+d x])^{5/2}\,\mathrm{Tan}[c+d x]}{63 b^2 d}+\frac{2 B\,\mathrm{Sec}[c+d x](a+b\,\mathrm{Sec}[c+d x])^{5/2}\,\mathrm{Tan}[c+d x]}{9 b d}$$

Result (type 1, 1 leaves):

???

- **Problem 357: Attempted integration timed out after 120 seconds.**

$$\int \mathrm{Sec}[c+d x]^2\,(a+b\,\mathrm{Sec}[c+d x])^{3/2}\,(A+B\,\mathrm{Sec}[c+d x])\,dx$$

Optimal (type 4, 388 leaves, 6 steps):

$$-\frac{1}{105\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(21\,a^2\,A\,b+63\,A\,b^3-6\,a^3\,B+82\,a\,b^2\,B\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,b^2\,d}$$
$$2\,(a-b)\,\sqrt{a+b}\,\left(b^2\,(63\,A-25\,B)+6\,a^2\,B-a\,(21\,A\,b-57\,b\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(21\,a\,A\,b-6\,a^2\,B+25\,b^2\,B\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b\,d}+$$
$$\frac{2\,(7\,A\,b-2\,a\,B)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,b\,d}+\frac{2\,B\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 358: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 312 leaves, 5 steps) :

$$-\frac{1}{15\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(20\,a\,A\,b+3\,a^2\,B+9\,b^2\,B\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,b\,d}$$
$$2\,(a-b)\,\sqrt{a+b}\,(15\,a\,A-5\,A\,b-3\,a\,B+9\,b\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}$$
$$\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(5\,A\,b+3\,a\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,B\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 360: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 361 leaves, 6 steps) :

$$\frac{1}{b\,d}(a-b)\sqrt{a+b}\,(a\,A-2\,b\,B)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{d}$$

$$\sqrt{a+b}\,(2\,b\,(A-B)+a\,(A+4\,B))\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{d}\sqrt{a+b}\,(3\,A\,b+2\,a\,B)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\Big[\frac{a+b}{a},\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{a\,A\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 979 leaves) :

$$\frac{2\,b\,B\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d\,(b+a\,\text{Cos}[c+d\,x])}+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{3/2}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(a^2\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.\right.$$

$$2\,a^2\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+4\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a^2\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-a\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-2\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$2\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-6\,a\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,a^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,a\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,a^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\,(a\,A-2\,b\,B)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\left(2\,a\,b\,(A-B)+a^2\,B-b^2\,(A+B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

Problem 361: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^2 (a+b \text{Sec}[c+d x])^{3/2} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 428 leaves, 7 steps):

$$\frac{1}{4 b d}(a-b) \sqrt{a+b} (5 A b+4 a B) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{4 d}\sqrt{a+b} (2 a A+5 A b+4 a B+8 b B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{4 a d}\sqrt{a+b} (4 a^2 A+3 A b^2+12 a b B) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{(5 A b+4 a B) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{4 d} + \frac{a A \text{Cos}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{2 d}$$

Result (type 4, 1598 leaves):

$$\frac{a A \text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[2 (c+d x)]}{4 d (b+a \text{Cos}[c+d x])} - \Bigg((a+b \text{Sec}[c+d x])^{3/2} \Bigg(5 a A b \sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right] + 5 A b^2 \sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right] + 4 a^2 \sqrt{\frac{-a+b}{a+b}} B \text{Tan}\left[\frac{1}{2} (c+d x)\right] + 4 a b \sqrt{\frac{-a+b}{a+b}} B \text{Tan}\left[\frac{1}{2} (c+d x)\right] - 10 a A b \sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3 - 8 a^2 \sqrt{\frac{-a+b}{a+b}} B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3 + 5 a A b \sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5 - 5 A b^2 \sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5 + 4 a^2 \sqrt{\frac{-a+b}{a+b}} B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5 - 4 a b \sqrt{\frac{-a+b}{a+b}} B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5 - 8 i a^2 A \text{EllipticPi}\left[-\frac{a+b}{a-b}, i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}} - 6 i A b^2 \text{EllipticPi}\left[-\frac{a+b}{a-b}, i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-24\,i\,a\,b\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$8\,i\,a^2 A\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-6\,i\,A\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$24\,i\,a\,b\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-i\,(a-b)\,(5\,A\,b+4\,a\,B)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,i\,(a-b)\,(2\,a\,A+b\,(A+4\,B))\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(4\sqrt{\frac{-a+b}{a+b}}\,d\,(b+a\,\mathrm{Cos}[c+d x])^{3/2}\,\mathrm{Sec}[c+d x]^{3/2}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg)$$

Problem 362: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^3\,(a+b\,\text{Sec}[c+d x])^{3/2}\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 4, 520 leaves, 8 steps):

$$\frac{1}{24\,a\,b\,d}(a-b)\sqrt{a+b}\,\left(16 a^2 A+3 A b^2+30 a b B\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{24\,a\,d}\sqrt{a+b}\,\left(16 a^2 A+14 a A b+3 A b^2+12 a^2 B+30 a b B\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$
$$\frac{1}{8\,a^2\,d}\sqrt{a+b}\,\left(12 a^2 A b-A b^3+8 a^3 B+6 a b^2 B\right)\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{\left(16 a^2 A+3 A b^2+30 a b B\right)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{24\,a\,d}+$$
$$\frac{(7 A b+6 a B)\,\text{Cos}[c+d x]\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{12\,d}+\frac{a A\,\text{Cos}[c+d x]^2\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3\,d}$$

Result (type 4, 1551 leaves):

$$\frac{1}{d\,(b+a\,\text{Cos}[c+d x])}\text{Cos}[c+d x]\,(a+b\,\text{Sec}[c+d x])^{3/2}\left(\frac{1}{12}a A\,\text{Sin}[c+d x]+\frac{1}{24}(7 A b+6 a B)\,\text{Sin}[2(c+d x)]+\frac{1}{12}a A\,\text{Sin}[3(c+d x)]\right)+$$
$$\Bigg((a+b\,\text{Sec}[c+d x])^{3/2}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$
$$\Bigg(16 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+16 a^2 A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+3 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+30 a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$
$$30 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-32 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-6 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-60 a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+16 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$16 a^2 A b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^5+3 a A b^2 \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^5-3 A b^3 \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^5+30 a^2 b B \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^5-30 a b^2 B \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^5-$$

$$72 a^2 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}+$$

$$6 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$48 a^3 B \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$36 a b^2 B \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$72 a^2 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}+6 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-48 a^3 B \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$36 a b^2 B \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}+(a+b) \left(16 a^2 A+3 A b^2+30 a b B\right) \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \left(1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$2 a \left(12 a^2 B+b^2 (-7 A+24 B)+a (26 A b-6 b B)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right],\frac{a-b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}\Bigg)\Bigg) \Bigg/$$
$$\left(24 a d (b+a \text{Cos}[c+d x])^{3/2} \text{Sec}[c+d x]^{3/2} \left(1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right)$$

Problem 363: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d x]^3 (a+b \text{Sec}[c+d x])^{5/2} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 566 leaves, 8 steps):

$$\frac{1}{3465 b^4 d} 2 (a-b) \sqrt{a+b} \left(110 a^4 A b-3069 a^2 A b^3-1617 A b^5-40 a^5 B-255 a^3 b^2 B-3705 a b^4 B\right)$$
$$\text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{3465 b^3 d}$$
$$2 (a-b) \sqrt{a+b} \left(6 a b^3 (209 A-505 B)-3 b^4 (539 A-225 B)-15 a^2 b^2 (121 A-19 B)+40 a^4 B-a^3 (110 A b-30 b B)\right)$$
$$\text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-$$
$$\frac{2 \left(110 a^3 A b-1254 a A b^3-40 a^4 B-285 a^2 b^2 B-675 b^4 B\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3465 b^2 d}-$$
$$\frac{2 \left(110 a^2 A b-539 A b^3-40 a^3 B-335 a b^2 B\right) (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{3465 b^2 d}-\frac{2 \left(22 a A b-8 a^2 B-81 b^2 B\right) (a+b \text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x]}{693 b^2 d}+$$
$$\frac{2 (11 A b-4 a B) (a+b \text{Sec}[c+d x])^{7/2} \text{Tan}[c+d x]}{99 b^2 d}+\frac{2 B \text{Sec}[c+d x] (a+b \text{Sec}[c+d x])^{7/2} \text{Tan}[c+d x]}{11 b d}$$

Result (type 1, 1 leaves):

???

Problem 364: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d x]^2 (a+b \text{Sec}[c+d x])^{5/2} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 469 leaves, 7 steps):

$$-\frac{1}{315 b^3 d} 2 (a-b) \sqrt{a+b} \left(45 a^3 A b + 435 a A b^3 - 10 a^4 B + 279 a^2 b^2 B + 147 b^4 B\right)$$

$$\text{Cot}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} -$$

$$\frac{1}{315 b^2 d} 2 (a-b) \sqrt{a+b} \left(3 b^3 (25 A - 49 B) - 6 a b^2 (60 A - 19 B) + 15 a^2 b (3 A - 11 B) - 10 a^3 B\right) \text{Cot}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{2 \left(45 a^2 A b + 75 A b^3 - 10 a^3 B + 114 a b^2 B\right) \sqrt{a+b \,\text{Sec}[c+d x]} \,\text{Tan}[c+d x]}{315 b d} + \frac{2 \left(45 a A b - 10 a^2 B + 49 b^2 B\right) (a+b \,\text{Sec}[c+d x])^{3/2} \,\text{Tan}[c+d x]}{315 b d} +$$

$$\frac{2 (9 A b - 2 a B) (a+b \,\text{Sec}[c+d x])^{5/2} \,\text{Tan}[c+d x]}{63 b d} + \frac{2 B (a+b \,\text{Sec}[c+d x])^{7/2} \,\text{Tan}[c+d x]}{9 b d}$$

Result (type 1, 1 leaves):

???

- **Problem 365: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d x] (a+b \,\text{Sec}[c+d x])^{5/2} (A+B \,\text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 384 leaves, 6 steps):

$$-\frac{1}{105 b^2 d} 2 (a-b) \sqrt{a+b} \left(161 a^2 A b + 63 A b^3 + 15 a^3 B + 145 a b^2 B\right) \text{Cot}[c+d x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{105 b d}$$

$$2 (a-b) \sqrt{a+b} \left(b^2 (63 A - 25 B) - 8 a b (7 A - 15 B) + 15 a^2 (7 A - B)\right) \text{Cot}[c+d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 \left(56 a A b + 15 a^2 B + 25 b^2 B\right) \sqrt{a+b \,\text{Sec}[c+d x]} \,\text{Tan}[c+d x]}{105 d} +$$

$$\frac{2 (7 A b + 5 a B) (a+b \,\text{Sec}[c+d x])^{3/2} \,\text{Tan}[c+d x]}{35 d} + \frac{2 B (a+b \,\text{Sec}[c+d x])^{5/2} \,\text{Tan}[c+d x]}{7 d}$$

Result (type 1, 1 leaves):

???

Problem 367: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 433 leaves, 7 steps):

$$\frac{1}{3\,b\,d}(a-b)\,\sqrt{a+b}\,\left(3\,a^2\,A-6\,A\,b^2-14\,a\,b\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,d}\sqrt{a+b}\,\left(2\,a\,b\,(9\,A-7\,B)-2\,b^2\,(3\,A-B)+3\,a^2\,(A+6\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}a\,\sqrt{a+b}\,(5\,A\,b+2\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{a\,A\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d}-\frac{b\,(3\,a\,A-2\,b\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 1146 leaves):

$$\left((a+b\,\text{Sec}[c+d\,x])^{5/2}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(3\,a^3\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-14\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$14\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,a^3\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+12\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+28\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+3\,a^3\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$3\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-6\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+6\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-14\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+14\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$30\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$12\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$30\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-12\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$(a+b)\,\left(3\,a^2\,A-6\,A\,b^2-14\,a\,b\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$2\,\left(9\,a^2\,b\,(A-B)+3\,a^3\,B-b^3\,(3\,A+B)-a\,b^2\,(9\,A+7\,B)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;\Bigg)\Bigg)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\;+$$

$$\frac{\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(\frac{2}{3}\,b\,(3\,A\,b+7\,a\,B)\,\text{Sin}[c+d\,x]+\frac{2}{3}\,b^2\,B\,\text{Tan}[c+d\,x]\right)}{d\,(b+a\,\text{Cos}[c+d\,x])^2}$$

- **Problem 368: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 450 leaves, 7 steps) :

$$\frac{1}{4\,b\,d}(a-b)\sqrt{a+b}\,\left(9\,a\,A\,b+4\,a^2\,B-8\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,d}\sqrt{a+b}\,\left(8\,b^2\,(A-B)+2\,a^2\,(A+2\,B)+3\,a\,b\,(3\,A+8\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(4\,a^2\,A+15\,A\,b^2+20\,a\,b\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{a\,(7\,A\,b+4\,a\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,A\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1338 leaves):

$$\frac{\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(2\,b^2\,B\,\text{Sin}[c+d\,x]+\frac{1}{4}\,a^2\,A\,\text{Sin}[2\,(c+d\,x)]\right)}{d\,(b+a\,\text{Cos}[c+d\,x])^2}+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{5/2}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(9\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-8\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-8\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-18\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-8\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+9\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-9\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+4\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-4\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+8\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,a^3\,A\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-30\,a\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-40\,a^2\,b\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-\right.$$

$$8\,a^3\,A\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-30\,a\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$40\,a^2\,b\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+(a+b)\,\left(9\,a\,A\,b+4\,a^2\,B-8\,b^2\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,\left(2\,a^3\,A-a^2\,b\,(A-12\,B)+12\,a\,b^2\,(A-B)-4\,b^3\,(A+B)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\bigg/$$

$$\left(4\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

- **Problem 369: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 518 leaves, 8 steps) :

$$\frac{1}{24\,b\,d}(a-b)\sqrt{a+b}\,\left(16\,a^2\,A+33\,A\,b^2+54\,a\,b\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,d}\sqrt{a+b}\,\left(16\,a^2\,A+26\,a\,A\,b+33\,A\,b^2+12\,a^2\,B+54\,a\,b\,B+48\,b^2\,B\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{8\,a\,d}\sqrt{a+b}\,\left(20\,a^2\,A\,b+5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(16\,a^2\,A+33\,A\,b^2+54\,a\,b\,B\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{24\,d}+$$

$$\frac{a\,(3\,A\,b+2\,a\,B)\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,A\,\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1567 leaves) :

$$\frac{1}{d\,(b+a\,\text{Cos}[c+d\,x])^2}\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{1}{12}\,a^2\,A\,\text{Sin}[c+d\,x]+\frac{1}{24}\,a\,(13\,A\,b+6\,a\,B)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{12}\,a^2\,A\,\text{Sin}[3\,(c+d\,x)]\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{5/2}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+33\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+33\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+54\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$54\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-32\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-66\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-108\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+33\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-33\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+54\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-54\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$120\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$30\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$48\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$180\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$120\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-30\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-48\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$180\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+(a+b)\,\left(16\,a^2\,A+33\,A\,b^2+54\,a\,b\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,\left(24\,b^3\,(A-B)+12\,a^3\,B+a\,b^2\,(-13\,A+72\,B)+a^2\,(38\,A\,b-6\,b\,B)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(24\, d\, (b + a \,\text{Cos}[c + d\, x])^{5/2}\, \text{Sec}[c + d\, x]^{5/2} \left(1 + \text{Tan}\left[\frac{1}{2}\, (c + d\, x)\right]^2\right)^{3/2} \sqrt{\frac{a + b - a\,\text{Tan}\left[\frac{1}{2}\,(c + d\, x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}\,(c + d\, x)\right]^2}{1 + \text{Tan}\left[\frac{1}{2}\,(c + d\, x)\right]^2}}\right)$$

- **Problem 371: Unable to integrate problem.**

$$\int \frac{\text{Sec}[c + d\, x]^3\, (A + B\,\text{Sec}[c + d\, x])}{\sqrt{a + b\,\text{Sec}[c + d\, x]}}\, dx$$

Optimal (type 4, 329 leaves, 5 steps):

$$\frac{1}{15\, b^4\, d} 2\, (a - b)\, \sqrt{a + b}\, \left(10\, a\, A\, b - 8\, a^2\, B - 9\, b^2\, B\right) \text{Cot}[c + d\, x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Sec}[c + d\, x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b\, (1 - \text{Sec}[c + d\, x])}{a + b}}\, \sqrt{-\frac{b\, (1 + \text{Sec}[c + d\, x])}{a - b}} + \frac{1}{15\, b^3\, d} 2\, \sqrt{a + b}\, \left(b^2\, (5\, A - 9\, B) - 8\, a^2\, B + 2\, a\, b\, (5\, A + B)\right) \text{Cot}[c + d\, x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Sec}[c + d\, x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b\, (1 - \text{Sec}[c + d\, x])}{a + b}}\, \sqrt{-\frac{b\, (1 + \text{Sec}[c + d\, x])}{a - b}} + \frac{2\, (5\, A\, b - 4\, a\, B)\, \sqrt{a + b\,\text{Sec}[c + d\, x]}\, \text{Tan}[c + d\, x]}{15\, b^2\, d} + \frac{2\, B\,\text{Sec}[c + d\, x]\, \sqrt{a + b\,\text{Sec}[c + d\, x]}\, \text{Tan}[c + d\, x]}{5\, b\, d}$$

Result (type 8, 35 leaves):

$$\int \frac{\text{Sec}[c + d\, x]^3\, (A + B\,\text{Sec}[c + d\, x])}{\sqrt{a + b\,\text{Sec}[c + d\, x]}}\, dx$$

- **Problem 372: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c + d\, x]^2\, (A + B\,\text{Sec}[c + d\, x])}{\sqrt{a + b\,\text{Sec}[c + d\, x]}}\, dx$$

Optimal (type 4, 261 leaves, 4 steps):

$$-\frac{1}{3 b^3 d}\left(2 (a-b) \sqrt{a+b}\ (3 A b-2 a B) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}\right)-$$

$$\frac{1}{3 b^2 d} 2 \sqrt{a+b}\ (3 A b-(2 a+b) B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{2 B \sqrt{a+b \text{Sec}[c+d x]}\ \text{Tan}[c+d x]}{3 b d}$$

Result (type 1, 1 leaves):

???

- **Problem 373: Unable to integrate problem.**

$$\int \frac{\text{Sec}[c+d x]\ (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}}\, dx$$

Optimal (type 4, 210 leaves, 3 steps):

$$-\frac{1}{b^2 d} 2 (a-b) \sqrt{a+b}\ B \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{2 \sqrt{a+b}\ (A-B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{b d}$$

Result (type 8, 33 leaves):

$$\int \frac{\text{Sec}[c+d x]\ (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}}\, dx$$

- **Problem 375: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]\ (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}}\, dx$$

Optimal (type 4, 348 leaves, 6 steps):

$$\frac{A\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,d}+$$

$$\frac{A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}+\frac{1}{a^2\,d}$$

$$\sqrt{a+b}\,(A\,b-2\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a\,d}$$

Result (type 4, 1027 leaves) :

$$\left(\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right.$$

$$\left(a\,A\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-\right.$$

$$a\,A\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+$$

$$2\,\text{i}\,A\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$4\,\text{i}\,a\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,\text{i}\,A\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-4\,\text{i}\,a\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-\text{i}\,A\,(a-b)\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-2\,\text{i}\,(A\,b-a\,B)$$

$$\left.\left.\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\,\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

- **Problem 376: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\cos[c+d x]^2 (A+B \sec[c+d x])}{\sqrt{a+b \sec[c+d x]}} \, dx$$

Optimal (type 4, 435 leaves, 7 steps):

$$-\frac{1}{4 a^2 b d}(a-b) \sqrt{a+b} (3 A b-4 a B) \cot[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \sec[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\sec[c+d x])}{a+b}} \sqrt{-\frac{b (1+\sec[c+d x])}{a-b}} - \frac{1}{4 a^2 d}\sqrt{a+b} (3 A b-2 a (A+2 B)) \cot[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \sec[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\sec[c+d x])}{a+b}} \sqrt{-\frac{b (1+\sec[c+d x])}{a-b}} - \frac{1}{4 a^3 d}\sqrt{a+b} \left(4 a^2 A+3 A b^2-4 a b B\right) \cot[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \sec[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\sec[c+d x])}{a+b}} \sqrt{-\frac{b (1+\sec[c+d x])}{a-b}} - \frac{(3 A b-4 a B) \sqrt{a+b \sec[c+d x]} \sin[c+d x]}{4 a^2 d} + \frac{A \cos[c+d x] \sqrt{a+b \sec[c+d x]} \sin[c+d x]}{2 a d}$$

Result (type 4, 1639 leaves):

$$\frac{A (b+a \cos[c+d x]) \sec[c+d x] \sin[2 (c+d x)]}{4 a d \sqrt{a+b \sec[c+d x]}} + \left(\sqrt{b+a \cos[c+d x]} \sqrt{\sec[c+d x]} \sqrt{\frac{a+b-a \tan\left[\frac{1}{2} (c+d x)\right]^2+b \tan\left[\frac{1}{2} (c+d x)\right]^2}{1+\tan\left[\frac{1}{2} (c+d x)\right]^2}} \left(-3 a A b \sqrt{\frac{-a+b}{a+b}} \tan\left[\frac{1}{2} (c+d x)\right] - 3 A b^2 \sqrt{\frac{-a+b}{a+b}} \tan\left[\frac{1}{2} (c+d x)\right] + 4 a^2 \sqrt{\frac{-a+b}{a+b}} B \tan\left[\frac{1}{2} (c+d x)\right] + 4 a b \sqrt{\frac{-a+b}{a+b}} B \tan\left[\frac{1}{2} (c+d x)\right] + 6 a A b \sqrt{\frac{-a+b}{a+b}} \tan\left[\frac{1}{2} (c+d x)\right]^3 - 8 a^2 \sqrt{\frac{-a+b}{a+b}} B \tan\left[\frac{1}{2} (c+d x)\right]^3 - 3 a A b \sqrt{\frac{-a+b}{a+b}} \tan\left[\frac{1}{2} (c+d x)\right]^5 + 3 A b^2 \sqrt{\frac{-a+b}{a+b}} \tan\left[\frac{1}{2} (c+d x)\right]^5 + 4 a^2 \sqrt{\frac{-a+b}{a+b}} B \tan\left[\frac{1}{2} (c+d x)\right]^5 - 4 a b \sqrt{\frac{-a+b}{a+b}} B \tan\left[\frac{1}{2} (c+d x)\right]^5 - 8 i a^2 A \text{EllipticPi}\left[-\frac{a+b}{a-b},\right.\right.\right.$$

$$i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\Big]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$6\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+8\,i\,a\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$8\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$8\,i\,a\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i\,(a-b)\,(-3\,A\,b+4\,a\,B)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,\left(2\,a^2\,A+3\,A\,b^2-a\,b\,(A+4\,B)\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\Bigg(4 a^2\sqrt{\frac{-a+b}{a+b}}\,d\sqrt{a+b\,\text{Sec}[c+d x]}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Bigg)$$

Problem 377: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d x]^3\,(A+B\,\text{Sec}[c+d x])}{\sqrt{a+b\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 525 leaves, 8 steps):

$$\frac{1}{24 a^3 b d}(a-b)\sqrt{a+b}\left(16 a^2 A+15 A b^2-18 a b B\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{24 a^3 d}\sqrt{a+b}\left(16 a^2 A-10 a A b+15 A b^2+12 a^2 B-18 a b B\right)$$

$$\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{1}{8 a^4 d}\sqrt{a+b}\left(4 a^2 A b+5 A b^3-8 a^3 B-6 a b^2 B\right)\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{\left(16 a^2 A+15 A b^2-18 a b B\right)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{24 a^3 d}-$$

$$\frac{(5 A b-6 a B)\,\text{Cos}[c+d x]\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{12 a^2 d}+\frac{A\,\text{Cos}[c+d x]^2\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 a d}$$

Result (type 4, 1585 leaves):

$$\frac{(b+a\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]\left(\frac{A\,\text{Sin}[c+d x]}{12 a}+\frac{(-5 A b+6 a B)\,\text{Sin}[2(c+d x)]}{24 a^2}+\frac{A\,\text{Sin}[3(c+d x)]}{12 a}\right)}{d\sqrt{a+b\,\text{Sec}[c+d x]}}-$$

$$\left(\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-18\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$18\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-32\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-30\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+36\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+15\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-15\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-18\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+18\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$24\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$30\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$48\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$36\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+30\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$48\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} - 36\,a\,b^2\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} +$$

$$(a+b)\left(16\,a^2\,A+15\,A\,b^2-18\,a\,b\,B\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}} - 2\,a\left(5\,A\,b^2+2\,a\,b\,(A-3\,B)+12\,a^2\,B\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(24\,a^3\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 378: Attempted integration timed out after 120 seconds.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^3\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 329 leaves, 5 steps) :

$$-\frac{1}{3\,b^4\,\sqrt{a+b}\,d}2\left(6\,a^2\,A\,b-3\,A\,b^3-8\,a^3\,B+5\,a\,b^2\,B\right)\mathrm{Cot}[c+d\,x]$$

$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}} - \frac{1}{3\,b^3\,\sqrt{a+b}\,d}$$

$$2\,(2\,a+b)\,(3\,A\,b-(4\,a+b)\,B)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}} -$$

$$\frac{2\,a^2\,(A\,b-a\,B)\,\mathrm{Tan}[c+d\,x]}{b^2\left(a^2-b^2\right)d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}} + \frac{2\,B\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Tan}[c+d\,x]}{3\,b^2\,d}$$

Result (type 1, 1 leaves) :

???

Problem 379: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 275 leaves, 4 steps):

$$\frac{1}{b^3 \sqrt{a+b}\, d} 2 \left(a A b-2 a^2 B+b^2 B\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{b^2 \sqrt{a+b}\, d} 2 (A b-(2 a+b) B) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 a (A b-a B) \text{Tan}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 380: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x] (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 254 leaves, 4 steps):

$$-\frac{2 (A b-a B) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{b^2 \sqrt{a+b}\, d} + \frac{2 (A+B) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{b \sqrt{a+b}\, d} - \frac{2 (A b-a B) \text{Tan}[c+d x]}{\left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 381: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Sec}[c+d x]}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 376 leaves, 6 steps):

$$\frac{2\,(A\,b-a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,\sqrt{a+b}\,d}-$$

$$\frac{2\,(A\,b-a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,\sqrt{a+b}\,d}-$$

$$\frac{2\,A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{2\,b\,(A\,b-a\,B)\,\text{Tan}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1491 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\left(\frac{2\,(-A\,b+a\,B)\,\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)}-\frac{2\,\left(-A\,b^2\,\text{Sin}[c+d\,x]+a\,b\,B\,\text{Sin}[c+d\,x]\right)}{a\,\left(a^2-b^2\right)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,(B+A\,\text{Cos}[c+d\,x])\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\left(2\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-a^2\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-a\,b\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$2\,a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+2\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-a^2\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$2\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+2\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\,i\,a^2 A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+2\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$i\,(a-b)\,(-A\,b+a\,B)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+i\,(a-b)\,(2\,A\,b+a\,(A-B))\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)d\,(B+A\,\text{Cos}[c+d x])\,(a+b\,\text{Sec}[c+d x])^{3/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 382: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d x]\,(A+B\,\text{Sec}[c+d x])}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 427 leaves, 7 steps) :

$$\frac{1}{a^2 b \sqrt{a+b}\, d}\left(a^2 A - 3 A b^2 + 2 a b B\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{1}{a^2 \sqrt{a+b}\, d}\left(3 A b + a\,(A - 2 B)\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{1}{a^3 d}\sqrt{a+b}\,\left(3 A b - 2 a B\right) \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{A\,\text{Sin}[c+d x]}{a\, d \sqrt{a+b\,\text{Sec}[c+d x]}} + \frac{b\left(a^2 A - 3 A b^2 + 2 a b B\right) \text{Tan}[c+d x]}{a^2 \left(a^2 - b^2\right) d \sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 1613 leaves) :

$$\frac{(b + a\,\text{Cos}[c+d x])^2\, \text{Sec}[c+d x]^2 \left(-\frac{2 b\,(A b - a B)\,\text{Sin}[c+d x]}{a^2\,(-a^2+b^2)} + \frac{2\left(-A b^3\,\text{Sin}[c+d x] + a b^2 B\,\text{Sin}[c+d x]\right)}{a^2\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d x])}\right)}{d\,(a + b\,\text{Sec}[c+d x])^{3/2}} -$$

$$\left((b + a\,\text{Cos}[c+d x])^{3/2}\, \text{Sec}[c+d x]^{3/2} \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] + a^2 A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - 3 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - 3 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] + 2 a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] +\right.$$

$$2 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - 2 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 + 6 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 - 4 a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 + a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 -$$

$$a^2 A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 - 3 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 + 3 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 + 2 a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 - 2 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 +$$

$$6 a^2 A b\,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$6 A b^3\,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$4 a^3 B\,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$4\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$6\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$4\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+4\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$(a+b)\,\left(a^2\,A-3\,A\,b^2+2\,a\,b\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-2\,a\,(a+b)\,(-A\,b+a\,B)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\right)\right)\Bigg/$$

$$\left(a^2\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\sqrt{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 383: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^2 \, (A+B \, \text{Sec}[c+d x])}{(a+b \, \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 531 leaves, 8 steps):

$$-\frac{1}{4 a^3 b \sqrt{a+b} \, d}\left(7 a^2 A b-15 A b^3-4 a^3 B+12 a b^2 B\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b \, (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b \, (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{4 a^3 \sqrt{a+b} \, d}\left(15 A b^2+a b \, (5 A-12 B)-2 a^2 \, (A+2 B)\right) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b \, (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b \, (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{4 a^4 d}\sqrt{a+b} \, \left(4 a^2 A+15 A b^2-12 a b B\right) \text{Cot}[c+d x] \, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b \, (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b \, (1+\text{Sec}[c+d x])}{a-b}} - \frac{(5 A b-4 a B) \, \text{Sin}[c+d x]}{4 a^2 d \sqrt{a+b \, \text{Sec}[c+d x]}} + \frac{A \, \text{Cos}[c+d x] \, \text{Sin}[c+d x]}{2 a d \sqrt{a+b \, \text{Sec}[c+d x]}} - \frac{b \left(7 a^2 A b-15 A b^3-4 a^3 B+12 a b^2 B\right) \text{Tan}[c+d x]}{4 a^3 \left(a^2-b^2\right) d \sqrt{a+b \, \text{Sec}[c+d x]}}$$

Result (type 4, 47 132 leaves): Display of huge result suppressed!

- **Problem 384: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^3 \, (A+B \, \text{Sec}[c+d x])}{(a+b \, \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 630 leaves, 9 steps):

$$\frac{1}{24 a^4 b \sqrt{a+b}\, d}\left(16 a^4 A+41 a^2 A b^2-105 A b^4-42 a^3 b B+90 a b^3 B\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{24 a^4 \sqrt{a+b}\, d}\left(105 A b^3+5 a b^2 (7 A-18 B)+4 a^3 (4 A+3 B)-6 a^2 b (A+5 B)\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{8 a^5 d}\sqrt{a+b} \left(12 a^2 A b+35 A b^3-8 a^3 B-30 a b^2 B\right) \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{\left(16 a^2 A+35 A b^2-30 a b B\right) \text{Sin}[c+d x]}{24 a^3 d \sqrt{a+b \text{Sec}[c+d x]}}-\frac{(7 A b-6 a B) \text{Cos}[c+d x] \text{Sin}[c+d x]}{12 a^2 d \sqrt{a+b \text{Sec}[c+d x]}}+\frac{A \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 a d \sqrt{a+b \text{Sec}[c+d x]}}+\frac{b \left(16 a^4 A+41 a^2 A b^2-105 A b^4-42 a^3 b B+90 a b^3 B\right) \text{Tan}[c+d x]}{24 a^4 \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 4, 2343 leaves) :

$$\frac{1}{d (a+b \text{Sec}[c+d x])^{3/2}}(b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2 \left(-\frac{\left(a^4 A-a^2 A b^2+24 A b^4-24 a b^3 B\right) \text{Sin}[c+d x]}{12 a^4 \left(-a^2+b^2\right)}-\frac{2 \left(A b^5 \text{Sin}[c+d x]-a b^4 B \text{Sin}[c+d x]\right)}{a^4 \left(a^2-b^2\right) (b+a \text{Cos}[c+d x])}+\frac{(-11 A b+6 a B) \text{Sin}[2 (c+d x)]}{24 a^3}+\frac{A \text{Sin}[3 (c+d x)]}{12 a^2}\right)-$$

$$\left((b+a \text{Cos}[c+d x])^{3/2} \text{Sec}[c+d x]^{3/2} \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(16 a^5 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]+16 a^4 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]+41 a^3 A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+41 a^2 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]-105 a A b^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]-\right.$$

$$105 A b^5 \text{Tan}\left[\frac{1}{2} (c+d x)\right]-42 a^4 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-42 a^3 b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]+90 a^2 b^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]+$$

$$90 a b^4 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-32 a^5 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-82 a^3 A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+210 a A b^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+$$

$$84 a^4 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-180 a^2 b^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+16 a^5 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-16 a^4 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+$$

$$41\,a^3\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-41\,a^2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-105\,a\,A\,b^4\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+105\,A\,b^5\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$42\,a^4\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+42\,a^3\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+90\,a^2\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-90\,a\,b^4\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$72\,a^4\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$138\,a^2\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$210\,A\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$48\,a^5\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$132\,a^3\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$180\,a\,b^4\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$72\,a^4\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+138\,a^2\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-210\,A\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$48 a^5 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 132 a^3 b^2 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + 180 a b^4 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$(a+b) \left(16 a^4 A+41 a^2 A b^2-105 A b^4-42 a^3 b B+90 a b^3 B\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$2 a (a+b) \left(-35 A b^3+12 a^3 B-2 a^2 b (5 A+9 B)+3 a b^2 (7 A+10 B)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(24 a^4 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2} \sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) - b \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 385: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d x]^4 (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 510 leaves, 6 steps):

$$-\frac{1}{3\,(a-b)\,b^5\,(a+b)^{3/2}\,d}2\,\left(8\,a^4\,A\,b-15\,a^2\,A\,b^3+3\,A\,b^5-16\,a^5\,B+28\,a^3\,b^2\,B-8\,a\,b^4\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,b^4\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d}2\,\left(9\,a\,b^3\,(A-B)+b^4\,(3\,A-B)+16\,a^4\,B-2\,a^2\,b^2\,(3\,A+8\,B)-a^3\,(8\,A\,b-12\,b\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(A\,b-a\,B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{2\,a^2\,\left(3\,a^2\,A\,b-7\,A\,b^3-6\,a^3\,B+10\,a\,b^2\,B\right)\,\text{Tan}[c+d\,x]}{3\,b^3\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,\left(a\,A\,b-2\,a^2\,B+b^2\,B\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,b^3\,\left(a^2-b^2\right)\,d}$$

Result (type 1, 1 leaves) :

???

Problem 386: Attempted integration timed out after 120 seconds.

$$\int\frac{\text{Sec}[c+d\,x]^3\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 417 leaves, 5 steps) :

$$\frac{1}{3\,(a-b)\,b^4\,(a+b)^{3/2}\,d}2\,\left(2\,a^3\,A\,b-6\,a\,A\,b^3-8\,a^4\,B+15\,a^2\,b^2\,B-3\,b^4\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,b^3\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d}2\,\left(2\,a^2\,b\,(A-3\,B)-3\,b^3\,(A-B)-8\,a^3\,B+3\,a\,b^2\,(A+3\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,a^2\,(A\,b-a\,B)\,\text{Tan}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,a\,\left(2\,a^2\,A\,b-6\,A\,b^3-5\,a^3\,B+9\,a\,b^2\,B\right)\,\text{Tan}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 1, 1 leaves) :

???

Problem 387: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 387 leaves, 5 steps):

$$\frac{1}{3 (a-b) b^3 (a+b)^{3/2} d} 2 \left(a^2 A b+3 A b^3+2 a^3 B-6 a b^2 B\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 b^2 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^2 B-3 b^2 (A+B)+a b (A+3 B)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 a (A b-a B) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}} + \frac{2 \left(a^2 A b+3 A b^3+2 a^3 B-6 a b^2 B\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 388: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x] (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 353 leaves, 5 steps):

$$-\frac{1}{3 (a-b) b^2 (a+b)^{3/2} d} 2 \left(4 a A b-a^2 B-3 b^2 B\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 (a-b) b (a+b)^{3/2} d} 2 (3 a A-A b+a B-3 b B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{2 (A b-a B) \text{Tan}[c+d x]}{3 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}} - \frac{2 \left(4 a A b-a^2 B-3 b^2 B\right) \text{Tan}[c+d x]}{3 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 33 leaves):

$$\int \frac{\text{Sec}[c+d x] (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

- **Problem 389: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A + B\,\text{Sec}[c + d\,x]}{(a + b\,\text{Sec}[c + d\,x])^{5/2}}\,dx$$

Optimal (type 4, 495 leaves, 7 steps):

$$\frac{1}{3\,a^2\,(a-b)\,b\,(a+b)^{3/2}\,d}\,2\left(7\,a^2\,A\,b - 3\,A\,b^3 - 4\,a^3\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}} - \frac{1}{3\,a^2\,(a-b)\,b\,(a+b)^{3/2}\,d}2\left(6\,a^2\,A\,b - a\,A\,b^2 - 3\,A\,b^3 - 3\,a^3\,B + a^2\,b\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}} - \frac{2\,A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^3\,d} + \frac{2\,b\,(A\,b - a\,B)\,\text{Tan}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}} + \frac{2\,b\left(7\,a^2\,A\,b - 3\,A\,b^3 - 4\,a^3\,B\right)\text{Tan}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 2083 leaves):

$$\left((b + a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^2\,(A + B\,\text{Sec}[c+d\,x])\left(\frac{2\left(-7\,a^2\,A\,b + 3\,A\,b^3 + 4\,a^3\,B\right)\text{Sin}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)^2} - \frac{2\left(A\,b^3\,\text{Sin}[c+d\,x] - a\,b^2\,B\,\text{Sin}[c+d\,x]\right)}{3\,a^2\,\left(a^2-b^2\right)\,(b + a\,\text{Cos}[c+d\,x])^2} - \frac{2\left(-8\,a^2\,A\,b^2\,\text{Sin}[c+d\,x] + 4\,A\,b^4\,\text{Sin}[c+d\,x] + 5\,a^3\,b\,B\,\text{Sin}[c+d\,x] - a\,b^3\,B\,\text{Sin}[c+d\,x]\right)}{3\,a^2\,\left(a^2-b^2\right)^2\,(b + a\,\text{Cos}[c+d\,x])}\right)\right)\Bigg/\left(d\,(B + A\,\text{Cos}[c+d\,x])\,(a + b\,\text{Sec}[c+d\,x])^{5/2}\right) +$$

$$\left(2\,(b + a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{3/2}\,(A + B\,\text{Sec}[c+d\,x])\,\sqrt{\frac{a + b - a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1 + \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(7\,a^3\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] + 7\,a^2\,A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] - 3\,a\,A\,b^3\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right] - \right.$$

$$3\,A\,b^4\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-4\,a^4\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-4\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$14\,a^3\,A\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+6\,a\,A\,b^3\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+8\,a^4\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$7\,a^3\,A\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-7\,a^2\,A\,b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-3\,a\,A\,b^3\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$3\,A\,b^4\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-4\,a^4\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+4\,a^3\,b\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$6\,i\,a^4\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+12\,i\,a^2\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$6\,i\,A\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,i\,a^4\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$12\,i\,a^2\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,i\,A\,b^4\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$i\,(a-b)\left(-7 a^2 A b+3 A b^3+4 a^3 B\right) \text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$i\,(a-b)\left(-4 a A b^2-6 A b^3+3 a^3 (A-B)+a^2 b\,(9 A+B)\right) \text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Bigg/$$

$$\left(3 a^2 \sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^2 d\,(B+A\,\text{Cos}[c+d x])\,(a+b\,\text{Sec}[c+d x])^{5/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 390: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]\,(A+B\,\text{Sec}[c+d x])}{(a+b\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 582 leaves, 8 steps):

$$\frac{1}{3 a^3 (a-b) b (a+b)^{3/2} d}\left(3 a^4 A-26 a^2 A b^2+15 A b^4+14 a^3 b B-6 a b^3 B\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{3 a^3 \sqrt{a+b} \left(a^2-b^2\right) d}\left(15 A b^3+a b^2 (5 A-6 B)-3 a^3 (A-4 B)-a^2 b (21 A+2 B)\right)$$

$$\text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{a^4 d}$$

$$\sqrt{a+b}\, (5 A b-2 a B) \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{A \text{Sin}[c+d x]}{a d (a+b \text{Sec}[c+d x])^{3/2}}+\frac{b \left(3 a^2 A-5 A b^2+2 a b B\right) \text{Tan}[c+d x]}{3 a^2 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}}+\frac{b \left(3 a^4 A-26 a^2 A b^2+15 A b^4+14 a^3 b B-6 a b^3 B\right) \text{Tan}[c+d x]}{3 a^3 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 4, 2390 leaves):

$$\frac{1}{d (a+b \text{Sec}[c+d x])^{5/2}}$$

$$(b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x]^3 \left(-\frac{2 b \left(-10 a^2 A b+6 A b^3+7 a^3 B-3 a b^2 B\right) \text{Sin}[c+d x]}{3 a^3 \left(-a^2+b^2\right)^2}+\frac{2 \left(A b^4 \text{Sin}[c+d x]-a b^3 B \text{Sin}[c+d x]\right)}{3 a^3 \left(a^2-b^2\right) (b+a \text{Cos}[c+d x])^2}+\right.$$

$$\left.\frac{2 \left(-11 a^2 A b^3 \text{Sin}[c+d x]+7 A b^5 \text{Sin}[c+d x]+8 a^3 b^2 B \text{Sin}[c+d x]-4 a b^4 B \text{Sin}[c+d x]\right)}{3 a^3 \left(a^2-b^2\right)^2 (b+a \text{Cos}[c+d x])}\right)-$$

$$\left((b+a \text{Cos}[c+d x])^{5/2} \text{Sec}[c+d x]^{5/2} \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(3 a^5 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]+3 a^4 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]-26 a^3 A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]-26 a^2 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+15 a A b^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+\right.$$

$$15 A b^5 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+14 a^4 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]+14 a^3 b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-6 a^2 b^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-6 a b^4 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-$$

$$6 a^5 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+52 a^3 A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-30 a A b^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-28 a^4 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+12 a^2 b^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+$$

$$3 a^5 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-3 a^4 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-26 a^3 A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+26 a^2 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+15 a A b^4 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-$$

$$15\,A\,b^5\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+14\,a^4\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-14\,a^3\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-6\,a^2\,b^3\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+6\,a\,b^4\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$30\,a^4\,A\,b\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$60\,a^2\,A\,b^3\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$30\,A\,b^5\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a^5\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,a^3\,b^2\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a\,b^4\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$30\,a^4\,A\,b\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-60\,a^2\,A\,b^3\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+30\,A\,b^5\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a^5\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+24\,a^3\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-12\,a\,b^4\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(3\,a^4\,A-26\,a^2\,A\,b^2+15\,A\,b^4+14\,a^3\,b\,B-6\,a\,b^3\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,a\,(a+b)\left(5\,A\,b^3+3\,a^3\,B+3\,a^2\,b\,(-2\,A+B)-a\,b^2\,(3\,A+2\,B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(3\,a\left(a^3-a\,b^2\right)^2 d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 391: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 686 leaves, 9 steps) :

$$-\frac{1}{12 a^4 (a-b) b (a+b)^{3/2} d}\left(33 a^4 A b-170 a^2 A b^3+105 A b^5-12 a^5 B+104 a^3 b^2 B-60 a b^4 B\right)$$

$$\text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{1}{12 a^4 \sqrt{a+b} \left(a^2-b^2\right) d}\left(105 A b^4+5 a b^3 (7 A-12 B)+6 a^4 (A+2 B)-5 a^2 b^2 (27 A+4 B)-a^3 (27 A b-84 b B)\right) \text{Cot}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{1}{4 a^5 d}\sqrt{a+b} \left(4 a^2 A+35 A b^2-20 a b B\right) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{(7 A b-4 a B) \text{Sin}[c+d x]}{4 a^2 d (a+b \text{Sec}[c+d x])^{3/2}}+\frac{A \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a d (a+b \text{Sec}[c+d x])^{3/2}}-$$

$$\frac{b \left(27 a^2 A b-35 A b^3-12 a^3 B+20 a b^2 B\right) \text{Tan}[c+d x]}{12 a^3 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}}-\frac{b \left(33 a^4 A b-170 a^2 A b^3+105 A b^5-12 a^5 B+104 a^3 b^2 B-60 a b^4 B\right) \text{Tan}[c+d x]}{12 a^4 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 4, 5217 leaves) :

$$\frac{1}{d (a+b \text{Sec}[c+d x])^{5/2}}$$

$$(b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x]^3 \left(\frac{2 b^2 \left(-13 a^2 A b+9 A b^3+10 a^3 B-6 a b^2 B\right) \text{Sin}[c+d x]}{3 a^4 \left(-a^2+b^2\right)^2}-\frac{2 \left(A b^5 \text{Sin}[c+d x]-a b^4 B \text{Sin}[c+d x]\right)}{3 a^4 \left(a^2-b^2\right) (b+a \text{Cos}[c+d x])^2}-\right.$$

$$\left.\frac{2 \left(-14 a^2 A b^4 \text{Sin}[c+d x]+10 A b^6 \text{Sin}[c+d x]+11 a^3 b^3 B \text{Sin}[c+d x]-7 a b^5 B \text{Sin}[c+d x]\right)}{3 a^4 \left(a^2-b^2\right)^2 (b+a \text{Cos}[c+d x])}+\frac{A \text{Sin}[2 (c+d x)]}{4 a^3}\right)+$$

$$\left((b+a \text{Cos}[c+d x])^{5/2} \left(\frac{a^2 A}{2 \left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{2 A b^2}{\left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}-\right.\right.$$

$$\frac{7 A b^4}{6 a^2 \left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}-\frac{2 a b B}{\left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{2 b^3 B}{3 a \left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}-\frac{9 a A b \sqrt{\text{Sec}[c+d x]}}{8 \left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{31 A b^3 \sqrt{\text{Sec}[c+d x]}}{12 a \left(a^2-b^2\right)^2 \sqrt{b+a \text{Cos}[c+d x]}}-$$

$$\frac{35\,A\,b^5\,\sqrt{\text{Sec}[c+d\,x]}}{24\,a^3\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,B\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{4\,b^2\,B\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{5\,b^4\,B\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-$$

$$\frac{11\,a\,A\,b\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{85\,A\,b^3\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{12\,a\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{35\,A\,b^5\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,a^3\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left.\frac{a^2\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{13\,b^2\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{5\,b^4\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a^2\,\left(a^2-b^2\right)^2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}\right)\,\text{Sec}[c+d\,x]^{5/2}$$

$$\left(\left(\left(\left(-33\,a^4\,A\,b+170\,a^2\,A\,b^3-105\,A\,b^5+12\,a^5\,B-104\,a^3\,b^2\,B+60\,a\,b^4\,B\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Big/\right.\right.\right.$$

$$\left(12\,a^4\,\left(a^2-b^2\right)^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)-$$

$$\left((a+b)\,\left(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+\right.\right.$$

$$2\,a\,\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2\,(11\,A-4\,B)-3\,a^3\,b\,(3\,A+8\,B)+a\,b^3\,(21\,A+20\,B)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$\left.6\,(a-b)^2\,(a+b)\,\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Big/$$

$$\left.\left.\left(12\,a^4\,\left(a^2-b^2\right)^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)\right)\right)\Big/$$

$$\left(d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(\left(\left(-33\,a^4\,A\,b+170\,a^2\,A\,b^3-105\,A\,b^5+12\,a^5\,B-104\,a^3\,b^2\,B+60\,a\,b^4\,B\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.\right.\right.$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\Bigg/\left(24\,a^4\left(a^2-b^2\right)^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)+$$

$$\Bigg((a+b)\Bigg(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$2\,a\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2(11\,A-4\,B)-3\,a^3\,b(3\,A+8\,B)+a\,b^3(21\,A+20\,B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$6\,(a-b)^2(a+b)\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}$$

$$\left(-2\,b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+2\,a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Bigg)\Bigg/$$

$$\left(12\,a^4\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)^2\right)+$$

$$\Bigg((a+b)\Bigg(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$2\,a\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2(11\,A-4\,B)-3\,a^3\,b(3\,A+8\,B)+a\,b^3(21\,A+20\,B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$6\,(a-b)^2(a+b)\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\Bigg)\Bigg/$$

$$\left(12\,a^4\,\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)-$$

$$\left(\left(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+\right.\right.$$

$$2\,a\,\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2\,(11\,A-4\,B)-3\,a^3\,b\,(3\,A+8\,B)+a\,b^3\,(21\,A+20\,B)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$\left.6\,(a-b)^2\,(a+b)\,\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)$$

$$\left(-a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Bigg/\left(24\,a^4\,\left(a^2-b^2\right)^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)+$$

$$\left((a+b)\,\left(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+\right.\right.$$

$$2\,a\,\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2\,(11\,A-4\,B)-3\,a^3\,b\,(3\,A+8\,B)+a\,b^3\,(21\,A+20\,B)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$\left.6\,(a-b)^2\,(a+b)\,\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\,\Bigg)\Bigg/\left(24\,a^4\left(a^2-b^2\right)^2\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)-$$

$$\Bigg(\left(-33\,a^4\,A\,b+170\,a^2\,A\,b^3-105\,A\,b^5+12\,a^5\,B-104\,a^3\,b^2\,B+60\,a\,b^4\,B\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\Bigg)\Bigg/$$

$$\left(24\,a^4\left(a^2-b^2\right)^2\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\right)+\Bigg(\left(-33\,a^4\,A\,b+170\,a^2\,A\,b^3-105\,A\,b^5+12\,a^5\,B-104\,a^3\,b^2\,B+60\,a\,b^4\,B\right)$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-$$

$$\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\Bigg)\Bigg)\Bigg/$$

$$\left(24\,a^4\left(a^2-b^2\right)^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)-$$

$$\Bigg((a+b)\Bigg(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$2\,a\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2\,(11\,A-4\,B)-3\,a^3\,b\,(3\,A+8\,B)+a\,b^3\,(21\,A+20\,B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$6\,(a-b)^2\,(a+b)\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}$$

$$\left(\frac{-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Bigg/\left(24\,a^4\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)-$$

$$\left((a+b)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\left(\frac{a\left(6\,a^4\,A-35\,A\,b^4+3\,a^2\,b^2\,(11\,A-4\,B)-3\,a^3\,b\,(3\,A+8\,B)+a\,b^3\,(21\,A+20\,B)\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{1-\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}-\right.$$

$$\frac{3\,(a-b)^2\,(a+b)\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+\left(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+\right.\right.$$

$$\left.\left.\left.\left.104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\Bigg/\left(2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\right)\right)\Bigg/$$

$$\left.\left.\left(12\,a^4\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\right)\right)$$

Problem 392: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]\,(A+A\,\text{Sec}[e+f x])}{\sqrt{a+b\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 4, 105 leaves, 1 step):

$$-\frac{1}{b^2 f}2 A (a-b) \sqrt{a+b}\ \text{Cot}[e+f x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}$$

Result (type 4, 283 leaves):

$$A\left(\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 (1+\text{Sec}[e+f x])\,\text{Sin}[e+f x]}{b f \sqrt{a+b\,\text{Sec}[e+f x]}}+\left(\sqrt{\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2}\ \sqrt{\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2 \text{Sec}[e+f x]}\ (1+\text{Sec}[e+f x])\right.\right.$$

$$\left(\frac{\sqrt{\frac{a-b}{a+b}}\,(a+b)\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)\,(1+\text{Cos}[e+f x])}}\ \text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a+b}{a-b}\right]}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}+(b+a\,\text{Cos}[e+f x])\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)$$

$$\left.\left.\left(-1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/\left(b f \sqrt{\text{Sec}[e+f x]}\ \sqrt{a+b\,\text{Sec}[e+f x]}\right)\right)$$

Problem 393: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]\,(A-A\,\text{Sec}[e+f x])}{\sqrt{a+b\,\text{Sec}[e+f x]}}\,dx$$

Optimal (type 4, 107 leaves, 1 step):

$$\frac{2 A \sqrt{a-b}\ (a+b)\,\text{Cot}[e+f x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]}}{\sqrt{a-b}}\right],\frac{a-b}{a+b}\right]\sqrt{\frac{b\,(1-\text{Sec}[e+f x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[e+f x])}{a-b}}}{b^2 f}$$

Result (type 4, 2069 leaves):

$$\frac{(b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 (A-A\,\text{Sec}[e+f x])\,\text{Sin}[e+f x]}{b f \sqrt{a+b\,\text{Sec}[e+f x]}}-\left((b+a\,\text{Cos}[e+f x])\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2 \text{Sec}\left[\frac{1}{2}(e+f x)\right]^4\right.$$

$$\left(-\frac{1}{2\sqrt{b+a\,\text{Cos}[e+f\,x]}\,\sqrt{\text{Sec}[e+f\,x]}}-\frac{\sqrt{\text{Sec}[e+f\,x]}}{2\sqrt{b+a\,\text{Cos}[e+f\,x]}}-\frac{a\sqrt{\text{Sec}[e+f\,x]}}{2\,b\sqrt{b+a\,\text{Cos}[e+f\,x]}}-\frac{a\,\text{Cos}[2\,(e+f\,x)]\,\sqrt{\text{Sec}[e+f\,x]}}{2\,b\sqrt{b+a\,\text{Cos}[e+f\,x]}}\right)$$

$$\sqrt{1+\text{Sec}[e+f\,x]}\;(A-A\,\text{Sec}[e+f\,x])\left(2\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}\;\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$

$$\left.\left.\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\left(-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(e+f\,x)\right]\right)\right)\right)\bigg/$$

$$\left(8\,b\,f\left(\frac{1}{1+\text{Cos}[e+f\,x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\;\sqrt{\text{Sec}[e+f\,x]}\;\sqrt{a+b\,\text{Sec}[e+f\,x]}\right.$$

$$\left(\left(a\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\sqrt{1+\text{Sec}[e+f\,x]}\;\text{Sin}[e+f\,x]\left(2\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}\;\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\frac{a-b}{a+b}\right]+\right.\right.\right.$$

$$\left.\left.\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\left(-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(e+f\,x)\right]\right)\right)\right)\bigg/$$

$$\left(16\,b\left(\frac{1}{1+\text{Cos}[e+f\,x]}\right)^{3/2}\sqrt{b+a\,\text{Cos}[e+f\,x]}\;\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\right)+\left(3\sqrt{b+a\,\text{Cos}[e+f\,x]}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\right.$$

$$\sqrt{1+\text{Sec}[e+f\,x]}\;\text{Sin}[e+f\,x]\left(2\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}\;\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\frac{a-b}{a+b}\right]+\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\right.$$

$$\left.\left.\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\left(-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(e+f\,x)\right]\right)\right)\right)\bigg/\left(16\,b\sqrt{\frac{1}{1+\text{Cos}[e+f\,x]}}\;\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\right)+$$

$$\left(\sqrt{b+a\,\text{Cos}[e+f\,x]}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\sqrt{1+\text{Sec}[e+f\,x]}\left(-\frac{a\,\text{Sin}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}+\frac{(b+a\,\text{Cos}[e+f\,x])\,\text{Sin}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])^2}\right)\right.$$

$$\left(2\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]+\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]\right.$$

$$\left.\left.\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\right)\right)\Big/\left(16\,b\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\left(\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}\right)^{3/2}\right)-$$

$$\left(\sqrt{b+a\,\text{Cos}[e+f x]}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^4\sqrt{1+\text{Sec}[e+f x]}\left(2\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]+\right.\right.$$

$$\left.\left.\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

$$\left(4\,b\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\right)-\frac{1}{8\,b\left(\frac{1}{1+\text{Cos}[e+f x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}}\sqrt{b+a\,\text{Cos}[e+f x]}$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^4\sqrt{1+\text{Sec}[e+f x]}\left(\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\left(-\frac{1}{2}\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\frac{3}{2}\text{Cos}\left[\frac{3}{2}(e+f x)\right]\right)\text{Sec}\left[\frac{1}{2}(e+f x)\right]+\right.$$

$$\frac{\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(e+f x)\right]\right],\frac{a-b}{a+b}\right]\left(\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{(1+\text{Cos}[e+f x])^2}-\frac{\text{Sin}[e+f x]}{1+\text{Cos}[e+f x]}\right)}{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}}+\frac{1}{2\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}}$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]\left(-\frac{a\,\text{Sin}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}+\frac{(b+a\,\text{Cos}[e+f x])\,\text{Sin}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])^2}\right)\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)+$$

$$\frac{1}{2}\sqrt{\frac{b+a\,\text{Cos}[e+f x]}{(a+b)(1+\text{Cos}[e+f x])}}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]\left(-\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{3}{2}(e+f x)\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\left.\frac{\sqrt{\frac{\text{Cos}[e+f x]}{1+\text{Cos}[e+f x]}}\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}{a+b}}}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}}\right)-$$

$$\left(\sqrt{b+a\,\text{Cos}[e+f\,x]}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\text{Sec}[e+f\,x]\left(2\sqrt{\frac{\text{Cos}[e+f\,x]}{1+\text{Cos}[e+f\,x]}}\;\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\right],\frac{a-b}{a+b}\right]+\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]\left(-\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(e+f\,x)\right]\right)\right)\text{Tan}[e+f\,x]\right)\Bigg/\left(16\,b\left(\frac{1}{1+\text{Cos}[e+f\,x]}\right)^{3/2}\sqrt{\frac{b+a\,\text{Cos}[e+f\,x]}{(a+b)\,(1+\text{Cos}[e+f\,x])}}\;\sqrt{1+\text{Sec}[e+f\,x]}\right)\Bigg)\Bigg)$$

- **Problem 415: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{7/2}\,(A+B\,\text{Sec}[c+d\,x])}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 277 leaves, 11 steps):

$$\frac{2\left(5\,a\,A\,b-5\,a^2\,B-3\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,b^3\,d}+\frac{2\,(A\,b-a\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,b^2\,d}+\frac{2\,a^2\,(A\,b-a\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{b^3\,(a+b)\,d}-\frac{2\left(5\,a\,A\,b-5\,a^2\,B-3\,b^2\,B\right)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,b^3\,d}+\frac{2\,(A\,b-a\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,b^2\,d}+\frac{2\,B\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,b\,d}$$

Result (type 4, 669 leaves):

$$-\frac{1}{30 b^3 d}\Bigg(-\Big(2\left(-40 a A b^2+40 a^2 b B+18 b^3 B\right) \text{Cos}[c+d x]^2\, \text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] (a+b\, \text{Sec}[c+d x]) \sqrt{1-\text{Sec}[c+d x]^2}\, \text{Sin}[c+d x]\Big)\Big/\left(a\, (b+a\, \text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right)+\Big(2\left(-45 a^2 A b-10 A b^3+45 a^3 B+19 a b^2 B\right) \text{Cos}[c+d x]^2 \left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]+\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\right) (a+b\, \text{Sec}[c+d x]) \sqrt{1-\text{Sec}[c+d x]^2}\, \text{Sin}[c+d x]\Big)\Big/\left(b\, (b+a\, \text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right)-\Big(2\left(-15 a^2 A b+15 a^3 B+9 a b^2 B\right) \text{Cos}[2 (c+d x)]\, (a+b\, \text{Sec}[c+d x]) \Big(2 a b-2 a b\, \text{Sec}[c+d x]^2+2 a b\, \text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}+a (a-2 b)\, \text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}+a^2\, \text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}-2 b^2\, \text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}\Big) \text{Sin}[c+d x]\Big)\Big/\left(a^2 b\, (b+a\, \text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right) \sqrt{\text{Sec}[c+d x]} \left(2-\text{Sec}[c+d x]^2\right)\right)\Bigg)+\frac{\sqrt{\text{Sec}[c+d x]} \left(\frac{2 \left(-5 a A b+5 a^2 B+3 b^2 B\right) \text{Sin}[c+d x]}{5 b^3}+\frac{2\, \text{Sec}[c+d x]\, (A b\, \text{Sin}[c+d x]-a B\, \text{Sin}[c+d x])}{3 b^2}+\frac{2 B\, \text{Sec}[c+d x]\, \text{Tan}[c+d x]}{5 b}\right)}{d}$$

- **Problem 420: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B\, \text{Sec}[c+d x]}{\text{Sec}[c+d x]^{3/2}\, (a+b\, \text{Sec}[c+d x])}\, dx$$

Optimal (type 4, 196 leaves, 9 steps):

$$-\frac{2 (A b-a B) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d}+\frac{2 \left(a^2 A+3 A b^2-3 a b B\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^3 d}-\frac{2 b^2 (A b-a B) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticPi}\left[\frac{2 a}{a+b},\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{a^3 (a+b) d}+\frac{2 A\, \text{Sin}[c+d x]}{3 a d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 4, 545 leaves):

$$-\frac{1}{6\,a\,d}\left(\left(4\,A\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\right.$$
$$\left((b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$
$$\left(2\,(A\,b-3\,a\,B)\,\text{Cos}[c+d\,x]^2\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left(b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)-$$
$$\left(2\,(3\,A\,b-3\,a\,B)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\left(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right.\right.$$
$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$a^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$\left.\left.2\,b^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left.\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\,\left(2-\text{Sec}[c+d\,x]^2\right)\right)\right)+\frac{A\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{3\,a\,d}$$

- **Problem 421: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Sec}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 242 leaves, 10 steps):

$$\frac{2\,\left(3\,a^2\,A+5\,A\,b^2-5\,a\,b\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,a^3\,d}-$$
$$\frac{2\,\left(a^2+3\,b^2\right)\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^4\,d}+$$
$$\frac{2\,b^3\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^4\,(a+b)\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{5\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{2\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 617 leaves):

$$\frac{1}{30\,a^2\,d}\left(-\left(2\,(8\,a\,A\,b+10\,a^2\,B)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\right.$$
$$(a\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2))+$$
$$\left(2\,(9\,a^2\,A+5\,A\,b^2-5\,a\,b\,B)\,\text{Cos}[c+d\,x]^2\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\,(b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2))-$$
$$\left(2\,(9\,a^2\,A+15\,A\,b^2-15\,a\,b\,B)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\left(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right.\right.$$
$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$a^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$\left.\left.2\,b^2\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left.\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\right)+$$
$$\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{A\,\text{Sin}[c+d\,x]}{10\,a}+\frac{(-A\,b+a\,B)\,\text{Sin}[2\,(c+d\,x)]}{3\,a^2}+\frac{A\,\text{Sin}[3\,(c+d\,x)]}{10\,a}\right)}{d}$$

Problem 423: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 315 leaves, 10 steps):

$$\frac{(a\,A\,b-3\,a^2\,B+2\,b^2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{b^2\,(a^2-b^2)\,d}+$$
$$\frac{(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{b\,(a^2-b^2)\,d}+$$
$$\frac{(a^2\,A\,b-3\,A\,b^3-3\,a^3\,B+5\,a\,b^2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{(a-b)\,b^2\,(a+b)^2\,d}-$$
$$\frac{(a\,A\,b-3\,a^2\,B+2\,b^2\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b^2\,(a^2-b^2)\,d}+\frac{a\,(A\,b-a\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\,(a^2-b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 685 leaves):

$$-\frac{1}{4(a-b)b^2(a+b)d}\Bigg(-\Big(2\left(-4aAb^2+8a^2bB-4b^3B\right)\text{Cos}[c+dx]^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right](a+b\,\text{Sec}[c+dx])\sqrt{1-\text{Sec}[c+dx]^2}\,\text{Sin}[c+dx]\Big)\Big/\left(a(b+a\,\text{Cos}[c+dx])\left(1-\text{Cos}[c+dx]^2\right)\right)+\Big(2\left(-3a^2Ab+4Ab^3+9a^3B-10ab^2B\right)\text{Cos}[c+dx]^2\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right]+\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right]\right)(a+b\,\text{Sec}[c+dx])\sqrt{1-\text{Sec}[c+dx]^2}\,\text{Sin}[c+dx]\Big)\Big/\left(b(b+a\,\text{Cos}[c+dx])\left(1-\text{Cos}[c+dx]^2\right)\right)-\Big(2\left(-a^2Ab+3a^3B-2ab^2B\right)\text{Cos}[2(c+dx)](a+b\,\text{Sec}[c+dx])\Big(2ab-2ab\,\text{Sec}[c+dx]^2+2ab\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right]\sqrt{\text{Sec}[c+dx]}\sqrt{1-\text{Sec}[c+dx]^2}+a(a-2b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right]\sqrt{\text{Sec}[c+dx]}\sqrt{1-\text{Sec}[c+dx]^2}+a^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right]\sqrt{\text{Sec}[c+dx]}\sqrt{1-\text{Sec}[c+dx]^2}-2b^2\,\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+dx]}\right],-1\right]\sqrt{\text{Sec}[c+dx]}\sqrt{1-\text{Sec}[c+dx]^2}\Big)\text{Sin}[c+dx]\Big)\Big/\left(a^2b(b+a\,\text{Cos}[c+dx])\left(1-\text{Cos}[c+dx]^2\right)\sqrt{\text{Sec}[c+dx]}\left(2-\text{Sec}[c+dx]^2\right)\right)\Bigg)+\frac{\sqrt{\text{Sec}[c+dx]}\left(\frac{\left(aAb-3a^2B+2b^2B\right)\text{Sin}[c+dx]}{b^2\left(-a^2+b^2\right)}+\frac{-aAb\,\text{Sin}[c+dx]+a^2B\,\text{Sin}[c+dx]}{b\left(-a^2+b^2\right)(b+a\,\text{Cos}[c+dx])}\right)}{d}$$

- **Problem 424: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{3/2}(A+B\,\text{Sec}[c+dx])}{(a+b\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 257 leaves, 9 steps):

$$-\frac{(Ab-aB)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{b\left(a^2-b^2\right)d}-\frac{(Ab-aB)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\left(a^2-b^2\right)d}+\frac{\left(a^2Ab+Ab^3+a^3B-3ab^2B\right)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticPi}\left[\frac{2a}{a+b},\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a(a-b)b(a+b)^2d}+\frac{a(Ab-aB)\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{b\left(a^2-b^2\right)d(a+b\,\text{Sec}[c+dx])}$$

Result (type 4, 643 leaves):

$$
\begin{aligned}
&\frac{1}{4\,b\,(-a+b)\,(a+b)\,d}\\
&\Bigg(-\Big(2\,(4\,A\,b^2-4\,a\,b\,B)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\\
&\quad\big(a\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\big)+\\
&\quad\Big(2\,(-a\,A\,b-3\,a^2\,B+4\,b^2\,B)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\\
&\qquad(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\,\big(b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\big)-\\
&\quad\Big(2\,(a\,A\,b-a^2\,B)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\\
&\qquad\quad\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+\\
&\qquad\quad a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-\\
&\qquad\quad 2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Big)\Big/\\
&\qquad\big(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\big)\Bigg)+\\
&\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(-\frac{(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)}+\frac{A\,b\,\text{Sin}[c+d\,x]-a\,B\,\text{Sin}[c+d\,x]}{(-a^2+b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d}
\end{aligned}
$$

- **Problem 425: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 263 leaves, 9 steps):

$$
\begin{aligned}
&\frac{(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,(a^2-b^2)\,d}+\frac{(2\,a^2\,A-A\,b^2-a\,b\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,(a^2-b^2)\,d}-\\
&\frac{(3\,a^2\,A\,b-A\,b^3-a^3\,B-a\,b^2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,(a-b)\,(a+b)^2\,d}-\frac{(A\,b-a\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])}
\end{aligned}
$$

Result (type 4, 727 leaves):

$$\frac{1}{4(a-b)(a+b)d(B+A\cos[c+dx])(a+b\sec[c+dx])^2}(b+a\cos[c+dx])^2\sec[c+dx](A+B\sec[c+dx])$$
$$\Bigg(-\Big(2(4aA-4bB)\cos[c+dx]^2\,\text{EllipticPi}\Big[-\frac{b}{a},-\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big](a+b\sec[c+dx])\sqrt{1-\sec[c+dx]^2}\,\sin[c+dx]\Big)\Big/$$
$$\left(a(b+a\cos[c+dx])\left(1-\cos[c+dx]^2\right)\right)+$$
$$\Big(2(-Ab+aB)\cos[c+dx]^2\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},-\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big]\Big)$$
$$(a+b\sec[c+dx])\sqrt{1-\sec[c+dx]^2}\,\sin[c+dx]\Big)\Big/\left(b(b+a\cos[c+dx])\left(1-\cos[c+dx]^2\right)\right)-$$
$$\Big(2(Ab-aB)\cos[2(c+dx)](a+b\sec[c+dx])\Big(2ab-2ab\sec[c+dx]^2+2ab\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big]$$
$$\sqrt{\sec[c+dx]}\sqrt{1-\sec[c+dx]^2}+a(a-2b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big]\sqrt{\sec[c+dx]}\sqrt{1-\sec[c+dx]^2}+$$
$$a^2\,\text{EllipticPi}\Big[-\frac{b}{a},-\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big]\sqrt{\sec[c+dx]}\sqrt{1-\sec[c+dx]^2}-$$
$$2b^2\,\text{EllipticPi}\Big[-\frac{b}{a},-\text{ArcSin}\Big[\sqrt{\sec[c+dx]}\Big],-1\Big]\sqrt{\sec[c+dx]}\sqrt{1-\sec[c+dx]^2}\Big)\sin[c+dx]\Big)\Big/$$
$$\left(a^2b(b+a\cos[c+dx])\left(1-\cos[c+dx]^2\right)\sqrt{\sec[c+dx]}\left(2-\sec[c+dx]^2\right)\right)\Bigg)+$$
$$\frac{(b+a\cos[c+dx])^2\sec[c+dx]^{3/2}(A+B\sec[c+dx])\left(\frac{(-Ab+aB)\sin[c+dx]}{a\left(a^2-b^2\right)}+\frac{Ab^2\sin[c+dx]-abB\sin[c+dx]}{a\left(a^2-b^2\right)(b+a\cos[c+dx])}\right)}{d(B+A\cos[c+dx])(a+b\sec[c+dx])^2}$$

- **Problem 426: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\sec[c+dx]}{\sqrt{\sec[c+dx]}\,(a+b\sec[c+dx])^2}\,dx$$

Optimal (type 4, 283 leaves, 9 steps):

$$\frac{\left(2a^2A-3Ab^2+abB\right)\sqrt{\cos[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\sec[c+dx]}}{a^2\left(a^2-b^2\right)d}-$$
$$\frac{\left(4a^2Ab-3Ab^3-2a^3B+ab^2B\right)\sqrt{\cos[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\sec[c+dx]}}{a^3\left(a^2-b^2\right)d}+$$
$$\frac{b\left(5a^2Ab-3Ab^3-3a^3B+ab^2B\right)\sqrt{\cos[c+dx]}\,\text{EllipticPi}\left[\frac{2a}{a+b},\frac{1}{2}(c+dx),2\right]\sqrt{\sec[c+dx]}}{a^3(a-b)(a+b)^2d}+\frac{b(Ab-aB)\sqrt{\sec[c+dx]}\,\sin[c+dx]}{a\left(a^2-b^2\right)d(a+b\sec[c+dx])}$$

Result (type 4, 657 leaves):

$$\frac{1}{4\,a\,(-a+b)\,(a+b)\,d}\Bigg(-\Bigg(2\,(4\,a\,A\,b-4\,a^2\,B)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\left(a\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)+\left(2\,(-2\,a^2\,A+A\,b^2+a\,b\,B)\,\text{Cos}[c+d\,x]^2\left(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\right)(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left(b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)-\Bigg(2\,(-2\,a^2\,A+3\,A\,b^2-a\,b\,B)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\Bigg(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Bigg)\text{Sin}[c+d\,x]\Bigg)\Big/\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\Bigg)+$$

$$\frac{\sqrt{\text{Sec}[c+d\,x]}\left(-\frac{b\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{a^2\,(-a^2+b^2)}+\frac{-A\,b^3\,\text{Sin}[c+d\,x]+a\,b^2\,B\,\text{Sin}[c+d\,x]}{a^2\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d}$$

- **Problem 431: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 402 leaves, 10 steps):

$$-\frac{(5\,a^2\,A\,b+A\,b^3-a^3\,B-5\,a\,b^2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,a\,b\,(a^2-b^2)^2\,d}-\frac{(7\,a^2\,A\,b-A\,b^3-3\,a^3\,B-3\,a\,b^2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,a^2\,(a^2-b^2)^2\,d}+\frac{1}{4\,a^2\,(a-b)^2\,b\,(a+b)^3\,d}(3\,a^4\,A\,b+10\,a^2\,A\,b^3-A\,b^5+a^5\,B-10\,a^3\,b^2\,B-3\,a\,b^4\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}+\frac{a\,(A\,b-a\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b\,(a^2-b^2)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{(3\,a^2\,A\,b+3\,A\,b^3+a^3\,B-7\,a\,b^2\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,(a^2-b^2)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 887 leaves):

$$\frac{1}{16 (a-b)^2 b (a+b)^2 d (B+A \operatorname{Cos}[c+d x]) (a+b \operatorname{Sec}[c+d x])^3} (b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^2 (A+B \operatorname{Sec}[c+d x]) \left(-\left(2 \left(-24 a A b^2+8 a^2 b B+16 b^3 B\right) \operatorname{Cos}[c+d x]^2 \operatorname{EllipticPi}\left[-\frac{b}{a}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right] (a+b \operatorname{Sec}[c+d x]) \sqrt{1-\operatorname{Sec}[c+d x]^2} \operatorname{Sin}[c+d x]\right) \Big/ \left(a (b+a \operatorname{Cos}[c+d x]) \left(1-\operatorname{Cos}[c+d x]^2\right)\right) + \left(2 \left(a^2 A b+5 A b^3+3 a^3 B-9 a b^2 B\right) \operatorname{Cos}[c+d x]^2 \left(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right] + \operatorname{EllipticPi}\left[-\frac{b}{a}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right]\right) (a+b \operatorname{Sec}[c+d x]) \sqrt{1-\operatorname{Sec}[c+d x]^2} \operatorname{Sin}[c+d x]\right) \Big/ \left(b (b+a \operatorname{Cos}[c+d x]) \left(1-\operatorname{Cos}[c+d x]^2\right)\right) - \left(2 \left(-5 a^2 A b-A b^3+a^3 B+5 a b^2 B\right) \operatorname{Cos}[2 (c+d x)] (a+b \operatorname{Sec}[c+d x]) \left(2 a b-2 a b \operatorname{Sec}[c+d x]^2+2 a b \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c+d x]} \sqrt{1-\operatorname{Sec}[c+d x]^2} + a (a-2 b) \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c+d x]} \sqrt{1-\operatorname{Sec}[c+d x]^2} + a^2 \operatorname{EllipticPi}\left[-\frac{b}{a}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c+d x]} \sqrt{1-\operatorname{Sec}[c+d x]^2} - 2 b^2 \operatorname{EllipticPi}\left[-\frac{b}{a}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c+d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c+d x]} \sqrt{1-\operatorname{Sec}[c+d x]^2}\right) \operatorname{Sin}[c+d x]\right) \Big/ \left(a^2 b (b+a \operatorname{Cos}[c+d x]) \left(1-\operatorname{Cos}[c+d x]^2\right) \sqrt{\operatorname{Sec}[c+d x]} \left(2-\operatorname{Sec}[c+d x]^2\right)\right)\right) + \left((b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^{5/2} (A+B \operatorname{Sec}[c+d x]) \left(\frac{\left(5 a^2 A b+A b^3-a^3 B-5 a b^2 B\right) \operatorname{Sin}[c+d x]}{4 a b \left(-a^2+b^2\right)^2} - \frac{-A b^2 \operatorname{Sin}[c+d x]+a b B \operatorname{Sin}[c+d x]}{2 a \left(a^2-b^2\right) (b+a \operatorname{Cos}[c+d x])^2} + \frac{-7 a^2 A b \operatorname{Sin}[c+d x]+A b^3 \operatorname{Sin}[c+d x]+3 a^3 B \operatorname{Sin}[c+d x]+3 a b^2 B \operatorname{Sin}[c+d x]}{4 a \left(a^2-b^2\right)^2 (b+a \operatorname{Cos}[c+d x])}\right)\right) \Big/ \left(d (B+A \operatorname{Cos}[c+d x]) (a+b \operatorname{Sec}[c+d x])^3\right)$$

Problem 432: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\operatorname{Sec}[c+d x]} (A+B \operatorname{Sec}[c+d x])}{(a+b \operatorname{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 402 leaves, 10 steps):

$$\frac{\left(9 a^2 A b-3 A b^3-5 a^3 B-a b^2 B\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{4 a^2 \left(a^2-b^2\right)^2 d}+$$

$$\frac{\left(8 a^4 A-5 a^2 A b^2+3 A b^4-7 a^3 b B+a b^3 B\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{4 a^3 \left(a^2-b^2\right)^2 d}-\frac{1}{4 a^3 (a-b)^2 (a+b)^3 d}$$

$$\left(15 a^4 A b-6 a^2 A b^3+3 A b^5-3 a^5 B-10 a^3 b^2 B+a b^4 B\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[\frac{2 a}{a+b},\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}-$$

$$\frac{(A b-a B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{2 \left(a^2-b^2\right) d (a+b\,\text{Sec}[c+d x])^2}-\frac{\left(7 a^2 A b-A b^3-3 a^3 B-3 a b^2 B\right) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{4 a \left(a^2-b^2\right)^2 d (a+b\,\text{Sec}[c+d x])}$$

Result (type 4, 890 leaves) :

$$\frac{1}{16 a (a-b)^2 (a+b)^2 d (B+A\,\text{Cos}[c+d x]) (a+b\,\text{Sec}[c+d x])^3} (b+a\,\text{Cos}[c+d x])^3\, \text{Sec}[c+d x]^2$$

$$(A+B\,\text{Sec}[c+d x]) \left(-\left(2 \left(16 a^3 A+8 a A b^2-24 a^2 b B\right) \text{Cos}[c+d x]^2\, \text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\right.\right.$$

$$\left.(a+b\,\text{Sec}[c+d x]) \sqrt{1-\text{Sec}[c+d x]^2}\ \text{Sin}[c+d x]\right) \Big/ \left(a (b+a\,\text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right)+$$

$$\left(2 \left(-5 a^2 A b-A b^3+a^3 B+5 a b^2 B\right) \text{Cos}[c+d x]^2 \left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]+\right.\right.$$

$$\left.\left.\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\right) (a+b\,\text{Sec}[c+d x]) \sqrt{1-\text{Sec}[c+d x]^2}\ \text{Sin}[c+d x]\right) \Big/$$

$$\left(b (b+a\,\text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right)-\left(2 \left(9 a^2 A b-3 A b^3-5 a^3 B-a b^2 B\right) \text{Cos}[2 (c+d x)] (a+b\,\text{Sec}[c+d x])\right.$$

$$\left(2 a b-2 a b\,\text{Sec}[c+d x]^2+2 a b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}+a (a-2 b)\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}+a^2\, \text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]$$

$$\left.\sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}-2 b^2\, \text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}\right)$$

$$\left.\left.\text{Sin}[c+d x]\right) \Big/ \left(a^2 b (b+a\,\text{Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right) \sqrt{\text{Sec}[c+d x]} \left(2-\text{Sec}[c+d x]^2\right)\right)\right)+$$

$$\left((b+a\,\text{Cos}[c+d x])^3\, \text{Sec}[c+d x]^{5/2} (A+B\,\text{Sec}[c+d x]) \left(\frac{\left(-9 a^2 A b+3 A b^3+5 a^3 B+a b^2 B\right) \text{Sin}[c+d x]}{4 a^2 \left(-a^2+b^2\right)^2}-\frac{A b^3\, \text{Sin}[c+d x]-a b^2 B\, \text{Sin}[c+d x]}{2 a^2 \left(a^2-b^2\right) (b+a\,\text{Cos}[c+d x])^2}+\right.\right.$$

$$\left.\left.\frac{11 a^2 A b^2\, \text{Sin}[c+d x]-5 A b^4\, \text{Sin}[c+d x]-7 a^3 b B\, \text{Sin}[c+d x]+a b^3 B\, \text{Sin}[c+d x]}{4 a^2 \left(a^2-b^2\right)^2 (b+a\,\text{Cos}[c+d x])}\right)\right) \Big/ \left(d (B+A\,\text{Cos}[c+d x]) (a+b\,\text{Sec}[c+d x])^3\right)$$

■ **Problem 435: Result unnecessarily involves imaginary or complex numbers.**

$$\int \mathrm{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]\right)\,dx$$

Optimal (type 4, 336 leaves, 13 steps):

$$\frac{(4\,A\,b+3\,a\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{\left(4\,a\,A\,b-a^2\,B+4\,b^2\,B\right)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,b\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{(4\,A\,b+a\,B)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{4\,b\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{(4\,A\,b+a\,B)\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{4\,b\,d}+\frac{B\,\mathrm{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 578 leaves):

$$-\frac{1}{16\,b\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(-\frac{8\,a\,b\,B\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\left(-4\,a\,A\,b+3\,a^2\,B-8\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\mathbb{i}\,\left(4\,a\,A\,b+a^2\,B\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(\frac{\text{Sec}[c+d\,x]\,(4\,A\,b\,\text{Sin}[c+d\,x]+a\,B\,\text{Sin}[c+d\,x])}{4\,b}+\frac{1}{2}\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)}{d\,\sqrt{\text{Sec}[c+d\,x]}}$$

- **Problem 436: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 253 leaves, 12 steps):

$$\frac{(2 a A+b B)\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\sec[c+d x]}}{d\sqrt{a+b \sec[c+d x]}}+\frac{(2 A b+a B)\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\sec[c+d x]}}{d\sqrt{a+b \sec[c+d x]}}-\frac{B\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \sec[c+d x]}}{d\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\sqrt{\sec[c+d x]}}+\frac{B\sqrt{\sec[c+d x]}\sqrt{a+b \sec[c+d x]}\ \sin[c+d x]}{d}$$

Result (type 4, 377 leaves):

$$\frac{1}{4 d\sqrt{\sec[c+d x]}}\sqrt{a+b \sec[c+d x]}\left(\frac{8 a A\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{(a+b)\sqrt{\frac{b+a \cos[c+d x]}{a+b}}}+\frac{2(4 A b+a B)\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{(a+b)\sqrt{\frac{b+a \cos[c+d x]}{a+b}}}-\left(2 i B\sqrt{-\frac{a(-1+\cos[c+d x])}{a+b}}\sqrt{\frac{a(1+\cos[c+d x])}{a-b}}\ \csc[c+d x]\left(-2 b(a+b)\ \text{EllipticE}\left[i\ \text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a \cos[c+d x]}\right],\frac{-a+b}{a+b}\right]+a\left(2 b\ \text{EllipticF}\left[i\ \text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a \cos[c+d x]}\right],\frac{-a+b}{a+b}\right]+a\ \text{EllipticPi}\left[1-\frac{a}{b},i\ \text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a \cos[c+d x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\right)\Big/\left(a\sqrt{\frac{1}{a-b}}\ b\sqrt{b+a \cos[c+d x]}\right)+4 B \tan[c+d x]\right)$$

Problem 441: Result unnecessarily involves imaginary or complex numbers.

$$\int \sec[c+d x]^{3/2}\,(a+b \sec[c+d x])^{3/2}\,(A+B \sec[c+d x])\,dx$$

Optimal (type 4, 421 leaves, 14 steps):

$$\frac{\left(42\,a\,A\,b+17\,a^2\,B+16\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{24\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(6\,a^2\,A\,b+8\,A\,b^3-a^3\,B+12\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{8\,b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,b\,d}+$$

$$\frac{(6\,A\,b+7\,a\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d}+\frac{b\,B\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 673 leaves) :

$$-\frac{1}{96\,b\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}}(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{2\left(-24\,a\,A\,b^2-28\,a^2\,b\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\left(-6\,a^2\,A\,b-48\,A\,b^3+9\,a^3\,B-56\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\left(30\,a^2\,A\,b+3\,a^3\,B+16\,a\,b^2\,B\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{1}{12}\text{Sec}[c+d\,x]^2\,(6\,A\,b\,\text{Sin}[c+d\,x]+7\,a\,B\,\text{Sin}[c+d\,x])+\right.\right.$$

$$\frac{\text{Sec}[c+d\,x]\left(30\,a\,A\,b\,\text{Sin}[c+d\,x]+3\,a^2\,B\,\text{Sin}[c+d\,x]+16\,b^2\,B\,\text{Sin}[c+d\,x]\right)}{24\,b}+$$

$$\left.\left.\frac{1}{3}\,b\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\right)$$

- **Problem 442: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 339 leaves, 13 steps) :

$$\frac{\left(8 a^2 A+4 A b^2+7 a b B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \text{ EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{4 d \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(12 a A b+3 a^2 B+4 b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \text{ EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{4 d \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\frac{(4 A b+5 a B) \text{ EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{4 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{(4 A b+5 a B) \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d}+\frac{b B \operatorname{Sec}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{2 d}$$

Result (type 4, 595 leaves) :

$$\frac{1}{16\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}$$

$$\left(\frac{2\left(16\,a^2\,A+4\,a\,b\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\left(20\,a\,A\,b+a^2\,B+8\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\mathrm{i}\,\left(-4\,a\,A\,b-5\,a^2\,B\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{1}{4}\,\text{Sec}[c+d\,x]\,(4\,A\,b\,\text{Sin}[c+d\,x]+5\,a\,B\,\text{Sin}[c+d\,x])+\frac{1}{2}\,b\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\right)$$

- **Problem 443: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 272 leaves, 12 steps) :

$$\frac{\left(2\,a\,A\,b+2\,a^2\,B+b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{b\,(2\,A\,b+3\,a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(2\,a\,A-b\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+\frac{b\,B\,\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 554 leaves):

$$\frac{b\,B\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d\,(b+a\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{1}{4\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{2\left(8\,a\,A\,b+4\,a^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\left(2\,a^2\,A+4\,A\,b^2+5\,a\,b\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\left(2\,\mathbb{i}\,\left(2\,a^2\,A-a\,b\,B\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

$$\text{Cos}[2\,(c+d\,x)]\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

- **Problem 444: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 276 leaves, 12 steps):

$$\frac{2\left(a^2 A-A\,b^2+3\,a\,b\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,b^2\,B\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,(4\,A\,b+3\,a\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 563 leaves):

$$\frac{2\,a\,A\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{1}{6\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(\frac{2\,(2\,a^2\,A+6\,A\,b^2+12\,a\,b\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(4\,a\,A\,b+3\,a^2\,B+6\,b^2\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,(4\,a\,A\,b+3\,a^2\,B)\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

- **Problem 448: Result unnecessarily involves imaginary or complex numbers.**

$$\int \text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 513 leaves, 15 steps):

$$\frac{\left(472 a^2 A b+128 A b^3+133 a^3 B+356 a b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{192 d \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{1}{64 b d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

$$\left(40 a^3 A b+160 a A b^3-5 a^4 B+120 a^2 b^2 B+48 b^4 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]} -$$

$$\frac{\left(264 a^2 A b+128 A b^3+15 a^3 B+284 a b^2 B\right) \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{192 b d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(264 a^2 A b+128 A b^3+15 a^3 B+284 a b^2 B\right) \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{192 b d}+$$

$$\frac{\left(104 a A b+59 a^2 B+36 b^2 B\right) \operatorname{Sec}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{96 d}+$$

$$\frac{b(8 A b+11 a B) \operatorname{Sec}[c+d x]^{5/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{24 d}+\frac{b B \operatorname{Sec}[c+d x]^{5/2}(a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{4 d}$$

Result (type 4, 768 leaves) :

$$-\frac{1}{768\, b\, d\, (b + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^{5/2}}$$

$$(a + b \operatorname{Sec}[c + d x])^{5/2} \left(\frac{2 \left(-416 a^2 A b^2 - 236 a^3 b B - 144 a b^3 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 a}{a+b}\right]}{\sqrt{b + a \operatorname{Cos}[c + d x]}} + \frac{1}{\sqrt{b + a \operatorname{Cos}[c + d x]}}\right.$$

$$2 \left(24 a^3 A b - 832 a A b^3 + 45 a^4 B - 436 a^2 b^2 B - 288 b^4 B\right) \sqrt{\frac{b + a \operatorname{Cos}[c + d x]}{a + b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 a}{a + b}\right] +$$

$$\left(2\, i \left(264 a^3 A b + 128 a A b^3 + 15 a^4 B + 284 a^2 b^2 B\right) \sqrt{\frac{a - a \operatorname{Cos}[c + d x]}{a + b}} \sqrt{\frac{a + a \operatorname{Cos}[c + d x]}{a - b}} \operatorname{Cos}[2 (c + d x)]\right.$$

$$\left(-2 b (a + b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{1}{a - b}} \sqrt{b + a \operatorname{Cos}[c + d x]}\right], \frac{-a + b}{a + b}\right] + a \left(2 b \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{1}{a - b}} \sqrt{b + a \operatorname{Cos}[c + d x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a + b}{a + b}\right] + a \operatorname{EllipticPi}\left[1 - \frac{a}{b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{1}{a - b}} \sqrt{b + a \operatorname{Cos}[c + d x]}\right], \frac{-a + b}{a + b}\right]\right)\right) \operatorname{Sin}[c + d x]\Bigg) \Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a - b}}\ b \sqrt{1 - \operatorname{Cos}[c + d x]^2} \sqrt{\frac{a^2 - a^2 \operatorname{Cos}[c + d x]^2}{a^2}} \left(-a^2 + 2 b^2 - 4 b (b + a \operatorname{Cos}[c + d x]) + 2 (b + a \operatorname{Cos}[c + d x])^2\right)\right)\right) +$$

$$\left((a + b \operatorname{Sec}[c + d x])^{5/2} \left(\frac{1}{24} \operatorname{Sec}[c + d x]^3 \left(8 A b^2 \operatorname{Sin}[c + d x] + 17 a b B \operatorname{Sin}[c + d x]\right) +\right.\right.$$

$$\frac{1}{96} \operatorname{Sec}[c + d x]^2 \left(104 a A b \operatorname{Sin}[c + d x] + 59 a^2 B \operatorname{Sin}[c + d x] + 36 b^2 B \operatorname{Sin}[c + d x]\right) +$$

$$1 / (192 b) \operatorname{Sec}[c + d x] \left(264 a^2 A b \operatorname{Sin}[c + d x] + 128 A b^3 \operatorname{Sin}[c + d x] + 15 a^3 B \operatorname{Sin}[c + d x] + 284 a b^2 B \operatorname{Sin}[c + d x]\right) +$$

$$\left.\left.\frac{1}{4} b^2 B \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]\right)\right) \Big/ \left(d (b + a \operatorname{Cos}[c + d x])^2 \operatorname{Sec}[c + d x]^{5/2}\right)$$

- **Problem 449: Result unnecessarily involves imaginary or complex numbers.**

$$\int \sqrt{\operatorname{Sec}[c + d x]}\ (a + b \operatorname{Sec}[c + d x])^{5/2} (A + B \operatorname{Sec}[c + d x])\, dx$$

Optimal (type 4, 422 leaves, 14 steps):

$$\frac{\left(48\,a^3\,A+66\,a\,A\,b^2+59\,a^2\,b\,B+16\,b^3\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{24\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(30\,a^2\,A\,b+8\,A\,b^3+5\,a^3\,B+20\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{8\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{24\,d}+$$

$$\frac{b\,(2\,A\,b+3\,a\,B)\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,d}+\frac{b\,B\,\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 678 leaves) :

$$\frac{1}{96\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^{5/2}}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(\frac{2\,(96\,a^3\,A+24\,a\,A\,b^2+52\,a^2\,b\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(126\,a^2\,A\,b+48\,A\,b^3-3\,a^3\,B+104\,a\,b^2\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,(-54\,a^2\,A\,b-33\,a^3\,B-16\,a\,b^2\,B)\,\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(\frac{1}{12}\,\mathrm{Sec}[c+d\,x]^2\,(6\,A\,b^2\,\mathrm{Sin}[c+d\,x]+13\,a\,b\,B\,\mathrm{Sin}[c+d\,x])+\right.\right.$$

$$\frac{1}{24}\,\mathrm{Sec}[c+d\,x]\,(54\,a\,A\,b\,\mathrm{Sin}[c+d\,x]+33\,a^2\,B\,\mathrm{Sin}[c+d\,x]+16\,b^2\,B\,\mathrm{Sin}[c+d\,x])+$$

$$\left.\left.\frac{1}{3}\,b^2\,B\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)\right)\Big/\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 450: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 359 leaves, 13 steps):

$$\frac{\left(16\,a^2\,A\,b+4\,A\,b^3+8\,a^3\,B+11\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{b\,\left(20\,a\,A\,b+15\,a^2\,B+4\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(8\,a^2\,A-4\,A\,b^2-9\,a\,b\,B\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{b\,(4\,A\,b+7\,a\,B)\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,d}+\frac{b\,B\,\sqrt{\text{Sec}[c+d\,x]}\;(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 628 leaves) :

$$\frac{1}{16\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{2\,\left(48\,a^2\,A\,b+16\,a^3\,B+4\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,\left(8\,a^3\,A+36\,a\,A\,b^2+21\,a^2\,b\,B+8\,b^3\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,\left(8\,a^3\,A-4\,a\,A\,b^2-9\,a^2\,b\,B\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{1}{4}\,\text{Sec}[c+d\,x]\,\left(4\,A\,b^2\,\text{Sin}[c+d\,x]+9\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{2}\,b^2\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Bigg/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 451: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 349 leaves, 13 steps):

$$\frac{\left(2 a^3 A+4 a A b^2+12 a^2 b B+3 b^3 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{3 d \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{b^2(2 A b+5 a B) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{d \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(14 a A b+6 a^2 B-3 b^2 B\right) \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{3 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}-$$

$$\frac{b(2 a A-3 b B) \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{3 d}+\frac{2 a A(a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{3 d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 4, 599 leaves) :

$$\frac{1}{12\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^{5/2}}(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(\frac{2\left(4\,a^3\,A+36\,a\,A\,b^2+36\,a^2\,b\,B\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\left(14\,a^2\,A\,b+12\,A\,b^3+6\,a^3\,B+27\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+$$

$$\left(2\,i\left(14\,a^2\,A\,b+6\,a^3\,B-3\,a\,b^2\,B\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(\frac{2}{3}\,a^2\,A\,\mathrm{Sin}[c+d\,x]+b^2\,B\,\mathrm{Tan}[c+d\,x]\right)}{d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{5/2}}$$

- **Problem 452: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{\mathrm{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 342 leaves, 13 steps):

$$\frac{2\left(8a^2Ab-8Ab^3+5a^3B+10ab^2B\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+dx]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),\frac{2a}{a+b}\right]\sqrt{\mathrm{Sec}[c+dx]}}{15d\sqrt{a+b\,\mathrm{Sec}[c+dx]}}+$$

$$\frac{2b^3B\sqrt{\frac{b+a\,\mathrm{Cos}[c+dx]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+dx),\frac{2a}{a+b}\right]\sqrt{\mathrm{Sec}[c+dx]}}{d\sqrt{a+b\,\mathrm{Sec}[c+dx]}}+$$

$$\frac{2\left(9a^2A+23Ab^2+35abB\right)\mathrm{EllipticE}\left[\frac{1}{2}(c+dx),\frac{2a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+dx]}}{15d\sqrt{\frac{b+a\,\mathrm{Cos}[c+dx]}{a+b}}\sqrt{\mathrm{Sec}[c+dx]}}+$$

$$\frac{2a(8Ab+5aB)\sqrt{a+b\,\mathrm{Sec}[c+dx]}\;\mathrm{Sin}[c+dx]}{15d\sqrt{\mathrm{Sec}[c+dx]}}+\frac{2aA(a+b\,\mathrm{Sec}[c+dx])^{3/2}\,\mathrm{Sin}[c+dx]}{5d\,\mathrm{Sec}[c+dx]^{3/2}}$$

Result (type 4, 616 leaves) :

$$\frac{1}{30\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}}$$

$$(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(\frac{2\,(34\,a^2\,A\,b+30\,A\,b^3+10\,a^3\,B+90\,a\,b^2\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(9\,a^3\,A+23\,a\,A\,b^2+35\,a^2\,b\,B+30\,b^3\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,(9\,a^3\,A+23\,a\,A\,b^2+35\,a^2\,b\,B)\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(\frac{2}{15}\,a\,(11\,A\,b+5\,a\,B)\,\text{Sin}[c+d\,x]+\frac{1}{5}\,a^2\,A\,\text{Sin}[2\,(c+d\,x)]\right)}{d\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{5/2}}$$

- **Problem 456: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 344 leaves, 13 steps):

$$\frac{(4\,A\,b-a\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,b\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{\left(4\,a\,A\,b-3\,a^2\,B-4\,b^2\,B\right)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,b^2\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{(4\,A\,b-3\,a\,B)\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{4\,b^2\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{(4\,A\,b-3\,a\,B)\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{4\,b^2\,d}+\frac{B\,\mathrm{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{2\,b\,d}$$

Result (type 4, 593 leaves) :

$$\frac{1}{16\, b^2\, d\, \sqrt{a + b\, \text{Sec}[c + d\, x]}} \sqrt{b + a\, \text{Cos}[c + d\, x]}\, \sqrt{\text{Sec}[c + d\, x]} \left(\frac{8\, a\, b\, B\, \sqrt{\frac{b + a\, \text{Cos}[c+d\, x]}{a+b}}\, \text{EllipticF}\left[\frac{1}{2}\, (c + d\, x),\, \frac{2\, a}{a+b}\right]}{\sqrt{b + a\, \text{Cos}[c + d\, x]}} + \frac{2\, \left(-12\, a\, A\, b + 9\, a^2\, B + 8\, b^2\, B\right) \sqrt{\frac{b + a\, \text{Cos}[c+d\, x]}{a+b}}\, \text{EllipticPi}\left[2,\, \frac{1}{2}\, (c + d\, x),\, \frac{2\, a}{a+b}\right]}{\sqrt{b + a\, \text{Cos}[c + d\, x]}} + \right.$$

$$\left(2\, i\, \left(-4\, a\, A\, b + 3\, a^2\, B\right) \sqrt{\frac{a - a\, \text{Cos}[c + d\, x]}{a + b}}\, \sqrt{\frac{a + a\, \text{Cos}[c + d\, x]}{a - b}}\, \text{Cos}[2\, (c + d\, x)]\right.$$

$$\left(-2\, b\, (a + b)\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{1}{a - b}}\, \sqrt{b + a\, \text{Cos}[c + d\, x]}\right],\, \frac{-a + b}{a + b}\right] + a\, \left(2\, b\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{1}{a - b}}\, \sqrt{b + a\, \text{Cos}[c + d\, x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a + b}{a + b}\right] + a\, \text{EllipticPi}\left[1 - \frac{a}{b},\, i\, \text{ArcSinh}\left[\sqrt{\frac{1}{a - b}}\, \sqrt{b + a\, \text{Cos}[c + d\, x]}\right],\, \frac{-a + b}{a + b}\right]\right)\right)\, \text{Sin}[c + d\, x]\right) \Big/$$

$$\left.\left(\sqrt{\frac{1}{a - b}}\, b\, \sqrt{1 - \text{Cos}[c + d\, x]^2}\, \sqrt{\frac{a^2 - a^2\, \text{Cos}[c + d\, x]^2}{a^2}}\, \left(-a^2 + 2\, b^2 - 4\, b\, (b + a\, \text{Cos}[c + d\, x]) + 2\, (b + a\, \text{Cos}[c + d\, x])^2\right)\right)\right) +$$

$$\frac{(b + a\, \text{Cos}[c + d\, x])\, \sqrt{\text{Sec}[c + d\, x]}\, \left(\frac{\text{Sec}[c+d\, x]\, (4\, A\, b\, \text{Sin}[c+d\, x] - 3\, a\, B\, \text{Sin}[c+d\, x])}{4\, b^2} + \frac{B\, \text{Sec}[c+d\, x]\, \text{Tan}[c+d\, x]}{2\, b}\right)}{d\, \sqrt{a + b\, \text{Sec}[c + d\, x]}}$$

- **Problem 457: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[c + d\, x]^{3/2}\, (A + B\, \text{Sec}[c + d\, x])}{\sqrt{a + b\, \text{Sec}[c + d\, x]}}\, dx$$

Optimal (type 4, 256 leaves, 12 steps) :

$$\frac{B\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticF\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{Sec[c+d\,x]}}{d\sqrt{a+b\,Sec[c+d\,x]}}+\frac{(2\,A\,b-a\,B)\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticPi\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{Sec[c+d\,x]}}{b\,d\sqrt{a+b\,Sec[c+d\,x]}}-$$

$$\frac{B\,EllipticE\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,Sec[c+d\,x]}}{b\,d\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\sqrt{Sec[c+d\,x]}}+\frac{B\sqrt{Sec[c+d\,x]}\sqrt{a+b\,Sec[c+d\,x]}\;Sin[c+d\,x]}{b\,d}$$

Result (type 4, 339 leaves) :

$$\frac{1}{4\,b\,d\sqrt{a+b\,Sec[c+d\,x]}}$$

$$\sqrt{Sec[c+d\,x]}\left(2\,(4\,A\,b-3\,a\,B)\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticPi\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]-\frac{1}{a\sqrt{\frac{1}{a-b}}\;b}2\,i\,B\sqrt{-\frac{a\,(-1+Cos[c+d\,x])}{a+b}}\right.$$

$$\sqrt{\frac{a\,(1+Cos[c+d\,x])}{a-b}}\sqrt{b+a\,Cos[c+d\,x]}\;Csc[c+d\,x]\left(-2\,b\,(a+b)\,EllipticE\left[i\,ArcSinh\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,Cos[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+\right.$$

$$a\left(2\,b\,EllipticF\left[i\,ArcSinh\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,Cos[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+\right.$$

$$\left.\left.\left.a\,EllipticPi\left[1-\frac{a}{b},i\,ArcSinh\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,Cos[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)+4\,B\,(b+a\,Cos[c+d\,x])\;Tan[c+d\,x]\right)$$

- **Problem 462: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{Sec[c+d\,x]^{5/2}\,(A+B\,Sec[c+d\,x])}{(a+b\,Sec[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 371 leaves, 13 steps) :

$$\frac{B\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{(2\,A\,b-3\,a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(2\,a\,A\,b-3\,a^2\,B+b^2\,B\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b^2\left(a^2-b^2\right)d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,a\,(A\,b-a\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\left(2\,a\,A\,b-3\,a^2\,B+b^2\,B\right)\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\left(a^2-b^2\right)d}$$

Result (type 4, 647 leaves) :

$$-\frac{1}{4\,(a-b)\,b^2\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\left(\frac{2\left(-4\,a\,A\,b^2+4\,a^2\,b\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\left(-6\,a^2\,A\,b+4\,A\,b^3+9\,a^3\,B-7\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,\mathrm{i}\,\left(-2\,a^2\,A\,b+3\,a^3\,B-a\,b^2\,B\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{3/2}\left(\frac{2\left(a^2\,A\,b\,\text{Sin}[c+d\,x]-a^3\,B\,\text{Sin}[c+d\,x]\right)}{b^2\left(-a^2+b^2\right)(b+a\,\text{Cos}[c+d\,x])}+\frac{B\,\text{Tan}[c+d\,x]}{b^2}\right)}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}$$

- **Problem 463: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 220 leaves, 9 steps) :

$$\frac{2\,B\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{2\,(A\,b-a\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a\,(A\,b-a\,B)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 595 leaves) :

$$-\frac{2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\left(a\,A\,b\,\text{Sin}[c+d\,x]-a^2\,B\,\text{Sin}[c+d\,x]\right)}{b\,\left(-a^2+b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{1}{2\,b\,(-a+b)\,(a+b)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}$$

$$\left(\frac{2\,\left(2\,A\,b^2-2\,a\,b\,B\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\,\left(a\,A\,b-3\,a^2\,B+2\,b^2\,B\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,i\,\left(a\,A\,b-a^2\,B\right)\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

- **Problem 468: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 399 leaves, 13 steps):

$$\frac{2\,(A\,b-a\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{2\,B\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{b^2\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+\frac{2\,\left(4\,A\,b^3+3\,a^3\,B-7\,a\,b^2\,B\right)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{2\,a\,(A\,b-a\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}-\frac{2\,a\,\left(4\,A\,b^3+3\,a^3\,B-7\,a\,b^2\,B\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 726 leaves):

$$\frac{1}{6 (a-b)^2 b^2 (a+b)^2 d (a+b \operatorname{Sec}[c+d x])^{5/2}} (b+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2} \left(\frac{2 \left(2 a^2 A b^2+6 A b^4+4 a^3 b B-12 a b^3 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{\sqrt{b+a \operatorname{Cos}[c+d x]}}+\right.$$

$$\frac{2 \left(4 a A b^3+9 a^4 B-19 a^2 b^2 B+6 b^4 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{\sqrt{b+a \operatorname{Cos}[c+d x]}}+$$

$$\left(2 i \left(4 a A b^3+3 a^4 B-7 a^2 b^2 B\right) \sqrt{\frac{a-a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\frac{a+a \operatorname{Cos}[c+d x]}{a-b}} \operatorname{Cos}[2 (c+d x)]\right.$$

$$\left(-2 b (a+b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{1}{a-b}} \sqrt{b+a \operatorname{Cos}[c+d x]}\right], \frac{-a+b}{a+b}\right]+a \left(2 b \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{1}{a-b}} \sqrt{b+a \operatorname{Cos}[c+d x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a \operatorname{EllipticPi}\left[1-\frac{a}{b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{1}{a-b}} \sqrt{b+a \operatorname{Cos}[c+d x]}\right], \frac{-a+b}{a+b}\right]\right)\right) \operatorname{Sin}[c+d x]\Bigg) \Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\, b \sqrt{1-\operatorname{Cos}[c+d x]^2} \sqrt{\frac{a^2-a^2 \operatorname{Cos}[c+d x]^2}{a^2}} \left(-a^2+2 b^2-4 b (b+a \operatorname{Cos}[c+d x])+2 (b+a \operatorname{Cos}[c+d x])^2\right)\right)\right)+$$

$$\frac{1}{d (a+b \operatorname{Sec}[c+d x])^{5/2}} (b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^{5/2} \left(-\frac{2 \left(a A b \operatorname{Sin}[c+d x]-a^2 B \operatorname{Sin}[c+d x]\right)}{3 b \left(-a^2+b^2\right) (b+a \operatorname{Cos}[c+d x])^2}-\right.$$

$$\left.\frac{2 \left(4 a A b^3 \operatorname{Sin}[c+d x]+3 a^4 B \operatorname{Sin}[c+d x]-7 a^2 b^2 B \operatorname{Sin}[c+d x]\right)}{3 b^2 \left(-a^2+b^2\right)^2 (b+a \operatorname{Cos}[c+d x])}\right)$$

■ Problem 479: Unable to integrate problem.

$$\int \operatorname{Sec}[c+d x]^m (a+b \operatorname{Sec}[c+d x])^4 (A+B \operatorname{Sec}[c+d x]) \, dx$$

Optimal (type 5, 544 leaves, 9 steps):

$$\frac{1}{d (1+m) (3+m) (4+m)} b \left(A b^3 \left(8+6 m+m^2\right)+4 a b^2 B \left(8+6 m+m^2\right)+2 a^3 B \left(19+8 m+m^2\right)+a^2 A b \left(68+37 m+5 m^2\right)\right) \mathrm{Sec}[c+d x]^{1+m} \mathrm{Sin}[c+d x]+$$

$$\frac{b^2 \left(b^2 B (3+m)^2+2 a A b (4+m)^2+a^2 B \left(26+9 m+m^2\right)\right) \mathrm{Sec}[c+d x]^{2+m} \mathrm{Sin}[c+d x]}{d (2+m) (3+m) (4+m)}+$$

$$\frac{b (A b (4+m)+a B (7+m)) \mathrm{Sec}[c+d x]^{1+m} (a+b \mathrm{Sec}[c+d x])^2 \mathrm{Sin}[c+d x]}{d (3+m) (4+m)}+\frac{b B \mathrm{Sec}[c+d x]^{1+m} (a+b \mathrm{Sec}[c+d x])^3 \mathrm{Sin}[c+d x]}{d (4+m)}-$$

$$\left(\left(A b^4 m (2+m)+4 a b^3 B m (2+m)+6 a^2 A b^2 m (3+m)+4 a^3 b B m (3+m)+a^4 A \left(3+4 m+m^2\right)\right)\right.$$
$$\left.\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1-m}{2}, \frac{3-m}{2}, \mathrm{Cos}[c+d x]^2\right] \mathrm{Sec}[c+d x]^{-1+m} \mathrm{Sin}[c+d x]\right) \Big/ \left(d (1-m) (1+m) (3+m) \sqrt{\mathrm{Sin}[c+d x]^2}\right)+$$

$$\left(\left(b^4 B \left(3+4 m+m^2\right)+4 a A b^3 \left(4+5 m+m^2\right)+6 a^2 b^2 B \left(4+5 m+m^2\right)+4 a^3 A b \left(8+6 m+m^2\right)+a^4 B \left(8+6 m+m^2\right)\right)\right.$$
$$\left.\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{m}{2}, \frac{2-m}{2}, \mathrm{Cos}[c+d x]^2\right] \mathrm{Sec}[c+d x]^m \mathrm{Sin}[c+d x]\right) \Big/ \left(d m (2+m) (4+m) \sqrt{\mathrm{Sin}[c+d x]^2}\right)$$

Result (type 8, 33 leaves) :

$$\int \mathrm{Sec}[c+d x]^m (a+b \mathrm{Sec}[c+d x])^4 (A+B \mathrm{Sec}[c+d x]) \, dx$$

- **Problem 480: Unable to integrate problem.**

$$\int \mathrm{Sec}[c+d x]^m (a+b \mathrm{Sec}[c+d x])^3 (A+B \mathrm{Sec}[c+d x]) \, dx$$

Optimal (type 5, 366 leaves, 8 steps) :

$$\frac{b \left(b^2 B (2+m)+3 a A b (3+m)+2 a^2 B (4+m)\right) \mathrm{Sec}[c+d x]^{1+m} \mathrm{Sin}[c+d x]}{d (1+m) (3+m)}+$$

$$\frac{b^2 (A b (3+m)+a B (5+m)) \mathrm{Sec}[c+d x]^{2+m} \mathrm{Sin}[c+d x]}{d (2+m) (3+m)}+\frac{b B \mathrm{Sec}[c+d x]^{1+m} (a+b \mathrm{Sec}[c+d x])^2 \mathrm{Sin}[c+d x]}{d (3+m)}-$$

$$\left(\left(b^3 B m (2+m)+3 a A b^2 m (3+m)+3 a^2 b B m (3+m)+a^3 A \left(3+4 m+m^2\right)\right) \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1-m}{2}, \frac{3-m}{2}, \mathrm{Cos}[c+d x]^2\right]\right.$$
$$\left.\mathrm{Sec}[c+d x]^{-1+m} \mathrm{Sin}[c+d x]\right) \Big/ \left(d (3+m) \left(1-m^2\right) \sqrt{\mathrm{Sin}[c+d x]^2}\right)+$$

$$\left(\left(A b^3 (1+m)+3 a b^2 B (1+m)+3 a^2 A b (2+m)+a^3 B (2+m)\right) \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{m}{2}, \frac{2-m}{2}, \mathrm{Cos}[c+d x]^2\right] \mathrm{Sec}[c+d x]^m \mathrm{Sin}[c+d x]\right) \Big/$$
$$\left(d m (2+m) \sqrt{\mathrm{Sin}[c+d x]^2}\right)$$

Result (type 8, 33 leaves) :

$$\int \text{Sec}[c+d\,x]^m\,(a+b\,\text{Sec}[c+d\,x])^3\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Problem 483: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 132 leaves, 8 steps):

$$\frac{6\,a\,(A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{2\,a\,(5\,A+7\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+\frac{2\,a\,(5\,A+7\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a\,(A+B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 872 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{3\,(A+B)\,\text{Cot}[c]}{5\,d}+\frac{(23\,A+28\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{84\,d}+\frac{(A+B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{28\,d}+\frac{(23\,A+28\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{84\,d}+\frac{(A+B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{28\,d}\right)-\frac{1}{21\,d\,\sqrt{1+\text{Cot}[c]^2}}\right.$$
$$5\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}3\,B\,(1+\text{Cos}[c+d\,x])\;\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 484: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 101 leaves, 7 steps):

$$\frac{2\,a\,(3\,A+5\,B)\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(A+B)\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+$$
$$\frac{2\,a\,(A+B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 830 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\;(1+\text{Cos}[c+d\,x])\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(3 A+5 B) \operatorname{Cot}[c]}{5 d}+\frac{(A+B) \operatorname{Cos}[d x] \operatorname{Sin}[c]}{3 d}+\frac{A \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{10 d}+\frac{(A+B) \operatorname{Cos}[c] \operatorname{Sin}[d x]}{3 d}+\frac{A \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{10 d}\right)-\frac{1}{3 d \sqrt{1+\operatorname{Cot}[c]^2}}$$

$$A (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]$$

$$\sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}-$$

$$\frac{1}{3 d \sqrt{1+\operatorname{Cot}[c]^2}} B (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}-\frac{1}{10 d} 3 A (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\left(\left(\operatorname{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/\right.$$

$$\left(\sqrt{1-\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1+\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}} \sqrt{1+\operatorname{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]}{\sqrt{1+\operatorname{Tan}[c]^2}}+\frac{2 \operatorname{Cos}[c]^2 \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}{\operatorname{Cos}[c]^2+\operatorname{Sin}[c]^2}}{\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}}\right)-\frac{1}{2 d} B (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\left(\left(\operatorname{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/\right.$$

$$\left(\sqrt{1-\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1+\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}} \sqrt{1+\operatorname{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

- **Problem 485: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 70 leaves, 6 steps):

$$\frac{2\,a\,(A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{d}+\frac{2\,a\,(A+3\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+\frac{2\,a\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 784 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{(A+B)\,\text{Cot}[c]}{d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}\right.$$

$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 486: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 66 leaves, 6 steps):

$$\frac{2\,a\,(A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{2\,a\,(A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{2\,a\,B\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 783 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{(A-2\,B+A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{2\,d}+\frac{B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}\right.$$

$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 487: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 95 leaves, 7 steps):

$$-\frac{2 a (A+B) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{d}+\frac{2 a (3 A+B) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 d}+\frac{2 a B \text{Sin}[c+d x]}{3 d \text{Cos}[c+d x]^{3/2}}+\frac{2 a (A+B) \text{Sin}[c+d x]}{d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 813 leaves):

$$a \left(\sqrt{\text{Cos}[c+d x]} (1+\text{Cos}[c+d x]) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(\frac{(A+B) \text{Csc}[c] \text{Sec}[c]}{d}+\frac{B \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{3 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (B \text{Sin}[c]+3 A \text{Sin}[d x]+3 B \text{Sin}[d x])}{3 d}\right)-\frac{1}{d \sqrt{1+\text{Cot}[c]^2}} A (1+\text{Cos}[c+d x]) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3 d \sqrt{1+\text{Cot}[c]^2}} B (1+\text{Cos}[c+d x]) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2 d} A (1+\text{Cos}[c+d x]) \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right)\middle/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}} \sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2 \text{Cos}[c]^2 \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2 d} B (1+\text{Cos}[c+d x]) \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Bigg)$$

- **Problem 488: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\,(A+B\,\text{Sec}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 132 leaves, 8 steps):

$$-\frac{2\,a\,(5\,A+3\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,B\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+3\,B)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 865 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{(5\,A+3\,B)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,B\,\text{Sin}[c]+5\,A\,\text{Sin}[d\,x]+5\,B\,\text{Sin}[d\,x])}{15\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,A\,\text{Sin}[c]+5\,B\,\text{Sin}[c]+15\,A\,\text{Sin}[d\,x]+9\,B\,\text{Sin}[d\,x])}{15\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}\right.$$

$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10\,d}3\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 489: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 194 leaves, 9 steps) :

$$\frac{4 a^2 (8 A+9 B) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{15 d}+\frac{4 a^2 (5 A+6 B) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{21 d}+\frac{4 a^2 (5 A+6 B) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{21 d}+\frac{4 a^2 (8 A+9 B) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{45 d}+\frac{2 a^2 (11 A+9 B) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{63 d}+\frac{2 A \text{Cos}[c+d x]^{5/2} \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{9 d}$$

Result (type 5, 1086 leaves) :

$$\frac{1}{B+A \text{Cos}[c+d x]} \text{Cos}[c+d x]^{7/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 (A+B \text{Sec}[c+d x]) \left(-\frac{(8 A+9 B) \text{Cot}[c]}{15 d}+\frac{(46 A+51 B) \text{Cos}[d x] \text{Sin}[c]}{168 d}+\frac{(37 A+36 B) \text{Cos}[2 d x] \text{Sin}[2 c]}{360 d}+\frac{(2 A+B) \text{Cos}[3 d x] \text{Sin}[3 c]}{56 d}+\frac{A \text{Cos}[4 d x] \text{Sin}[4 c]}{144 d}+\frac{(46 A+51 B) \text{Cos}[c] \text{Sin}[d x]}{168 d}+\frac{(37 A+36 B) \text{Cos}[2 c] \text{Sin}[2 d x]}{360 d}+\frac{(2 A+B) \text{Cos}[3 c] \text{Sin}[3 d x]}{56 d}+\frac{A \text{Cos}[4 c] \text{Sin}[4 d x]}{144 d}\right)-$$

$$\frac{1}{21 d (B+A \text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2}} 5 A \text{Cos}[c+d x]^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 (A+B \text{Sec}[c+d x]) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{7 d (B+A \text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2}} 2 B \text{Cos}[c+d x]^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 (A+B \text{Sec}[c+d x]) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{15 d (B+A \text{Cos}[c+d x])} 4 A \text{Cos}[c+d x]^3 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 (A+B \text{Sec}[c+d x]) \left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}} \sqrt{1+\text{Tan}[c]^2}\right)-\right.$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d\,(B+A\,\text{Cos}[c+d x])}$$

$$3\,B\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,(a+a\,\text{Sec}[c+d x])^2\,(A+B\,\text{Sec}[c+d x])$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 490: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{7/2}\,(a+a\,\text{Sec}[c+d x])^2\,(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 4, 161 leaves, 8 steps):

$$\frac{4\,a^2\,(3 A+4 B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),2\right]}{5\,d}+\frac{4\,a^2\,(6 A+7 B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]}{21\,d}+\frac{4\,a^2\,(6 A+7 B)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{21\,d}+$$
$$\frac{2\,a^2\,(9 A+7 B)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{35\,d}+\frac{2\,A\,\text{Cos}[c+d x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d x]\right)\,\text{Sin}[c+d x]}{7\,d}$$

Result (type 5, 1040 leaves):

$$\frac{1}{B+A\,\text{Cos}[c+d x]}\text{Cos}[c+d x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,(a+a\,\text{Sec}[c+d x])^2$$
$$(A+B\,\text{Sec}[c+d x])\left(-\frac{(3 A+4 B)\,\text{Cot}[c]}{5\,d}+\frac{(51 A+56 B)\,\text{Cos}[d x]\,\text{Sin}[c]}{168\,d}+\frac{(2 A+B)\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{20\,d}+\right.$$
$$\left.\frac{A\,\text{Cos}[3 d x]\,\text{Sin}[3 c]}{56\,d}+\frac{(51 A+56 B)\,\text{Cos}[c]\,\text{Sin}[d x]}{168\,d}+\frac{(2 A+B)\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{20\,d}+\frac{A\,\text{Cos}[3 c]\,\text{Sin}[3 d x]}{56\,d}\right)-$$

$$\frac{1}{7\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,2\,A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{10\,d\,(B+A\,\text{Cos}[c+d\,x])}3\,A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{5\,d\,(B+A\,\text{Cos}[c+d\,x])}$$
$$2\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 491: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\ (a+a\,\text{Sec}[c+d\,x])^2\ (A+B\,\text{Sec}[c+d\,x])\ dx$$

Optimal (type 4, 126 leaves, 7 steps):

$$\frac{4\,a^2\ (4\,A+5\,B)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),\ 2\right]}{5\,d}+\frac{4\,a^2\ (A+2\,B)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),\ 2\right]}{3\,d}+$$
$$\frac{2\,a^2\ (7\,A+5\,B)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\ \left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\ \text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 994 leaves):

$$\frac{1}{B+A\,\text{Cos}[c+d\,x]}\text{Cos}[c+d\,x]^{7/2}\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ (a+a\,\text{Sec}[c+d\,x])^2\ (A+B\,\text{Sec}[c+d\,x])$$
$$\left(-\frac{(4\,A+5\,B)\ \text{Cot}[c]}{5\,d}+\frac{(2\,A+B)\ \text{Cos}[d\,x]\ \text{Sin}[c]}{6\,d}+\frac{A\,\text{Cos}[2\,d\,x]\ \text{Sin}[2\,c]}{20\,d}+\frac{(2\,A+B)\ \text{Cos}[c]\ \text{Sin}[d\,x]}{6\,d}+\frac{A\,\text{Cos}[2\,c]\ \text{Sin}[2\,d\,x]}{20\,d}\right)-$$
$$\frac{1}{3\,d\ (B+A\,\text{Cos}[c+d\,x])\ \sqrt{1+\text{Cot}[c]^2}}A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\ \frac{1}{2}\right\},\ \left\{\frac{5}{4}\right\},\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ (a+a\,\text{Sec}[c+d\,x])^2\ (A+B\,\text{Sec}[c+d\,x])\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$
$$\frac{1}{3\,d\ (B+A\,\text{Cos}[c+d\,x])\ \sqrt{1+\text{Cot}[c]^2}}2\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\ \frac{1}{2}\right\},\ \left\{\frac{5}{4}\right\},\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ (a+a\,\text{Sec}[c+d\,x])^2\ (A+B\,\text{Sec}[c+d\,x])\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\frac{1}{5 d (B + A \cos[c + d x])} 2 A \cos[c + d x]^3 \csc[c] \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \sec[c + d x])^2 (A + B \sec[c + d x])$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \cos[d x + \text{ArcTan}[\tan[c]]]^2\right] \sin[d x + \text{ArcTan}[\tan[c]]] \tan[c]\right) \Big/ \right.$$
$$\left(\sqrt{1 - \cos[d x + \text{ArcTan}[\tan[c]]]} \sqrt{1 + \cos[d x + \text{ArcTan}[\tan[c]]]} \sqrt{\cos[c] \cos[d x + \text{ArcTan}[\tan[c]]] \sqrt{1 + \tan[c]^2}} \sqrt{1 + \tan[c]^2}\right) -$$
$$\left.\frac{\frac{\sin[d x + \text{ArcTan}[\tan[c]]] \tan[c]}{\sqrt{1 + \tan[c]^2}} + \frac{2 \cos[c]^2 \cos[d x + \text{ArcTan}[\tan[c]]] \sqrt{1 + \tan[c]^2}}{\cos[c]^2 + \sin[c]^2}}{\sqrt{\cos[c] \cos[d x + \text{ArcTan}[\tan[c]]] \sqrt{1 + \tan[c]^2}}}\right) - \frac{1}{2 d (B + A \cos[c + d x])}$$
$$B \cos[c + d x]^3 \csc[c] \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a \sec[c + d x])^2 (A + B \sec[c + d x])$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \cos[d x + \text{ArcTan}[\tan[c]]]^2\right] \sin[d x + \text{ArcTan}[\tan[c]]] \tan[c]\right) \Big/ \right.$$
$$\left(\sqrt{1 - \cos[d x + \text{ArcTan}[\tan[c]]]} \sqrt{1 + \cos[d x + \text{ArcTan}[\tan[c]]]} \sqrt{\cos[c] \cos[d x + \text{ArcTan}[\tan[c]]] \sqrt{1 + \tan[c]^2}} \sqrt{1 + \tan[c]^2}\right) -$$
$$\left.\frac{\frac{\sin[d x + \text{ArcTan}[\tan[c]]] \tan[c]}{\sqrt{1 + \tan[c]^2}} + \frac{2 \cos[c]^2 \cos[d x + \text{ArcTan}[\tan[c]]] \sqrt{1 + \tan[c]^2}}{\cos[c]^2 + \sin[c]^2}}{\sqrt{\cos[c] \cos[d x + \text{ArcTan}[\tan[c]]] \sqrt{1 + \tan[c]^2}}}\right)$$

- **Problem 492: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \cos[c + d x]^{3/2} (a + a \sec[c + d x])^2 (A + B \sec[c + d x]) \, dx$$

Optimal (type 4, 116 leaves, 7 steps):

$$\frac{4\,a^2\,A\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{d}+\frac{4\,a^2\,(2\,A+3\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+$$
$$\frac{2\,a^2\,(A-3\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,B\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 735 leaves) :

$$\frac{1}{B + A\,Cos[c + d\,x]} Cos[c + d\,x]^{7/2}\, Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4 (a + a\,Sec[c + d\,x])^2 (A + B\,Sec[c + d\,x])$$
$$\left(-\frac{(2\,A - B + 2\,A\,Cos[2\,c] + B\,Cos[2\,c])\,Csc[c]\,Sec[c]}{4\,d} + \frac{A\,Cos[d\,x]\,Sin[c]}{6\,d} + \frac{A\,Cos[c]\,Sin[d\,x]}{6\,d} + \frac{B\,Sec[c]\,Sec[c + d\,x]\,Sin[d\,x]}{2\,d}\right) -$$
$$\frac{1}{3\,d\,(B + A\,Cos[c + d\,x])\,\sqrt{1 + Cot[c]^2}}\, 2\,A\,Cos[c + d\,x]^3\,Csc[c]\,HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d\,x - ArcTan[Cot[c]]]^2\right]$$
$$Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4 (a + a\,Sec[c + d\,x])^2 (A + B\,Sec[c + d\,x])\, Sec[d\,x - ArcTan[Cot[c]]]\, \sqrt{1 - Sin[d\,x - ArcTan[Cot[c]]]}$$
$$\sqrt{-\sqrt{1 + Cot[c]^2}\, Sin[c]\, Sin[d\,x - ArcTan[Cot[c]]]}\, \sqrt{1 + Sin[d\,x - ArcTan[Cot[c]]]} -$$
$$\frac{1}{d\,(B + A\,Cos[c + d\,x])\,\sqrt{1 + Cot[c]^2}}\, B\,Cos[c + d\,x]^3\,Csc[c]\,HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d\,x - ArcTan[Cot[c]]]^2\right]$$
$$Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4 (a + a\,Sec[c + d\,x])^2 (A + B\,Sec[c + d\,x])\, Sec[d\,x - ArcTan[Cot[c]]]\, \sqrt{1 - Sin[d\,x - ArcTan[Cot[c]]]}$$
$$\sqrt{-\sqrt{1 + Cot[c]^2}\, Sin[c]\, Sin[d\,x - ArcTan[Cot[c]]]}\, \sqrt{1 + Sin[d\,x - ArcTan[Cot[c]]]} -$$
$$\frac{1}{2\,d\,(B + A\,Cos[c + d\,x])} A\,Cos[c + d\,x]^3\,Csc[c]\,Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4 (a + a\,Sec[c + d\,x])^2 (A + B\,Sec[c + d\,x])$$
$$\left(\left(HypergeometricPFQ\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, Cos[d\,x + ArcTan[Tan[c]]]^2\right] Sin[d\,x + ArcTan[Tan[c]]]\, Tan[c]\right) \Big/\right.$$
$$\left(\sqrt{1 - Cos[d\,x + ArcTan[Tan[c]]]}\, \sqrt{1 + Cos[d\,x + ArcTan[Tan[c]]]}\, \sqrt{Cos[c]\, Cos[d\,x + ArcTan[Tan[c]]]\, \sqrt{1 + Tan[c]^2}}\, \sqrt{1 + Tan[c]^2}\right) -$$
$$\left.\frac{\frac{Sin[d\,x + ArcTan[Tan[c]]]\, Tan[c]}{\sqrt{1 + Tan[c]^2}} + \frac{2\,Cos[c]^2\, Cos[d\,x + ArcTan[Tan[c]]]\, \sqrt{1 + Tan[c]^2}}{Cos[c]^2 + Sin[c]^2}}{\sqrt{Cos[c]\, Cos[d\,x + ArcTan[Tan[c]]]\, \sqrt{1 + Tan[c]^2}}}\right)$$

- **Problem 493: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{Cos[c + d\,x]}\, (a + a\,Sec[c + d\,x])^2 (A + B\,Sec[c + d\,x])\, dx$$

Optimal (type 4, 120 leaves, 7 steps) :

$$-\frac{4 a^2 B \,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{d}+\frac{4 a^2 (3 A+2 B) \,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{2 a^2 (3 A+5 B) \,\text{Sin}[c+d x]}{3 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 B \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{3 d \,\text{Cos}[c+d x]^{3/2}}$$

Result (type 5, 736 leaves) :

$$\frac{1}{B+A \,\text{Cos}[c+d x]} \text{Cos}[c+d x]^{7/2} \,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \,\text{Sec}[c+d x])^2 (A+B \,\text{Sec}[c+d x]) \left(-\frac{(-A-4 B+A \,\text{Cos}[2 c]) \,\text{Csc}[c] \,\text{Sec}[c]}{4 d}+\frac{B \,\text{Sec}[c] \,\text{Sec}[c+d x]^2 \,\text{Sin}[d x]}{6 d}+\frac{\text{Sec}[c] \,\text{Sec}[c+d x] (B \,\text{Sin}[c]+3 A \,\text{Sin}[d x]+6 B \,\text{Sin}[d x])}{6 d}\right)-$$

$$\frac{1}{d (B+A \,\text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2}} A \,\text{Cos}[c+d x]^3 \,\text{Csc}[c] \,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \,\text{Sec}[c+d x])^2 (A+B \,\text{Sec}[c+d x]) \,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[c] \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3 d (B+A \,\text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2}} 2 B \,\text{Cos}[c+d x]^3 \,\text{Csc}[c] \,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \,\text{Sec}[c+d x])^2 (A+B \,\text{Sec}[c+d x]) \,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[c] \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{2 d (B+A \,\text{Cos}[c+d x])} B \,\text{Cos}[c+d x]^3 \,\text{Csc}[c] \,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \,\text{Sec}[c+d x])^2 (A+B \,\text{Sec}[c+d x]) \left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \,\text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}} \sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2 \,\text{Cos}[c]^2 \,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 494: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 159 leaves, 8 steps):

$$-\frac{4\,a^2\,(5\,A+4\,B)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^2\,(2\,A+B)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a^2\,(5\,A+7\,B)\,\mathrm{Sin}[c+d\,x]}{15\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(5\,A+4\,B)\,\mathrm{Sin}[c+d\,x]}{5\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+\frac{2\,B\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 1025 leaves):

$$\frac{1}{B+A\,\mathrm{Cos}[c+d\,x]}\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\left(\frac{(5\,A+4\,B)\,\mathrm{Csc}[c]\,\mathrm{Sec}[c]}{5\,d}+\frac{B\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}[d\,x]}{10\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(3\,B\,\mathrm{Sin}[c]+5\,A\,\mathrm{Sin}[d\,x]+10\,B\,\mathrm{Sin}[d\,x])}{30\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(5\,A\,\mathrm{Sin}[c]+10\,B\,\mathrm{Sin}[c]+30\,A\,\mathrm{Sin}[d\,x]+24\,B\,\mathrm{Sin}[d\,x])}{30\,d}\right)-$$

$$\frac{1}{3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}\,2\,A\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}\,B\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}+$$

$$\frac{1}{2\,d\,(B+A\,\mathrm{Cos}[c+d\,x])}A\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,(A+B\,\mathrm{Sec}[c+d\,x])$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{5\,d\,(B+A\,\text{Cos}[c+d x])}$$

$$2\,B\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,(a+a\,\text{Sec}[c+d x])^2\,(A+B\,\text{Sec}[c+d x])$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 495: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^2\,(A+B\,\text{Sec}[c+d x])}{\text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 194 leaves, 9 steps) :

$$-\frac{4\,a^2\,(4\,A+3\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),2\right]}{5\,d}+\frac{4\,a^2\,(7\,A+6\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]}{21\,d}+\frac{2\,a^2\,(7\,A+9\,B)\,\text{Sin}[c+d x]}{35\,d\,\text{Cos}[c+d x]^{5/2}}+\frac{4\,a^2\,(7\,A+6\,B)\,\text{Sin}[c+d x]}{21\,d\,\text{Cos}[c+d x]^{3/2}}+\frac{4\,a^2\,(4\,A+3\,B)\,\text{Sin}[c+d x]}{5\,d\,\sqrt{\text{Cos}[c+d x]}}+\frac{2\,B\,\left(a^2+a^2\,\text{Cos}[c+d x]\right)\,\text{Sin}[c+d x]}{7\,d\,\text{Cos}[c+d x]^{7/2}}$$

Result (type 5, 1067 leaves):

$$\frac{1}{B+A\,\text{Cos}[c+d\,x]}\text{Cos}[c+d\,x]^{7/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\frac{(4\,A+3\,B)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{14\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(5\,B\,\text{Sin}[c]+7\,A\,\text{Sin}[d\,x]+14\,B\,\text{Sin}[d\,x])}{70\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(21\,A\,\text{Sin}[c]+42\,B\,\text{Sin}[c]+70\,A\,\text{Sin}[d\,x]+60\,B\,\text{Sin}[d\,x])}{210\,d}+$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(35\,A\,\text{Sin}[c]+30\,B\,\text{Sin}[c]+84\,A\,\text{Sin}[d\,x]+63\,B\,\text{Sin}[d\,x])}{105\,d}\right)-$$
$$\frac{1}{3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{7\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,2\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$
$$\frac{1}{5\,d\,(B+A\,\text{Cos}[c+d\,x])}2\,A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10\,d\,(B+A\,\text{Cos}[c+d\,x])}$$

$$3\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

- **Problem 496: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 157 leaves, 7 steps) :

$$\frac{3\,(7\,A-5\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}-\frac{5\,(A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}-$$

$$\frac{5\,(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}+\frac{(7\,A-5\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}-\frac{(A-B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1292 leaves) :

$$\frac{1}{20\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,21\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\left(\frac{2\,(-5\,A+5\,B-16\,A\,\text{Cos}[c]+10\,B\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{4\,(-A+B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\right.\right.$$

$$\left.\left.\frac{2\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{4\,(-A+B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{2\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\right)\right)\Big/$$

$$((B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x]))+\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\left(5\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d\,x])\right.$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

Problem 497: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2}\,(A+B\,\text{Sec}[c+d x])}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 4, 124 leaves, 6 steps):

$$-\frac{3\,(A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),\,2\right]}{a\,d}+\frac{(5 A-3 B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),\,2\right]}{3\,a\,d}+$$
$$\frac{(5 A-3 B)\,\sqrt{\text{Cos}[c+d x]}\,\,\text{Sin}[c+d x]}{3\,a\,d}-\frac{(A-B)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])}$$

Result (type 5, 1239 leaves):

$$-\frac{1}{4\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])}\,3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d x])$$
$$\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i d x}\,\left(2\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\,\right)\Big/\,\left(3\,i\,d\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i d x}\,\left(2\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\,\right)\Big/\,\left(-i\,d\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{4\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d x])$$
$$\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i d x}\,\left(2\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\,\right)\Big/\,\left(3\,i\,d\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i d x}\,\left(2\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\,\right)\Big/\,\left(-i\,d\,\left(1+e^{2 i d x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2 i d x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\sqrt{\text{Cos}[c+d x]}\,\,(A+B\,\text{Sec}[c+d x])\,\left(-\frac{2\,(-A+B)\,(1+2\,\text{Cos}[c])\,\text{Csc}[c]}{d}+\frac{4\,A\,\text{Cos}[d x]\,\text{Sin}[c]}{3\,d}-\right.\right.$$
$$\left.\left.\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\,\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{4\,A\,\text{Cos}[c]\,\text{Sin}[d x]}{3\,d}\right)\right)\Big/\,((B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x]))-$$

$$\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)+$$
$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right.$$
$$\left.\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 498: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 88 leaves, 5 steps):

$$\frac{(3\,A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1208 leaves):

$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\,(A+B\,\text{Sec}[c+d x])\left(-\frac{2\,(A-B+2\,A\,\text{Cos}[c])\,\text{Csc}[c]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}\right)\right)\Big/$$

$$((B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x]))+$$

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\right.$$

$$\left.\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])\right)-$$

$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\right.$$

$$\left.\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])\right)$$

- **Problem 499: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]}{\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Sec}[c+d x])}\,dx$$

Optimal (type 4, 83 leaves, 5 steps):

$$-\frac{(A-B)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a d}+\frac{(A+B)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{a d}+\frac{(A-B)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])}$$

Result (type 5, 1204 leaves):

$$-\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\frac{\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,\left(-\frac{2\,(-A+B)\,\text{Csc}[c]}{d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}\right)}{(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}-$$

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right.$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/\left(d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 500: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 113 leaves, 6 steps):

$$\frac{(A-3\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-3\,B)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{(A-B)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1240 leaves):

$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$
$$\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$
$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])\,\Bigg(\frac{(2\,B-A\,\text{Cos}[c]+B\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}+$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{4\,B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\Bigg)\Bigg)\Bigg/\ ((B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x]))-$$

$$\Bigg(A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$
$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)+$$

$$\Bigg(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$
$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 501: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 152 leaves, 7 steps):

$$-\frac{3\,(A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(3\,A-5\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}-$$
$$\frac{(3\,A-5\,B)\,\text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{3\,(A-B)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{(A-B)\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1277 leaves):

$$-\frac{1}{4\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,(A+B\,\text{Sec}[c+d\,x])$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{4\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d x])$$

$$\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\,(A+B\,\text{Sec}[c+d x])\left(-\frac{(-A+B)\,(2+\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}-\right.\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{4\,B\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{3\,d}+$$

$$\left.\left.\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,(B\,\text{Sin}[c]+3\,A\,\text{Sin}[d x]-3\,B\,\text{Sin}[d x])}{3\,d}\right)\right)\Big/\left((B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])\right)+$$

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])\right)-$$

$$\left(5\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right](A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 502: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 204 leaves, 8 steps):

$$\frac{7\,(8\,A-5\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a^2\,d}-\frac{5\,(3\,A-2\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}-\frac{5\,(3\,A-2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}+$$
$$\frac{7\,(8\,A-5\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a^2\,d}-\frac{(3\,A-2\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1396 leaves):

$$\frac{1}{5\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,28\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$
$$\frac{1}{2\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,7\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\right.$$

$$(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)-$$

$$\left(20\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(A+B\,\text{Sec}[c+d\,x])\,\left(\frac{4\,(-20\,A+15\,B-36\,A\,\text{Cos}[c]+20\,B\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{8\,(-2\,A+B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}-\right.\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(-4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{8\,(-2\,A+B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+$$

$$\left.\left.\frac{4\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(\sqrt{\text{Cos}[c+d\,x]}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 503: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 171 leaves, 7 steps):

$$-\frac{(7\,A-4\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a^2\,d}+\frac{5\,(2\,A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a^2\,d}+$$

$$\frac{5\,(2\,A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(7\,A-4\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1352 leaves):

$$-\frac{1}{2\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2}\,7\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)+$$

$$\frac{1}{(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2}\,2\,i\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)-$$

$$\left(20\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\right.$$

$$(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+$$

$$\left(10\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\right.$$

$$\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4(A+B\,\text{Sec}[c+d\,x])\left(-\frac{4\,(-3\,A+2\,B-4\,A\,\text{Cos}[c]+2\,B\,\text{Cos}[c])\,\text{Csc}[c]}{d}+\frac{8\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{8\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(\sqrt{\text{Cos}[c+d\,x]}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 504: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 137 leaves, 6 steps):

$$\frac{(4\,A-B)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a^2\,d}-\frac{(5\,A-2\,B)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,a^2\,d}-\frac{(5\,A-2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1318 leaves):

$$\frac{1}{(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\,\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-\right.$$

$$\left.\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\,\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{2\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\,\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-\right.$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)+$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]\,(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^2\right)-$$

$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]\,(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(A+B\,\text{Sec}[c+d x])\left(-\frac{4\,(2 A-B+2 A\,\text{Cos}[c])\,\text{Csc}[c]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(-2 A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right)\Big/\left(\sqrt{\text{Cos}[c+d x]}\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^2\right)$$

- **Problem 505: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]}{\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 4, 121 leaves, 6 steps):

$$-\frac{A\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a^2 d}+\frac{(2 A+B)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a^2 d}+\frac{A\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{a^2 d\,(1+\text{Cos}[c+d x])}-\frac{(A-B)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 d\,(a+a\,\text{Cos}[c+d x])^2}$$

Result (type 5, 921 leaves):

$$-\frac{1}{2\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2}\,\mathrm{i}\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+\mathrm{i}\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Big/\left(3\,\mathrm{i}\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\Bigg(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+\mathrm{i}\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Big/\left(-\mathrm{i}\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\Bigg)-$$

$$\Bigg(4\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]$$

$$(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)-$$

$$\Bigg(2\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\mathrm{Sec}[c+d\,x]\,(A+B\,\mathrm{Sec}[c+d\,x])\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(B+A\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+\Bigg(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4(A+B\,\mathrm{Sec}[c+d\,x])$$

$$\left(\frac{4\,A\,\mathrm{Csc}[c]}{d}+\frac{4\,A\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{2\,(-A+B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\Bigg)\Big/$$

$$\left(\sqrt{\mathrm{Cos}[c+d\,x]}\,(B+A\,\mathrm{Cos}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)$$

- **Problem 506: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]}{\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 121 leaves, 6 steps) :

$$\frac{B\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\,2\right]}{a^2\,d}+\frac{(A+2\,B)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\,2\right]}{3\,a^2\,d}-\frac{B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])}+\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 921 leaves) :

$$\frac{1}{2\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,\mathrm{i}\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\Bigg(\Bigg(\Bigg(2\,e^{2\,\mathrm{i}\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\mathrm{i}\,d\,x}\,(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]\,\sqrt{e^{-\mathrm{i}\,d\,x}\left(2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\,\text{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathrm{i}\,d\,x}\,(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]\,\sqrt{e^{-\mathrm{i}\,d\,x}\left(2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\,\text{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(-\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\Bigg(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]$$

$$(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)-$$

$$\Bigg(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(A+B\,\text{Sec}[c+d\,x])$$

$$\left(-\frac{4\,B\,\text{Csc}[c]}{d}-\frac{4\,B\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\Bigg)\Bigg/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 507: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 164 leaves, 7 steps):

$$\frac{(A-4B)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{a^2 d}+\frac{(2A-5B)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3a^2 d}-\frac{(A-4B)\,\text{Sin}[c+dx]}{a^2 d\sqrt{\text{Cos}[c+dx]}}+\frac{(2A-5B)\,\text{Sin}[c+dx]}{3a^2 d\sqrt{\text{Cos}[c+dx]}\,(1+\text{Cos}[c+dx])}+\frac{(A-B)\,\text{Sin}[c+dx]}{3d\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 5, 1351 leaves):

$$\frac{1}{2(B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2}\,\mathrm{i}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])$$
$$\left(\left(2\,e^{2\mathrm{i}dx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\right)\Big/\left(3\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]-3d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\right)\Big/\left(-\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{(B+A\,\text{Cos}[c+dx])(a+a\,\text{Sec}[c+dx])^2}\,2\mathrm{i}\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx])$$
$$\left(\left(2\,e^{2\mathrm{i}dx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\right)\Big/\left(3\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]-3d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\right)\Big/\left(-\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)\right)-$$
$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\right.$$
$$(A+B\,\text{Sec}[c+dx])\,\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3d\,(B+A\,\text{Cos}[c+dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4(A+B\,\text{Sec}[c+d\,x])\left(\frac{2\,(2\,B-A\,\text{Cos}[c]+2\,B\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\right.\right.$$
$$\left.\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{8\,B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/$$
$$\left(\sqrt{\text{Cos}[c+d\,x]}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 508: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 197 leaves, 8 steps):

$$-\frac{(4\,A-7\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a^2\,d}-\frac{5\,(A-2\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}-\frac{5\,(A-2\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$
$$\frac{(4\,A-7\,B)\,\text{Sin}[c+d\,x]}{a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{(4\,A-7\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}\,(1+\text{Cos}[c+d\,x])}+\frac{(A-B)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1392 leaves):

$$-\frac{1}{(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{2\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,7\,i\,B\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\big(2\,\big(1+e^{2\,i\,d\,x}\big)\,\text{Cos}[c]+2\,i\,\big(-1+e^{2\,i\,d\,x}\big)\,\text{Sin}[c]\big)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\Big(3\,i\,d\,\big(1+e^{2\,i\,d\,x}\big)\,\text{Cos}[c]-3\,d\,\big(-1+e^{2\,i\,d\,x}\big)\,\text{Sin}[c]\Big)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\big(2\,\big(1+e^{2\,i\,d\,x}\big)\,\text{Cos}[c]+2\,i\,\big(-1+e^{2\,i\,d\,x}\big)\,\text{Sin}[c]\big)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\Big(-i\,d\,\big(1+e^{2\,i\,d\,x}\big)\,\text{Cos}[c]+d\,\big(-1+e^{2\,i\,d\,x}\big)\,\text{Sin}[c]\Big)\Bigg)+$$

$$\Bigg(10\,A\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[c+d\,x]$$

$$(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\Big)-$$

$$\Bigg(20\,B\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\text{Sec}[c+d\,x]\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\Big)+$$

$$\Bigg(\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(A+B\,\text{Sec}[c+d\,x])\,\Bigg(-\frac{2\,(-2\,A+4\,B-2\,A\,\text{Cos}[c]+3\,B\,\text{Cos}[c])\,\text{Csc}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}[c]}{d}-$$

$$\frac{2\,\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^3\,\big(-A\,\text{Sin}\big[\frac{d\,x}{2}\big]+B\,\text{Sin}\big[\frac{d\,x}{2}\big]\big)}{3\,d}-\frac{4\,\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]\,\big(-2\,A\,\text{Sin}\big[\frac{d\,x}{2}\big]+3\,B\,\text{Sin}\big[\frac{d\,x}{2}\big]\big)}{d}+$$

$$\frac{8\,B\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(B\,\text{Sin}[c]+3\,A\,\text{Sin}[d\,x]-6\,B\,\text{Sin}[d\,x])}{3\,d}-\frac{2\,(-A+B)\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^2\,\text{Tan}\big[\frac{c}{2}\big]}{3\,d}\Bigg)\Bigg)\Big/$$

$$\Big(\sqrt{\text{Cos}[c+d\,x]}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\Big)$$

Problem 509: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \,\text{Sec}[c+d x])}{(a+a \,\text{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 221 leaves, 8 steps) :

$$-\frac{7 (17 A-7 B) \,\text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{10 a^3 d}+\frac{(33 A-13 B) \,\text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{6 a^3 d}+\frac{(33 A-13 B) \sqrt{\text{Cos}[c+d x]} \,\text{Sin}[c+d x]}{6 a^3 d}-\frac{(A-B) \,\text{Cos}[c+d x]^{7/2} \,\text{Sin}[c+d x]}{5 d (a+a \,\text{Cos}[c+d x])^3}-\frac{(2 A-B) \,\text{Cos}[c+d x]^{5/2} \,\text{Sin}[c+d x]}{3 a d (a+a \,\text{Cos}[c+d x])^2}-\frac{7 (17 A-7 B) \,\text{Cos}[c+d x]^{3/2} \,\text{Sin}[c+d x]}{30 d \left(a^3+a^3 \,\text{Cos}[c+d x]\right)}$$

Result (type 5, 1448 leaves) :

$$-\frac{1}{10 (B+A \,\text{Cos}[c+d x]) (a+a \,\text{Sec}[c+d x])^3} 119 \, i \, A \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B \,\text{Sec}[c+d x])$$
$$\left(\left(2 e^{2 i d x} \,\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \,\text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \,\text{Cos}[2 c]+i e^{2 i d x} \,\text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \,\text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \,\text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \,\text{Cos}[2 c]+i e^{2 i d x} \,\text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)+$$
$$\frac{1}{10 (B+A \,\text{Cos}[c+d x]) (a+a \,\text{Sec}[c+d x])^3} 49 \, i \, B \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B \,\text{Sec}[c+d x])$$
$$\left(\left(2 e^{2 i d x} \,\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \,\text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \,\text{Cos}[2 c]+i e^{2 i d x} \,\text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \,\text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \,\text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \,\text{Cos}[2 c]+i e^{2 i d x} \,\text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)-$$
$$\left(22 A \,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2\right.$$
$$(A+B \,\text{Sec}[c+d x]) \,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\ (B+A\,\text{Cos}[c+d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(26\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\ \text{Csc}\left[\frac{c}{2}\right]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\ (A+B\,\text{Sec}[c+d\,x])\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\ (B+A\,\text{Cos}[c+d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^3\right)+\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\ (A+B\,\text{Sec}[c+d\,x])$$

$$\Bigg(-\frac{4\ (-59\,A+29\,B-60\,A\,\text{Cos}[c]+20\,B\,\text{Cos}[c])\ \text{Csc}[c]}{5\,d}+\frac{16\,A\,\text{Cos}[d\,x]\ \text{Sin}[c]}{3\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\ \left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\ \left(-19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+14\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\ \left(-59\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+29\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,A\,\text{Cos}[c]\ \text{Sin}[d\,x]}{3\,d}+$$

$$\frac{4\ (-19\,A+14\,B)\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\ (-A+B)\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ \text{Tan}\left[\frac{c}{2}\right]}{5\,d}\Bigg)\Bigg)\Bigg/\left(\text{Cos}[c+d\,x]^{3/2}\ (B+A\,\text{Cos}[c+d\,x])\ (a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 510: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\ (A+B\,\text{Sec}[c+d\,x])}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 188 leaves, 7 steps):

$$\frac{(49\,A-9\,B)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),2\right]}{10\,a^3\,d}-\frac{(13\,A-3\,B)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),2\right]}{6\,a^3\,d}-$$

$$\frac{(A-B)\ \text{Cos}[c+d\,x]^{5/2}\ \text{Sin}[c+d\,x]}{5\,d\ (a+a\,\text{Cos}[c+d\,x])^3}-\frac{(8\,A-3\,B)\ \text{Cos}[c+d\,x]^{3/2}\ \text{Sin}[c+d\,x]}{15\,a\,d\ (a+a\,\text{Cos}[c+d\,x])^2}-\frac{(13\,A-3\,B)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{6\,d\ \left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1415 leaves):

$$\frac{1}{10\ (B+A\,\text{Cos}[c+d\,x])\ (a+a\,\text{Sec}[c+d\,x])^3}\,49\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\ \text{Csc}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}[c+d\,x]^2\ (A+B\,\text{Sec}[c+d\,x])$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) -$$

$$\frac{1}{10\, (B + A\, \text{Cos}[c + d x])\, (a + a\, \text{Sec}[c + d x])^3}\, 9 i B\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c + d x]^2\, (A + B\, \text{Sec}[c + d x])$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\left(26 A\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c + d x]^2\right.$$

$$(A + B\, \text{Sec}[c + d x])\, \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(3 d\, (B + A\, \text{Cos}[c + d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^3\right) -$$

$$\left(2 B\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c + d x]^2\, (A + B\, \text{Sec}[c + d x])\, \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(d\, (B + A\, \text{Cos}[c + d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^3\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 (A+B\,\text{Sec}[c+d\,x]) \left(-\frac{4\,(29\,A-9\,B+20\,A\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5 \left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right] \left(-29\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3 \left(-14\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{4\,(-14\,A+9\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(\text{Cos}[c+d\,x]^{3/2}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 511: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 182 leaves, 7 steps):

$$-\frac{(9\,A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}+\frac{(3\,A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-\frac{(A-B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(6\,A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{(9\,A+B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1407 leaves):

$$-\frac{1}{10\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{10\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\,(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\,(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(B+A\,\text{Cos}[c+d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(A+B\,\text{Sec}[c+d x])\left(\frac{4\,(9A+B)\,\text{Csc}[c]}{5d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(9A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-9A\,\text{Sin}\left[\frac{d x}{2}\right]+4B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{15d}+\frac{4\,(-9A+4B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left(\text{Cos}[c+d x]^{3/2}\,(B+A\,\text{Cos}[c+d x])\,(a+a\,\text{Sec}[c+d x])^3\right)$$

- **Problem 512: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]}{\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 178 leaves, 7 steps) :

$$-\frac{(A-B)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{10 a^3 d}+\frac{(A+B)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{6 a^3 d}-\frac{(A-B)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{5 d (a+a\,\text{Cos}[c+d x])^3}+\frac{(4 A+B)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{15 a d (a+a\,\text{Cos}[c+d x])^2}+\frac{(A-B)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{10 d \left(a^3+a^3\,\text{Cos}[c+d x]\right)}$$

Result (type 5, 1406 leaves):

$$-\frac{1}{10 (B+A\,\text{Cos}[c+d x]) (a+a\,\text{Sec}[c+d x])^3}\, i\, A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B\,\text{Sec}[c+d x])$$
$$\left(\left(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i\,\text{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i\,\text{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{10 (B+A\,\text{Cos}[c+d x]) (a+a\,\text{Sec}[c+d x])^3}\, i\, B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B\,\text{Sec}[c+d x])$$
$$\left(\left(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i\,\text{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i\,\text{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)-$$
$$\left(2 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2\right.$$
$$(A+B\,\text{Sec}[c+d x])\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3 d (B+A\,\text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\Big(2\,B\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Big)\Big/$$

$$\Big(3\,d\,(B+A\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\Big)+$$

$$\Big(\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,(A+B\,\text{Sec}[c+d\,x])\,\Big(-\frac{4\,(-A+B)\,\text{Csc}[c]}{5\,d}-\frac{4\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{d\,x}{2}]\,(-A\,\text{Sin}[\frac{d\,x}{2}]+B\,\text{Sin}[\frac{d\,x}{2}])}{5\,d}+$$

$$\frac{2\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^5\,(-A\,\text{Sin}[\frac{d\,x}{2}]+B\,\text{Sin}[\frac{d\,x}{2}])}{5\,d}+\frac{4\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^3\,(4\,A\,\text{Sin}[\frac{d\,x}{2}]+B\,\text{Sin}[\frac{d\,x}{2}])}{15\,d}+$$

$$\frac{4\,(4\,A+B)\,\text{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^2\,\text{Tan}[\frac{c}{2}]}{15\,d}+\frac{2\,(-A+B)\,\text{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^4\,\text{Tan}[\frac{c}{2}]}{5\,d}\Big)\Big)\Big/\Big(\text{Cos}[c+d\,x]^{3/2}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\Big)$$

- **Problem 513: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 180 leaves, 7 steps):

$$\frac{(A+9\,B)\,\text{EllipticE}[\frac{1}{2}\,(c+d\,x),2]}{10\,a^3\,d}+\frac{(A+3\,B)\,\text{EllipticF}[\frac{1}{2}\,(c+d\,x),2]}{6\,a^3\,d}+$$

$$\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+\frac{(A-6\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(A+9\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1407 leaves):

$$\frac{1}{10\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,A\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])$$

$$\Big(\Big(\Big(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\big(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\big)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Big)\Big/\Big(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\Big)-$$

$$\Big(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\big(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\big)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{10 (B+A \text{Cos}[c+d x]) (a+a \text{Sec}[c+d x])^3} 9 i B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2 (A+B \text{Sec}[c+d x])$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)-$$

$$\Bigg(2 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^2$$

$$(A+B \text{Sec}[c+d x]) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d (B+A \text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2} (a+a \text{Sec}[c+d x])^3\right)-$$

$$\Bigg(2 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d x]^2 (A+B \text{Sec}[c+d x]) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (B+A \text{Cos}[c+d x]) \sqrt{1+\text{Cot}[c]^2} (a+a \text{Sec}[c+d x])^3\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (A+B \text{Sec}[c+d x]) \Bigg(-\frac{4 (A+9 B) \text{Csc}[c]}{5 d}-\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(-A \text{Sin}\left[\frac{d x}{2}\right]+B \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}-$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(-A \text{Sin}\left[\frac{d x}{2}\right]+6 B \text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}-\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]+9 B \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}-$$

$$\left.\left.\frac{4\,(-A+6\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(-A+B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(\text{Cos}[c+d\,x]^{3/2}\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 514: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 221 leaves, 8 steps):

$$\frac{(9\,A-49\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(3\,A-13\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-\frac{(9\,A-49\,B)\,\text{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{(A-B)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3}+\frac{(3\,A-8\,B)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{(3\,A-13\,B)\,\text{Sin}[c+d\,x]}{6\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1447 leaves):

$$\frac{1}{10\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{10\,(B+A\,\text{Cos}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,49\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,(A+B\,\text{Sec}[c+d\,x])$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\right.$$

$$(A + B\,Sec[c + d\,x])\,Sec[d\,x - ArcTan[Cot[c]]]\,\sqrt{1 - Sin[d\,x - ArcTan[Cot[c]]]}$$
$$\left.\sqrt{-\sqrt{1 + Cot[c]^2}\,Sin[c]\,Sin[d\,x - ArcTan[Cot[c]]]}\,\sqrt{1 + Sin[d\,x - ArcTan[Cot[c]]]}\right) \Big/$$
$$\left(d\,(B + A\,Cos[c + d\,x])\,\sqrt{1 + Cot[c]^2}\,(a + a\,Sec[c + d\,x])^3\right) +$$
$$\left(26\,B\,Cos\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d\,x - ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right]\right.$$
$$Sec[c + d\,x]^2\,(A + B\,Sec[c + d\,x])\,Sec[d\,x - ArcTan[Cot[c]]]\,\sqrt{1 - Sin[d\,x - ArcTan[Cot[c]]]}$$
$$\left.\sqrt{-\sqrt{1 + Cot[c]^2}\,Sin[c]\,Sin[d\,x - ArcTan[Cot[c]]]}\,\sqrt{1 + Sin[d\,x - ArcTan[Cot[c]]]}\right) \Big/$$
$$\left(3\,d\,(B + A\,Cos[c + d\,x])\,\sqrt{1 + Cot[c]^2}\,(a + a\,Sec[c + d\,x])^3\right) +$$
$$\left(Cos\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6 (A + B\,Sec[c + d\,x]) \left(\frac{2\,(20\,B - 9\,A\,Cos[c] + 29\,B\,Cos[c])\,Csc\left[\frac{c}{2}\right] Sec\left[\frac{c}{2}\right] Sec[c]}{5\,d} +\right.\right.$$
$$\frac{2\,Sec\left[\frac{c}{2}\right] Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^5 \left(-A\,Sin\left[\frac{d\,x}{2}\right] + B\,Sin\left[\frac{d\,x}{2}\right]\right)}{5\,d} + \frac{4\,Sec\left[\frac{c}{2}\right] Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^3 \left(-6\,A\,Sin\left[\frac{d\,x}{2}\right] + 11\,B\,Sin\left[\frac{d\,x}{2}\right]\right)}{15\,d} +$$
$$\frac{4\,Sec\left[\frac{c}{2}\right] Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right] \left(-9\,A\,Sin\left[\frac{d\,x}{2}\right] + 29\,B\,Sin\left[\frac{d\,x}{2}\right]\right)}{5\,d} + \frac{16\,B\,Sec[c]\,Sec[c + d\,x]\,Sin[d\,x]}{d} + \frac{4\,(-6\,A + 11\,B)\,Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^2 Tan\left[\frac{c}{2}\right]}{15\,d} +$$
$$\left.\left.\frac{2\,(-A + B)\,Sec\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4 Tan\left[\frac{c}{2}\right]}{5\,d}\right)\right) \Big/ \left(Cos[c + d\,x]^{3/2}\,(B + A\,Cos[c + d\,x])\,(a + a\,Sec[c + d\,x])^3\right)$$

Problem 519: Result unnecessarily involves higher level functions.

$$\int \sqrt{Cos[c + d\,x]}\,\sqrt{a + a\,Sec[c + d\,x]}\,(A + B\,Sec[c + d\,x])\,dx$$

Optimal (type 3, 96 leaves, 4 steps):

$$\frac{2\,\sqrt{a}\,B\,ArcSinh\left[\frac{\sqrt{a}\,Tan[c+d\,x]}{\sqrt{a+a\,Sec[c+d\,x]}}\right] \sqrt{Cos[c + d\,x]}\,\sqrt{Sec[c + d\,x]}}{d} + \frac{2\,a\,A\,Sin[c + d\,x]}{d\,\sqrt{Cos[c + d\,x]}\,\sqrt{a + a\,Sec[c + d\,x]}}$$

Result (type 5, 135 leaves):

$$-\frac{1}{3\,d\,\left(1+e^{i\,(c+d\,x)}\right)}2\,i\,\sqrt{\text{Cos}[c+d\,x]}\,\left(3\,A\,\left(-1+e^{i\,(c+d\,x)}\right)+6\,B\,e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,B\,e^{2\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

Problem 520: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 98 leaves, 4 steps):

$$\frac{\sqrt{a}\,\,(2\,A+B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{a\,B\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 157 leaves):

$$\frac{1}{3\,d}\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-3\,i\,(2\,A+B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]-i\,(2\,A+B)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,B\,\text{Sec}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 521: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\,(A+B\,\text{Sec}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 151 leaves, 5 steps):

$$\frac{\sqrt{a}\,\,(4\,A+3\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+\frac{a\,B\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(4\,A+3\,B)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 166 leaves):

$$\frac{1}{12\,d}\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-3\,i\,(4\,A+3\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-i\,(4\,A+3\,B)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+3\,\text{Sec}[c+d\,x]\,\,(4\,A+3\,B+2\,B\,\text{Sec}[c+d\,x])\,\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 522: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\;(A+B\,\text{Sec}[c+d\,x])}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 196 leaves, 6 steps):

$$\frac{\sqrt{a}\;(6\,A+5\,B)\;\text{ArcSinh}\left[\frac{\sqrt{a}\;\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+\frac{a\,B\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(6\,A+5\,B)\,\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(6\,A+5\,B)\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 5, 185 leaves):

$$\frac{1}{24\,d}\sqrt{\text{Cos}[c+d\,x]}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\;\left(-3\,i\,(6\,A+5\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,(6\,A+5\,B)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\text{Sec}[c+d\,x]\,\left(3\,(6\,A+5\,B)+2\,(6\,A+5\,B)\,\text{Sec}[c+d\,x]+8\,B\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 527: Result unnecessarily involves higher level functions.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 145 leaves, 5 steps):

$$\frac{2\,a^{3/2}\,B\,\text{ArcSinh}\left[\frac{\sqrt{a}\;\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{2\,a^2\,(4\,A+3\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+a\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 157 leaves):

$$\frac{1}{3\,d}a\,\sqrt{\text{Cos}[c+d\,x]}\;(1+\text{Cos}[c+d\,x])\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\sqrt{a\,(1+\text{Sec}[c+d\,x])}\;\left(-3\,i\,B\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,B\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+(5\,A+3\,B+A\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 528: Result unnecessarily involves higher level functions.

$$\int \sqrt{\text{Cos}[c+d\,x]}\;(a+a\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{a^{3/2}\,(2A+3B)\,\text{ArcSinh}\Big[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\Big]\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{d}+\frac{a^2\,(2A-B)\,\text{Sin}[c+dx]}{d\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a\,B\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{d\,\sqrt{\text{Cos}[c+dx]}}$$

Result (type 5, 178 leaves):

$$\frac{1}{6\,d\,\sqrt{\text{Cos}[c+dx]}}a\,(1+\text{Cos}[c+dx])\,\text{Sec}\Big[\frac{1}{2}(c+dx)\Big]^3\sqrt{a\,(1+\text{Sec}[c+dx])}$$
$$\Big(-3\,i\,(2A+3B)\,e^{\frac{1}{2}i(c+dx)}\,\text{Cos}[c+dx]\,\text{Hypergeometric2F1}\Big[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+dx)}\Big]-$$
$$i\,(2A+3B)\,e^{\frac{3}{2}i(c+dx)}\,\text{Cos}[c+dx]\,\text{Hypergeometric2F1}\Big[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+dx)}\Big]+3\,(B+2A\,\text{Cos}[c+dx])\,\text{Sin}\Big[\frac{1}{2}(c+dx)\Big]\Big)$$

Problem 529: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\text{Sec}[c+dx])^{3/2}\,(A+B\,\text{Sec}[c+dx])}{\sqrt{\text{Cos}[c+dx]}}\,dx$$

Optimal (type 3, 153 leaves, 5 steps):

$$\frac{a^{3/2}\,(12A+7B)\,\text{ArcSinh}\Big[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\Big]\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{4\,d}+\frac{a^2\,(4A+5B)\,\text{Sin}[c+dx]}{4\,d\,\text{Cos}[c+dx]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a\,B\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2\,d\,\text{Cos}[c+dx]^{3/2}}$$

Result (type 5, 189 leaves):

$$\frac{1}{24\,d\,\text{Cos}[c+dx]^{3/2}}a\,(1+\text{Cos}[c+dx])\,\text{Sec}\Big[\frac{1}{2}(c+dx)\Big]^3\sqrt{a\,(1+\text{Sec}[c+dx])}$$
$$\Big(-3\,i\,(12A+7B)\,e^{\frac{1}{2}i(c+dx)}\,\text{Cos}[c+dx]^2\,\text{Hypergeometric2F1}\Big[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+dx)}\Big]-$$
$$i\,(12A+7B)\,e^{\frac{3}{2}i(c+dx)}\,\text{Cos}[c+dx]^2\,\text{Hypergeometric2F1}\Big[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+dx)}\Big]+3\,(2B+(4A+7B)\,\text{Cos}[c+dx])\,\text{Sin}\Big[\frac{1}{2}(c+dx)\Big]\Big)$$

Problem 530: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\text{Sec}[c+dx])^{3/2}\,(A+B\,\text{Sec}[c+dx])}{\text{Cos}[c+dx]^{3/2}}\,dx$$

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{3/2}\,(14A+11B)\,\text{ArcSinh}\Big[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\Big]\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{8\,d}+$$
$$\frac{a^2\,(6A+7B)\,\text{Sin}[c+dx]}{12\,d\,\text{Cos}[c+dx]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a^2\,(14A+11B)\,\text{Sin}[c+dx]}{8\,d\,\text{Cos}[c+dx]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a\,B\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{3\,d\,\text{Cos}[c+dx]^{5/2}}$$

Result (type 5, 205 leaves):

$$\frac{1}{48\, d\, \text{Cos}[c+d\, x]^{5/2}}\, a\, (1+\text{Cos}[c+d\, x])\, \text{Sec}\left[\frac{1}{2}\, (c+d\, x)\right]^3 \sqrt{a\, (1+\text{Sec}[c+d\, x])}\, \left(-3\, i\, (14\, A+11\, B)\, e^{\frac{1}{2}\, i\, (c+d\, x)}\, \text{Cos}[c+d\, x]^3\, \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2\, i\, (c+d\, x)}\right] - i\, (14\, A+11\, B)\, e^{\frac{3}{2}\, i\, (c+d\, x)}\, \text{Cos}[c+d\, x]^3\, \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2\, i\, (c+d\, x)}\right] + \left(8\, B+2\, (6\, A+11\, B)\, \text{Cos}[c+d\, x] + (42\, A+33\, B)\, \text{Cos}[c+d\, x]^2\right)\, \text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right)$$

- **Problem 531: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\, \text{Sec}[c+d\, x])^{3/2}\, (A+B\, \text{Sec}[c+d\, x])}{\text{Cos}[c+d\, x]^{5/2}}\, dx$$

Optimal (type 3, 247 leaves, 7 steps):

$$\frac{a^{3/2}\, (88\, A+75\, B)\, \text{ArcSinh}\left[\frac{\sqrt{a}\, \text{Tan}[c+d\, x]}{\sqrt{a+a\, \text{Sec}[c+d\, x]}}\right] \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{\text{Sec}[c+d\, x]}}{64\, d} + \frac{a^2\, (8\, A+9\, B)\, \text{Sin}[c+d\, x]}{24\, d\, \text{Cos}[c+d\, x]^{7/2} \sqrt{a+a\, \text{Sec}[c+d\, x]}} + \frac{a^2\, (88\, A+75\, B)\, \text{Sin}[c+d\, x]}{96\, d\, \text{Cos}[c+d\, x]^{5/2} \sqrt{a+a\, \text{Sec}[c+d\, x]}} + \frac{a^2\, (88\, A+75\, B)\, \text{Sin}[c+d\, x]}{64\, d\, \text{Cos}[c+d\, x]^{3/2} \sqrt{a+a\, \text{Sec}[c+d\, x]}} + \frac{a\, B \sqrt{a+a\, \text{Sec}[c+d\, x]}\, \text{Sin}[c+d\, x]}{4\, d\, \text{Cos}[c+d\, x]^{7/2}}$$

Result (type 5, 223 leaves):

$$\frac{1}{384\, d\, \text{Cos}[c+d\, x]^{7/2}}\, a\, (1+\text{Cos}[c+d\, x])\, \text{Sec}\left[\frac{1}{2}\, (c+d\, x)\right]^3 \sqrt{a\, (1+\text{Sec}[c+d\, x])}\, \left(-3\, i\, (88\, A+75\, B)\, e^{\frac{1}{2}\, i\, (c+d\, x)}\, \text{Cos}[c+d\, x]^4\, \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2\, i\, (c+d\, x)}\right] - i\, (88\, A+75\, B)\, e^{\frac{3}{2}\, i\, (c+d\, x)}\, \text{Cos}[c+d\, x]^4\, \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2\, i\, (c+d\, x)}\right] + \left(48\, B+8\, (8\, A+15\, B)\, \text{Cos}[c+d\, x] + 2\, (88\, A+75\, B)\, \text{Cos}[c+d\, x]^2 + 3\, (88\, A+75\, B)\, \text{Cos}[c+d\, x]^3\right)\, \text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right)$$

- **Problem 535: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d\, x]^{5/2}\, (a+a\, \text{Sec}[c+d\, x])^{5/2}\, (A+B\, \text{Sec}[c+d\, x])\, dx$$

Optimal (type 3, 192 leaves, 6 steps):

$$\frac{2\, a^{5/2}\, B\, \text{ArcSinh}\left[\frac{\sqrt{a}\, \text{Tan}[c+d\, x]}{\sqrt{a+a\, \text{Sec}[c+d\, x]}}\right] \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{\text{Sec}[c+d\, x]}}{d} + \frac{2\, a^3\, (32\, A+35\, B)\, \text{Sin}[c+d\, x]}{15\, d \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{a+a\, \text{Sec}[c+d\, x]}} + \frac{2\, a^2\, (8\, A+5\, B) \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{a+a\, \text{Sec}[c+d\, x]}\, \text{Sin}[c+d\, x]}{15\, d} + \frac{2\, a\, A\, \text{Cos}[c+d\, x]^{3/2}\, (a+a\, \text{Sec}[c+d\, x])^{3/2}\, \text{Sin}[c+d\, x]}{5\, d}$$

Result (type 5, 179 leaves) :

$$\frac{1}{60\,d}a^2\sqrt{\cos[c+d\,x]}\,(1+\cos[c+d\,x])^2\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\left(-30\,i\,B\,e^{\frac{1}{2}i\,(c+d\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-10\,i\,B\,e^{\frac{3}{2}i\,(c+d\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+(89\,A+80\,B+2\,(14\,A+5\,B)\,\cos[c+d\,x]+3\,A\,\cos[2\,(c+d\,x)])\,\sin\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 536: Result unnecessarily involves higher level functions.

$$\int \cos[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 197 leaves, 6 steps) :

$$\frac{a^{5/2}\,(2\,A+5\,B)\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\tan[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]\sqrt{\cos[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{d}+\frac{a^3\,(14\,A+3\,B)\,\sin[c+d\,x]}{3\,d\,\sqrt{\cos[c+d\,x]}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}-\frac{a^2\,(2\,A-3\,B)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\sin[c+d\,x]}{3\,d\,\sqrt{\cos[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{\cos[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\sin[c+d\,x]}{3\,d}$$

Result (type 5, 200 leaves) :

$$\frac{1}{12\,d\,\sqrt{\cos[c+d\,x]}}\,a^2\,(1+\cos[c+d\,x])^2\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\left(-3\,i\,(2\,A+5\,B)\,e^{\frac{1}{2}i\,(c+d\,x)}\,\cos[c+d\,x]\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,(2\,A+5\,B)\,e^{\frac{3}{2}i\,(c+d\,x)}\,\cos[c+d\,x]\,\mathrm{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+(A+3\,B+2\,(8\,A+3\,B)\,\cos[c+d\,x]+A\,\cos[2\,(c+d\,x)])\,\sin\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 537: Result unnecessarily involves higher level functions.

$$\int \sqrt{\cos[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])\,dx$$

Optimal (type 3, 200 leaves, 6 steps) :

$$\frac{a^{5/2}\,(20\,A+19\,B)\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\tan[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]\sqrt{\cos[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,d}+\frac{a^3\,(4\,A-9\,B)\,\sin[c+d\,x]}{4\,d\,\sqrt{\cos[c+d\,x]}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{a^2\,(4\,A+7\,B)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\sin[c+d\,x]}{4\,d\,\sqrt{\cos[c+d\,x]}}+\frac{a\,B\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\sin[c+d\,x]}{2\,d\,\sqrt{\cos[c+d\,x]}}$$

Result (type 5, 204 leaves) :

$$\frac{1}{48\,d\,\text{Cos}[c+d\,x]^{3/2}}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-3\,i\,(20\,A+19\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,(20\,A+19\,B)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+3\,\left(2\,B+(4\,A+11\,B)\,\text{Cos}[c+d\,x]+8\,A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 538: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{5/2}\,(38\,A+25\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+$$
$$\frac{a^3\,(54\,A+49\,B)\,\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(2\,A+3\,B)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{a\,B\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 209 leaves):

$$\frac{1}{96\,d\,\text{Cos}[c+d\,x]^{5/2}}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-3\,i\,(38\,A+25\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,(38\,A+25\,B)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(8\,B+2\,(6\,A+17\,B)\,\text{Cos}[c+d\,x]+(66\,A+75\,B)\,\text{Cos}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 539: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 247 leaves, 7 steps):

$$\frac{a^{5/2}\,(200\,A+163\,B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+\frac{a^3\,(104\,A+95\,B)\,\text{Sin}[c+d\,x]}{96\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^3\,(200\,A+163\,B)\,\text{Sin}[c+d\,x]}{64\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(8\,A+11\,B)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{a\,B\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 225 leaves):

$$\frac{1}{768\, d\, \mathrm{Cos}[c+d\,x]^{7/2}} a^2\, (1+\mathrm{Cos}[c+d\,x])^2\, \mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$

$$\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\, \Big(-3\,i\,(200\,A+163\,B)\, e^{\frac{1}{2}\,i\,(c+d\,x)}\, \mathrm{Cos}[c+d\,x]^4\, \mathrm{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right] -$$

$$i\,(200\,A+163\,B)\, e^{\frac{3}{2}\,i\,(c+d\,x)}\, \mathrm{Cos}[c+d\,x]^4\, \mathrm{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right] +$$

$$\left(48\,B+8\,(8\,A+23\,B)\, \mathrm{Cos}[c+d\,x] + (272\,A+326\,B)\, \mathrm{Cos}[c+d\,x]^2 + (600\,A+489\,B)\, \mathrm{Cos}[c+d\,x]^3\right) \mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)$$

- **Problem 540: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{\mathrm{Cos}[c+d\,x]^{5/2}}\, dx$$

Optimal (type 3, 294 leaves, 8 steps):

$$\frac{a^{5/2}\,(326\,A+283\,B)\, \mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right] \sqrt{\mathrm{Cos}[c+d\,x]}\, \sqrt{\mathrm{Sec}[c+d\,x]}}{128\,d} +$$

$$\frac{a^3\,(170\,A+157\,B)\,\mathrm{Sin}[c+d\,x]}{240\,d\,\mathrm{Cos}[c+d\,x]^{7/2}\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}} + \frac{a^3\,(326\,A+283\,B)\,\mathrm{Sin}[c+d\,x]}{192\,d\,\mathrm{Cos}[c+d\,x]^{5/2}\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}} + \frac{a^3\,(326\,A+283\,B)\,\mathrm{Sin}[c+d\,x]}{128\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}} +$$

$$\frac{a^2\,(10\,A+13\,B)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{40\,d\,\mathrm{Cos}[c+d\,x]^{7/2}} + \frac{a\,B\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 244 leaves):

$$\frac{1}{7680\, d\, \mathrm{Cos}[c+d\,x]^{9/2}} a^2\, (1+\mathrm{Cos}[c+d\,x])^2\, \mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$

$$\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\, \Big(-15\,i\,(326\,A+283\,B)\, e^{\frac{1}{2}\,i\,(c+d\,x)}\, \mathrm{Cos}[c+d\,x]^5\, \mathrm{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right] -$$

$$5\,i\,(326\,A+283\,B)\, e^{\frac{3}{2}\,i\,(c+d\,x)}\, \mathrm{Cos}[c+d\,x]^5\, \mathrm{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right] + \Big(384\,B+48\,(10\,A+29\,B)\,\mathrm{Cos}[c+d\,x] +$$

$$8\,(230\,A+283\,B)\,\mathrm{Cos}[c+d\,x]^2 + 10\,(326\,A+283\,B)\,\mathrm{Cos}[c+d\,x]^3 + 15\,(326\,A+283\,B)\,\mathrm{Cos}[c+d\,x]^4\Big)\, \mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)$$

- **Problem 546: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\mathrm{Sec}[c+d\,x]}{\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\, dx$$

Optimal (type 3, 181 leaves, 7 steps):

$$\frac{(2A-B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{\sqrt{a}\,d}+\frac{B\,\text{Sin}[c+d x]}{d\,\text{Cos}[c+d x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 402 leaves) :

$$\frac{1}{4\,d\,\text{Cos}[c+d x]^{3/2}\,\sqrt{a\,(1+\text{Sec}[c+d x])}\,\sqrt{\text{Sin}[c+d x]^2}}\,\text{Sin}[c+d x]\,\Bigg(-\text{Cos}[c+d x]\,\sqrt{1+\text{Cos}[c+d x]}\,\Bigg(2\sqrt{2}\,B\,\text{Log}[1+\text{Cos}[c+d x]]+(8A-4B)\,\text{Log}\left[\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])\right]-$$
$$2\sqrt{2}\,A\,\text{Log}\left[(1+\text{Cos}[c+d x])^2\right]+\sqrt{2}\,B\,\text{Log}\left[(1+\text{Cos}[c+d x])^2\right]-2\sqrt{2}\,B\,\text{Log}\left[2\sqrt{1+\text{Cos}[c+d x]}+\sqrt{2-2\,\text{Cos}[c+d x]^2}\right]-$$
$$8A\,\text{Log}\left[1+\text{Cos}[c+d x]+\sqrt{1+\text{Cos}[c+d x]}\,\sqrt{\text{Sin}[c+d x]^2}\right]+4B\,\text{Log}\left[1+\text{Cos}[c+d x]+\sqrt{1+\text{Cos}[c+d x]}\,\sqrt{\text{Sin}[c+d x]^2}\right]+$$
$$2\sqrt{2}\,A\,\text{Log}\left[3+2\,\text{Cos}[c+d x]-\text{Cos}[c+d x]^2+2\sqrt{2}\,\sqrt{1+\text{Cos}[c+d x]}\,\sqrt{\text{Sin}[c+d x]^2}\right]-$$
$$\sqrt{2}\,B\,\text{Log}\left[3+2\,\text{Cos}[c+d x]-\text{Cos}[c+d x]^2+2\sqrt{2}\,\sqrt{1+\text{Cos}[c+d x]}\,\sqrt{\text{Sin}[c+d x]^2}\right]\Bigg)+4B\sqrt{\text{Sin}[c+d x]^2}\Bigg)$$

- **Problem 547: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]}{\text{Cos}[c+d x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 230 leaves, 8 steps) :

$$-\frac{(4A-7B)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{4\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{\sqrt{a}\,d}+$$
$$\frac{B\,\text{Sin}[c+d x]}{2\,d\,\text{Cos}[c+d x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{(4A-B)\,\text{Sin}[c+d x]}{4\,d\,\text{Cos}[c+d x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 481 leaves) :

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(B\,\text{Sec}[c+d x]^2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2}\text{Sec}[c+d x]\left(4 A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\Big/$$
$$\left(d\sqrt{\text{Cos}[c+d x]}\sqrt{a(1+\text{Sec}[c+d x])}\right)+\frac{1}{8 d\sqrt{a(1+\text{Sec}[c+d x])}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}$$
$$\left(-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}\sqrt{2}(4 A-B)\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}\left(\text{Log}[1+\text{Cos}[c+d x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d x]}+\sqrt{2-2\,\text{Cos}[c+d x]^2}\right]\right)\right.$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]-\frac{1}{2\sqrt{1-\text{Cos}[c+d x]^2}}(-4 A+7 B)\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}$$
$$\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d x])^2\right]+4\,\text{Log}\left[\sqrt{\text{Cos}[c+d x]}+\text{Cos}[c+d x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d x]+\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]+\right.$$
$$\left.\left.\sqrt{2}\,\text{Log}\left[3+2\,\text{Cos}[c+d x]-\text{Cos}[c+d x]^2+2\sqrt{2}\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]\right)$$

- **Problem 560: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]}{\text{Cos}[c+d x]^{5/2}(a+a\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 234 leaves, 8 steps):

$$\frac{2 B\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{a^{5/2} d}+\frac{(3 A-43 B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{16\sqrt{2}\,a^{5/2} d}+$$
$$\frac{(A-B)\,\text{Sin}[c+d x]}{4 d\,\text{Cos}[c+d x]^{5/2}(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{(3 A-11 B)\,\text{Sin}[c+d x]}{16 a d\,\text{Cos}[c+d x]^{3/2}(a+a\,\text{Sec}[c+d x])^{3/2}}$$

Result (type 3, 505 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \left(\frac{1}{4}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \left(3 A \text{Sin}\left[\frac{1}{2}(c+d x)\right]-11 B \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \left(A \text{Sin}\left[\frac{1}{2}(c+d x)\right]-B \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\Big/$$

$$\left(d \text{Cos}[c+d x]^{5/2} (a (1+\text{Sec}[c+d x]))^{5/2}\right)+\frac{1}{8 d (a (1+\text{Sec}[c+d x]))^{5/2}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \text{Sec}[c+d x]^{5/2}$$

$$\left(-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}\sqrt{2}\,(3 A-11 B)\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}\left(\text{Log}[1+\text{Cos}[c+d x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d x]}+\sqrt{2-2\text{Cos}[c+d x]^2}\right]\right)\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}16 B\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}$$

$$\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d x])^2\right]+4\text{Log}\left[\sqrt{\text{Cos}[c+d x]}+\text{Cos}[c+d x]^{3/2}\right]-4\text{Log}\left[1+\text{Cos}[c+d x]+\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]+\right.$$

$$\left.\left.\sqrt{2}\,\text{Log}\left[3+2\text{Cos}[c+d x]-\text{Cos}[c+d x]^2+2\sqrt{2}\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]\right)$$

- **Problem 578: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]}{\text{Cos}[c+d x]^{3/2}(a+b\,\text{Sec}[c+d x])}\,dx$$

Optimal (type 4, 86 leaves, 6 steps):

$$-\frac{2 B\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{b d}+\frac{2(A b-a B)\,\text{EllipticPi}\left[\frac{2 a}{a+b},\frac{1}{2}(c+d x),2\right]}{b(a+b) d}+\frac{2 B\,\text{Sin}[c+d x]}{b d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 4, 208 leaves):

$$\frac{1}{2 b d}\left(\frac{2(2 A b-3 a B)\,\text{EllipticPi}\left[\frac{2 a}{a+b},\frac{1}{2}(c+d x),2\right]}{a+b}-\frac{2 b B\left(2\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]-\frac{2 b\,\text{EllipticPi}\left[\frac{2 a}{a+b},\frac{1}{2}(c+d x),2\right]}{a+b}\right)}{a}+\right.$$

$$\frac{4 B\,\text{Sin}[c+d x]}{\sqrt{\text{Cos}[c+d x]}}+1\Big/\left(a b\sqrt{\text{Sin}[c+d x]^2}\right)2 B\left(2 a b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d x]}\right],-1\right]-\right.$$

$$\left.\left.2 b(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d x]}\right],-1\right]+\left(a^2-2 b^2\right)\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d x]}\right],-1\right]\right)\text{Sin}[c+d x]\right)$$

Problem 594: Unable to integrate problem.

$$\int \cos[c+d x]^{7/2} \sqrt{a+b \sec[c+d x]}\ (A+B \sec[c+d x])\, dx$$

Optimal (type 4, 343 leaves, 11 steps):

$$\frac{2 \left(a^2-b^2\right) \left(25 a^2 A+8 A b^2-14 a b B\right) \sqrt{\frac{b+a \cos[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{105 a^3 d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+$$

$$\frac{2 \left(19 a^2 A b+8 A b^3+63 a^3 B-14 a b^2 B\right) \sqrt{\cos[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \sec[c+d x]}}{105 a^3 d \sqrt{\frac{b+a \cos[c+d x]}{a+b}}}+$$

$$\frac{2 \left(25 a^2 A-4 A b^2+7 a b B\right) \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}\ \sin[c+d x]}{105 a^2 d}+$$

$$\frac{2 (A b+7 a B) \cos[c+d x]^{3/2} \sqrt{a+b \sec[c+d x]}\ \sin[c+d x]}{35 a d}+\frac{2 A \cos[c+d x]^{5/2} \sqrt{a+b \sec[c+d x]}\ \sin[c+d x]}{7 d}$$

Result (type 8, 37 leaves):

$$\int \cos[c+d x]^{7/2} \sqrt{a+b \sec[c+d x]}\ (A+B \sec[c+d x])\, dx$$

Problem 595: Unable to integrate problem.

$$\int \cos[c+d x]^{5/2} \sqrt{a+b \sec[c+d x]}\ (A+B \sec[c+d x])\, dx$$

Optimal (type 4, 267 leaves, 10 steps):

$$-\frac{2 \left(a^2-b^2\right) (2 A b-5 a B) \sqrt{\frac{b+a \cos[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{15 a^2 d \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}}+$$

$$\frac{2 \left(9 a^2 A-2 A b^2+5 a b B\right) \sqrt{\cos[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \sec[c+d x]}}{15 a^2 d \sqrt{\frac{b+a \cos[c+d x]}{a+b}}}+$$

$$\frac{2 (A b+5 a B) \sqrt{\cos[c+d x]} \sqrt{a+b \sec[c+d x]}\ \sin[c+d x]}{15 a d}+\frac{2 A \cos[c+d x]^{3/2} \sqrt{a+b \sec[c+d x]}\ \sin[c+d x]}{5 d}$$

Result (type 8, 37 leaves):

$$\int \cos[c+d x]^{5/2} \sqrt{a+b \sec[c+d x]}\ (A+B \sec[c+d x])\, dx$$

Problem 596: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \, (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 201 leaves, 9 steps):

$$\frac{2 A \left(a^2-b^2\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}} + \frac{2 (A b+3 a B) \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{3 a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}} + \frac{2 A \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \, \text{Sin}[c+d x]}{3 d}$$

Result (type 8, 37 leaves):

$$\int \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \, (A+B \text{Sec}[c+d x]) \, dx$$

Problem 597: Unable to integrate problem.

$$\int \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \, (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 208 leaves, 12 steps):

$$\frac{2 a B \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}} + \frac{2 b B \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \, \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}} + \frac{2 A \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

Result (type 8, 37 leaves):

$$\int \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \, (A+B \text{Sec}[c+d x]) \, dx$$

Problem 598: Unable to integrate problem.

$$\int \frac{\sqrt{a+b \text{Sec}[c+d x]} \, (A+B \text{Sec}[c+d x])}{\sqrt{\text{Cos}[c+d x]}} \, dx$$

Optimal (type 4, 253 leaves, 13 steps):

$$\frac{(2 a A+b B) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \text{ EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{(2 A b+a B) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \text{ EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{B \sqrt{\operatorname{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}+\frac{B \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{\sqrt{a+b \operatorname{Sec}[c+d x]} (A+B \operatorname{Sec}[c+d x])}{\sqrt{\operatorname{Cos}[c+d x]}} dx$$

Problem 599: Unable to integrate problem.

$$\int \frac{\sqrt{a+b \operatorname{Sec}[c+d x]} (A+B \operatorname{Sec}[c+d x])}{\operatorname{Cos}[c+d x]^{3/2}} dx$$

Optimal (type 4, 336 leaves, 14 steps):

$$\frac{(4 A b+3 a B) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \text{ EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{4 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{\left(4 a A b-a^2 B+4 b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \text{ EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{4 b d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{(4 A b+a B) \sqrt{\operatorname{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{4 b d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}+\frac{B \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{2 d \operatorname{Cos}[c+d x]^{3/2}}+\frac{(4 A b+a B) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 b d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{\sqrt{a+b \operatorname{Sec}[c+d x]} (A+B \operatorname{Sec}[c+d x])}{\operatorname{Cos}[c+d x]^{3/2}} dx$$

Problem 600: Unable to integrate problem.

$$\int \operatorname{Cos}[c+d x]^{9/2} (a+b \operatorname{Sec}[c+d x])^{3/2} (A+B \operatorname{Sec}[c+d x]) dx$$

Optimal (type 4, 427 leaves, 12 steps):

$$\frac{2\left(a^2-b^2\right)\left(39 a^2 A b+8 A b^3+75 a^3 B-18 a b^2 B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{315 a^3 d\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{1}{315 a^3 d\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}}$$

$$2\left(147 a^4 A+33 a^2 A b^2+8 A b^4+246 a^3 b B-18 a b^3 B\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d x]}+$$

$$\frac{2\left(88 a^2 A b-4 A b^3+75 a^3 B+9 a b^2 B\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{315 a^2 d}+$$

$$\frac{2\left(49 a^2 A+3 A b^2+72 a b B\right)\text{Cos}[c+d x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{315 a d}+$$

$$\frac{2(10 A b+9 a B)\,\text{Cos}[c+d x]^{5/2}\sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{63 d}+\frac{2 a A\,\text{Cos}[c+d x]^{7/2}\sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{9 d}$$

Result (type 8, 37 leaves) :

$$\int \text{Cos}[c+d x]^{9/2}(a+b\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x])\,dx$$

- **Problem 601: Unable to integrate problem.**

$$\int \text{Cos}[c+d x]^{7/2}(a+b\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Optimal (type 4, 342 leaves, 11 steps) :

$$\frac{2\left(a^2-b^2\right)\left(25 a^2 A-6 A b^2+21 a b B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{105 a^2 d\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}}+$$

$$\frac{2\left(82 a^2 A b-6 A b^3+63 a^3 B+21 a b^2 B\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d x]}}{105 a^2 d\sqrt{\frac{b+a\,\text{Cos}[c+d x]}{a+b}}}+$$

$$\frac{2\left(25 a^2 A+3 A b^2+42 a b B\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{105 a d}+$$

$$\frac{2(8 A b+7 a B)\,\text{Cos}[c+d x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{35 d}+\frac{2 a A\,\text{Cos}[c+d x]^{5/2}\sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{7 d}$$

Result (type 8, 37 leaves) :

$$\int \text{Cos}[c+d x]^{7/2}(a+b\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x])\,dx$$

Problem 602: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 266 leaves, 10 steps):

$$\frac{2 \left(a^2-b^2\right) (3 A b+5 a B) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{15 a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 \left(9 a^2 A+3 A b^2+20 a b B\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{15 a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 (6 A b+5 a B) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{15 d}+\frac{2 a A \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{5 d}$$

Result (type 8, 37 leaves):

$$\int \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} (A+B \text{Sec}[c+d x]) \, dx$$

Problem 603: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{3/2} (a+b \text{Sec}[c+d x])^{3/2} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 276 leaves, 13 steps):

$$\frac{2 \left(a^2 A-A b^2+3 a b B\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 b^2 B \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 (4 A b+3 a B) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{3 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 a A \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d}$$

Result (type 8, 37 leaves):

$$\int \text{Cos}[c+d x]^{3/2} (a+b \text{Sec}[c+d x])^{3/2} (A+B \text{Sec}[c+d x]) \, dx$$

Problem 604: Unable to integrate problem.

$$\int \sqrt{\text{Cos}[c+d x]} (a+b \text{Sec}[c+d x])^{3/2} (A+B \text{Sec}[c+d x]) \, dx$$

Optimal (type 4, 272 leaves, 13 steps):

$$\frac{\left(2\,a\,A\,b+2\,a^2\,B+b^2\,B\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+\frac{b\,(2\,A\,b+3\,a\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{(2\,a\,A-b\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}}+\frac{b\,B\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 8, 37 leaves):

$$\int\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]\right)\,dx$$

- **Problem 605: Unable to integrate problem.**

$$\int\frac{\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 339 leaves, 14 steps):

$$\frac{\left(8\,a^2\,A+4\,A\,b^2+7\,a\,b\,B\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{4\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+\frac{\left(12\,a\,A\,b+3\,a^2\,B+4\,b^2\,B\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{4\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{(4\,A\,b+5\,a\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{4\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{b\,B\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{2\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{(4\,A\,b+5\,a\,B)\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{4\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 8, 37 leaves):

$$\int\frac{\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

- **Problem 606: Unable to integrate problem.**

$$\int\frac{\left(a+b\,\mathrm{Sec}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]\right)}{\mathrm{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 421 leaves, 15 steps):

$$\frac{\left(42\,a\,A\,b+17\,a^2\,B+16\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(6\,a^2\,A\,b+8\,A\,b^3-a^3\,B+12\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{8\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{b\,B\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$

$$\frac{(6\,A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{24\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 37 leaves) :

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\,(A+B\,\text{Sec}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Problem 607: Unable to integrate problem.

$$\int\text{Cos}[c+d\,x]^{11/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 519 leaves, 13 steps) :

$$\left(2\left(a^2-b^2\right)\left(675 a^4 A+285 a^2 A b^2+40 A b^4+1254 a^3 b B-110 a b^3 B\right)\sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\right)\Big/$$

$$\left(3465 a^3 d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}\right)+\frac{1}{3465 a^3 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

$$2\left(3705 a^4 A b+255 a^2 A b^3+40 A b^5+1617 a^5 B+3069 a^3 b^2 B-110 a b^4 B\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \text{Sec}[c+d x]}+$$

$$\frac{1}{3465 a^2 d}2\left(675 a^4 A+1025 a^2 A b^2-20 A b^4+1793 a^3 b B+55 a b^3 B\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]+$$

$$\frac{2\left(1145 a^2 A b+15 A b^3+539 a^3 B+825 a b^2 B\right)\text{Cos}[c+d x]^{3/2}\sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3465 a d}+$$

$$\frac{2\left(81 a^2 A+113 A b^2+209 a b B\right)\text{Cos}[c+d x]^{5/2}\sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{693 d}+$$

$$\frac{2 a (14 A b+11 a B)\text{Cos}[c+d x]^{7/2}\sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{99 d}+\frac{2 a A \text{Cos}[c+d x]^{9/2}(a+b \text{Sec}[c+d x])^{3/2}\text{Sin}[c+d x]}{11 d}$$

Result (type 8, 37 leaves):

$$\int \text{Cos}[c+d x]^{11/2}(a+b \text{Sec}[c+d x])^{5/2}(A+B \text{Sec}[c+d x])\, dx$$

- **Problem 608: Unable to integrate problem.**

$$\int \text{Cos}[c+d x]^{9/2}(a+b \text{Sec}[c+d x])^{5/2}(A+B \text{Sec}[c+d x])\, dx$$

Optimal (type 4, 425 leaves, 12 steps):

$$\frac{2\left(a^2-b^2\right)\left(114 a^2 A b-10 A b^3+75 a^3 B+45 a b^2 B\right)\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{315 a^2 d \sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{1}{315 a^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$2\left(147 a^4 A+279 a^2 A b^2-10 A b^4+435 a^3 b B+45 a b^3 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \operatorname{Sec}[c+d x]}+$$

$$\frac{2\left(163 a^2 A b+5 A b^3+75 a^3 B+135 a b^2 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{315 a d}+$$

$$\frac{2\left(49 a^2 A+75 A b^2+135 a b B\right)\operatorname{Cos}[c+d x]^{3/2}\sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{315 d}+$$

$$\frac{2 a(4 A b+3 a B)\operatorname{Cos}[c+d x]^{5/2}\sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{21 d}+\frac{2 a A \operatorname{Cos}[c+d x]^{7/2}(a+b \operatorname{Sec}[c+d x])^{3/2}\operatorname{Sin}[c+d x]}{9 d}$$

Result (type 8, 37 leaves):

$$\int \operatorname{Cos}[c+d x]^{9/2}(a+b \operatorname{Sec}[c+d x])^{5/2}(A+B \operatorname{Sec}[c+d x])\, dx$$

- **Problem 609: Unable to integrate problem.**

$$\int \operatorname{Cos}[c+d x]^{7/2}(a+b \operatorname{Sec}[c+d x])^{5/2}(A+B \operatorname{Sec}[c+d x])\, dx$$

Optimal (type 4, 340 leaves, 11 steps):

$$\frac{2\left(a^2-b^2\right)\left(25 a^2 A+15 A b^2+56 a b B\right)\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{105 a d \sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{1}{105 a d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$2\left(145 a^2 A b+15 A b^3+63 a^3 B+161 a b^2 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \operatorname{Sec}[c+d x]}+$$

$$\frac{2\left(25 a^2 A+45 A b^2+77 a b B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{105 d}+$$

$$\frac{2 a(10 A b+7 a B)\operatorname{Cos}[c+d x]^{3/2}\sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{35 d}+\frac{2 a A \operatorname{Cos}[c+d x]^{5/2}(a+b \operatorname{Sec}[c+d x])^{3/2}\operatorname{Sin}[c+d x]}{7 d}$$

Result (type 8, 37 leaves):

$$\int \operatorname{Cos}[c+d x]^{7/2}(a+b \operatorname{Sec}[c+d x])^{5/2}(A+B \operatorname{Sec}[c+d x])\, dx$$

Problem 610: Unable to integrate problem.

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 342 leaves, 14 steps):

$$\frac{2\left(8\,a^2\,A\,b-8\,A\,b^3+5\,a^3\,B+10\,a\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,b^3\,B\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\frac{2\left(9\,a^2\,A+23\,A\,b^2+35\,a\,b\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{15\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$
$$\frac{2\,a\,(8\,A\,b+5\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 8, 37 leaves):

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Problem 611: Unable to integrate problem.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Optimal (type 4, 349 leaves, 14 steps):

$$\frac{\left(2\,a^3\,A+4\,a\,A\,b^2+12\,a^2\,b\,B+3\,b^3\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{b^2\,(2\,A\,b+5\,a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\frac{\left(14\,a\,A\,b+6\,a^2\,B-3\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$
$$\frac{b\,(2\,a\,A-3\,b\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{\text{Cos}[c+d\,x]}\;(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 8, 37 leaves):

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,(A+B\,\text{Sec}[c+d\,x])\,dx$$

Problem 612: Unable to integrate problem.

$$\int \sqrt{\text{Cos}[c+d x]}\ (a+b\,\text{Sec}[c+d x])^{5/2}\ (A+B\,\text{Sec}[c+d x])\ dx$$

Optimal (type 4, 359 leaves, 14 steps):

$$\frac{\left(16 a^2 A b+4 A b^3+8 a^3 B+11 a b^2 B\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{4 d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{b \left(20 a A b+15 a^2 B+4 b^2 B\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{4 d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{\left(8 a^2 A-4 A b^2-9 a b B\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right] \sqrt{a+b\,\text{Sec}[c+d x]}}{4 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{b (4 A b+7 a B) \sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{4 d \sqrt{\text{Cos}[c+d x]}}+\frac{b B (a+b\,\text{Sec}[c+d x])^{3/2}\ \text{Sin}[c+d x]}{2 d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int \sqrt{\text{Cos}[c+d x]}\ (a+b\,\text{Sec}[c+d x])^{5/2}\ (A+B\,\text{Sec}[c+d x])\ dx$$

Problem 613: Unable to integrate problem.

$$\int \frac{(a+b\,\text{Sec}[c+d x])^{5/2}\ (A+B\,\text{Sec}[c+d x])}{\sqrt{\text{Cos}[c+d x]}}\ dx$$

Optimal (type 4, 422 leaves, 15 steps):

$$\frac{\left(48 a^3 A+66 a A b^2+59 a^2 b B+16 b^3 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{24 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(30 a^2 A b+8 A b^3+5 a^3 B+20 a b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{8 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\frac{\left(54 a A b+33 a^2 B+16 b^2 B\right) \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{24 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}+\frac{b(2 A b+3 a B) \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{4 d \operatorname{Cos}[c+d x]^{3/2}}+$$

$$\frac{\left(54 a A b+33 a^2 B+16 b^2 B\right) \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{24 d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{b B(a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{3 d \operatorname{Cos}[c+d x]^{3/2}}$$

Result (type 8, 37 leaves) :

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{5/2}(A+B \operatorname{Sec}[c+d x])}{\sqrt{\operatorname{Cos}[c+d x]}} \, dx$$

- **Problem 614: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{5/2}(A+B \operatorname{Sec}[c+d x])}{\operatorname{Cos}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 513 leaves, 16 steps) :

$$\frac{\left(472 a^2 A b+128 A b^3+133 a^3 B+356 a b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{192 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(40 a^3 A b+160 a A b^3-5 a^4 B+120 a^2 b^2 B+48 b^4 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{64 b d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{1}{192 b d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$\left(264 a^2 A b+128 A b^3+15 a^3 B+284 a b^2 B\right) \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}+$$

$$\frac{b (8 A b+11 a B) \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{24 d \operatorname{Cos}[c+d x]^{5/2}}+\frac{\left(104 a A b+59 a^2 B+36 b^2 B\right) \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{96 d \operatorname{Cos}[c+d x]^{3/2}}+$$

$$\frac{\left(264 a^2 A b+128 A b^3+15 a^3 B+284 a b^2 B\right) \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{192 b d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{b B (a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{4 d \operatorname{Cos}[c+d x]^{5/2}}$$

Result (type 1, 1 leaves) :

???

Problem 615: Unable to integrate problem.

$$\int \frac{\operatorname{Cos}[c+d x]^{5/2} (A+B \operatorname{Sec}[c+d x])}{\sqrt{a+b \operatorname{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 280 leaves, 10 steps) :

$$-\frac{2 \left(7 a^2 A b+8 A b^3-5 a^3 B-10 a b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{15 a^3 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{2 \left(9 a^2 A+8 A b^2-10 a b B\right) \sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{15 a^3 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}-$$

$$\frac{2 (4 A b-5 a B) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{15 a^2 d}+\frac{2 A \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{5 a d}$$

Result (type 8, 37 leaves) :

$$\int \frac{\operatorname{Cos}[c+d x]^{5/2} (A+B \operatorname{Sec}[c+d x])}{\sqrt{a+b \operatorname{Sec}[c+d x]}} \, dx$$

Problem 616: Unable to integrate problem.

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 212 leaves, 9 steps):

$$\frac{2 \left(a^2 A+2 A b^2-3 a b B\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{3 a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}-\frac{2 (2 A b-3 a B) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{3 a^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 A \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 a d}$$

Result (type 8, 37 leaves):

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Problem 617: Unable to integrate problem.

$$\int \frac{\sqrt{\text{Cos}[c+d x]} (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 150 leaves, 8 steps):

$$-\frac{2 (A b-a B) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 A \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

Result (type 8, 37 leaves):

$$\int \frac{\sqrt{\text{Cos}[c+d x]} (A+B \text{Sec}[c+d x])}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Problem 618: Unable to integrate problem.

$$\int \frac{A+B \text{Sec}[c+d x]}{\sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 138 leaves, 8 steps):

$$\frac{2\,A\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticF\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{Cos[c+d\,x]}\,\sqrt{a+b\,Sec[c+d\,x]}}+\frac{2\,B\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticPi\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{Cos[c+d\,x]}\,\sqrt{a+b\,Sec[c+d\,x]}}$$

Result (type 8, 37 leaves) :

$$\int\frac{A+B\,Sec[c+d\,x]}{\sqrt{Cos[c+d\,x]}\,\sqrt{a+b\,Sec[c+d\,x]}}\,dx$$

Problem 619: Unable to integrate problem.

$$\int\frac{A+B\,Sec[c+d\,x]}{Cos[c+d\,x]^{3/2}\,\sqrt{a+b\,Sec[c+d\,x]}}\,dx$$

Optimal (type 4, 256 leaves, 13 steps) :

$$\frac{B\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticF\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{Cos[c+d\,x]}\,\sqrt{a+b\,Sec[c+d\,x]}}+\frac{(2\,A\,b-a\,B)\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticPi\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b\,d\,\sqrt{Cos[c+d\,x]}\,\sqrt{a+b\,Sec[c+d\,x]}}-$$

$$\frac{B\,\sqrt{Cos[c+d\,x]}\;EllipticE\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,Sec[c+d\,x]}}{b\,d\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}}+\frac{B\,\sqrt{a+b\,Sec[c+d\,x]}\;Sin[c+d\,x]}{b\,d\,\sqrt{Cos[c+d\,x]}}$$

Result (type 8, 37 leaves) :

$$\int\frac{A+B\,Sec[c+d\,x]}{Cos[c+d\,x]^{3/2}\,\sqrt{a+b\,Sec[c+d\,x]}}\,dx$$

Problem 620: Unable to integrate problem.

$$\int\frac{A+B\,Sec[c+d\,x]}{Cos[c+d\,x]^{5/2}\,\sqrt{a+b\,Sec[c+d\,x]}}\,dx$$

Optimal (type 4, 344 leaves, 14 steps) :

$$\frac{(4\,A\,b-a\,B)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{4\,b\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-\frac{\left(4\,a\,A\,b-3\,a^2\,B-4\,b^2\,B\right)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{4\,b^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{(4\,A\,b-3\,a\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{4\,b^2\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{B\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{2\,b\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{(4\,A\,b-3\,a\,B)\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{4\,b^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 8, 37 leaves) :

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]}{\mathrm{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}\,dx$$

- **Problem 621: Unable to integrate problem.**

$$\int\frac{\mathrm{Cos}[c+d\,x]^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 423 leaves, 11 steps) :

$$-\frac{2\,\left(12\,a^2\,A\,b+48\,A\,b^3-5\,a^3\,B-40\,a\,b^2\,B\right)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{15\,a^4\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\left(2\,\left(9\,a^4\,A+24\,a^2\,A\,b^2-48\,A\,b^4-25\,a^3\,b\,B+40\,a\,b^3\,B\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)\Big/$$

$$\left(15\,a^4\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)+\frac{2\,b\,(A\,b-a\,B)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{2\,\left(9\,a^2\,A\,b-24\,A\,b^3-5\,a^3\,B+20\,a\,b^2\,B\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{15\,a^3\,\left(a^2-b^2\right)\,d}+$$

$$\frac{2\,\left(a^2\,A-6\,A\,b^2+5\,a\,b\,B\right)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{5\,a^2\,\left(a^2-b^2\right)\,d}$$

Result (type 8, 37 leaves) :

$$\int\frac{\mathrm{Cos}[c+d\,x]^{5/2}\,(A+B\,\mathrm{Sec}[c+d\,x])}{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}\,dx$$

Problem 622: Unable to integrate problem.

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 326 leaves, 10 steps):

$$\frac{2 \left(a^2 A+8 A b^2-6 a b B\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 a^3 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}} - \frac{2 \left(5 a^2 A b-8 A b^3-3 a^3 B+6 a b^2 B\right) \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{3 a^3 \left(a^2-b^2\right) d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}} + \frac{2 b (A b-a B) \sqrt{\text{Cos}[c+d x]} \, \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}} + \frac{2 \left(a^2 A-4 A b^2+3 a b B\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \, \text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right) d}$$

Result (type 8, 37 leaves):

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Problem 623: Unable to integrate problem.

$$\int \frac{\sqrt{\text{Cos}[c+d x]} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 235 leaves, 9 steps):

$$-\frac{2 (2 A b-a B) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \, \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}} + \frac{2 \left(a^2 A-2 A b^2+a b B\right) \sqrt{\text{Cos}[c+d x]} \, \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{a^2 \left(a^2-b^2\right) d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}} + \frac{2 b (A b-a B) \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{\sqrt{\text{Cos}[c+d x]} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Problem 624: Unable to integrate problem.

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{\sqrt{\operatorname{Cos}[c + d x]}\ (a + b \operatorname{Sec}[c + d x])^{3/2}}\, dx$$

Optimal (type 4, 215 leaves, 9 steps):

$$\frac{2 A \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 a}{a+b}\right]}{a d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}} + \frac{2 (A b - a B) \sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 a}{a+b}\right] \sqrt{a + b \operatorname{Sec}[c + d x]}}{a \left(a^2 - b^2\right) d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}} - \frac{2 (A b - a B) \operatorname{Sin}[c + d x]}{\left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{\sqrt{\operatorname{Cos}[c + d x]}\ (a + b \operatorname{Sec}[c + d x])^{3/2}}\, dx$$

Problem 625: Unable to integrate problem.

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{\operatorname{Cos}[c + d x]^{3/2}\ (a + b \operatorname{Sec}[c + d x])^{3/2}}\, dx$$

Optimal (type 4, 220 leaves, 10 steps):

$$\frac{2 B \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 a}{a+b}\right]}{b d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}} - \frac{2 (A b - a B) \sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 a}{a+b}\right] \sqrt{a + b \operatorname{Sec}[c + d x]}}{b \left(a^2 - b^2\right) d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}} + \frac{2 a (A b - a B) \operatorname{Sin}[c + d x]}{b \left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{\operatorname{Cos}[c + d x]^{3/2}\ (a + b \operatorname{Sec}[c + d x])^{3/2}}\, dx$$

Problem 626: Unable to integrate problem.

$$\int \frac{A + B \operatorname{Sec}[c + d x]}{\operatorname{Cos}[c + d x]^{5/2}\ (a + b \operatorname{Sec}[c + d x])^{3/2}}\, dx$$

Optimal (type 4, 371 leaves, 14 steps):

$$\frac{B\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{(2\,A\,b-3\,a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(2\,a\,A\,b-3\,a^2\,B+b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b^2\left(a^2-b^2\right)d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,a\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\left(2\,a\,A\,b-3\,a^2\,B+b^2\,B\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\left(a^2-b^2\right)d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 37 leaves) :

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

- **Problem 627: Attempted integration timed out after 120 seconds.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 487 leaves, 15 steps) :

$$\frac{(4\,A\,b-5\,a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{4\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\left(12\,a\,A\,b-15\,a^2\,B-4\,b^2\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{4\,b^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(12\,a^2\,A\,b-4\,A\,b^3-15\,a^3\,B+7\,a\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,b^3\left(a^2-b^2\right)d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,a\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{\left(4\,a\,A\,b-5\,a^2\,B+b^2\,B\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{2\,b^2\left(a^2-b^2\right)d\,\text{Cos}[c+d\,x]^{3/2}}+$$

$$\frac{\left(12\,a^2\,A\,b-4\,A\,b^3-15\,a^3\,B+7\,a\,b^2\,B\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,b^3\left(a^2-b^2\right)d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 1, 1 leaves) :

???

Problem 628: Unable to integrate problem.

$$\int \frac{\text{Cos}[c+d x]^{5/2} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 588 leaves, 12 steps):

$$-\left(2 \left(17 a^4 A b+116 a^2 A b^3-128 A b^5-5 a^5 B-80 a^3 b^2 B+80 a b^4 B\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]\right) \Big/ \left(15 a^5 \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}\right)+\left(2 \left(9 a^6 A+55 a^4 A b^2-212 a^2 A b^4+128 A b^6-40 a^5 b B+140 a^3 b^3 B-80 a b^5 B\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}\right) \Big/ \left(15 a^5 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\right)+\frac{2 b (A b-a B) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}}+\frac{2 b \left(12 a^2 A b-8 A b^3-9 a^3 B+5 a b^2 B\right) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}-\frac{1}{15 a^4 \left(a^2-b^2\right)^2 d} 2 \left(14 a^4 A b-98 a^2 A b^3+64 A b^5-5 a^5 B+65 a^3 b^2 B-40 a b^4 B\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]+\frac{2 \left(3 a^4 A-71 a^2 A b^2+48 A b^4+50 a^3 b B-30 a b^3 B\right) \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{15 a^3 \left(a^2-b^2\right)^2 d}$$

Result (type 8, 37 leaves):

$$\int \frac{\text{Cos}[c+d x]^{5/2} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Problem 629: Unable to integrate problem.

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \text{Sec}[c+d x])}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 472 leaves, 11 steps):

$$\frac{2\left(a^4 A+16 a^2 A b^2-16 A b^4-9 a^3 b B+8 a b^3 B\right)\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{3 a^4\left(a^2-b^2\right) d\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\left(2\left(8 a^4 A b-28 a^2 A b^3+16 A b^5-3 a^5 B+15 a^3 b^2 B-8 a b^4 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \operatorname{Sec}[c+d x]}\right)\Big/$$

$$\left(3 a^4\left(a^2-b^2\right)^2 d\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\right)+\frac{2 b(A b-a B)\sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d(a+b \operatorname{Sec}[c+d x])^{3/2}}+$$

$$\frac{2 b\left(10 a^2 A b-6 A b^3-7 a^3 B+3 a b^2 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d\sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{2\left(a^4 A-13 a^2 A b^2+8 A b^4+8 a^3 b B-4 a b^3 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{3 a^3\left(a^2-b^2\right)^2 d}$$

Result (type 8, 37 leaves):

$$\int\frac{\operatorname{Cos}[c+d x]^{3/2}(A+B \operatorname{Sec}[c+d x])}{(a+b \operatorname{Sec}[c+d x])^{5/2}}\,dx$$

Problem 630: Unable to integrate problem.

$$\int\frac{\sqrt{\operatorname{Cos}[c+d x]}\ (A+B \operatorname{Sec}[c+d x])}{(a+b \operatorname{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 368 leaves, 10 steps):

$$-\frac{2\left(9 a^2 A b-8 A b^3-3 a^3 B+2 a b^2 B\right)\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{3 a^3\left(a^2-b^2\right) d\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\left(2\left(3 a^4 A-15 a^2 A b^2+8 A b^4+6 a^3 b B-2 a b^3 B\right)\sqrt{\operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \operatorname{Sec}[c+d x]}\right)\Big/$$

$$\left(3 a^3\left(a^2-b^2\right)^2 d\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\right)+\frac{2 b(A b-a B) \operatorname{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d\sqrt{\operatorname{Cos}[c+d x]}\ (a+b \operatorname{Sec}[c+d x])^{3/2}}+\frac{2 b\left(8 a^2 A b-4 A b^3-5 a^3 B+a b^2 B\right) \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int\frac{\sqrt{\operatorname{Cos}[c+d x]}\ (A+B \operatorname{Sec}[c+d x])}{(a+b \operatorname{Sec}[c+d x])^{5/2}}\,dx$$

Problem 631: Unable to integrate problem.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Sec}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 346 leaves, 10 steps):

$$\frac{2\left(3\,a^2\,A-2\,A\,b^2-a\,b\,B\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,a^2\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\frac{2\left(6\,a^2\,A\,b-2\,A\,b^3-3\,a^3\,B-a\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$
$$\frac{2\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{3\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Sec}[c+d\,x]\right)^{3/2}}-\frac{2\left(5\,a^2\,A\,b-A\,b^3-2\,a^3\,B-2\,a\,b^2\,B\right)\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Sec}[c+d\,x]\right)^{5/2}}\,dx$$

Problem 632: Unable to integrate problem.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,\left(a+b\,\text{Sec}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 329 leaves, 10 steps):

$$-\frac{2\,(A\,b-a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,a\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$
$$\frac{2\left(3\,a^2\,A+A\,b^2-4\,a\,b\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$
$$\frac{2\,a\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Sec}[c+d\,x]\right)^{3/2}}+\frac{2\left(2\,a^2\,A\,b+2\,A\,b^3+a^3\,B-5\,a\,b^2\,B\right)\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Problem 633: Unable to integrate problem.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 399 leaves, 14 steps):

$$\frac{2\,(A\,b-a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,b\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,B\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,\left(4\,A\,b^3+3\,a^3\,B-7\,a\,b^2\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,a\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{2\,a\,\left(4\,A\,b^3+3\,a^3\,B-7\,a\,b^2\,B\right)\,\text{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Problem 634: Attempted integration timed out after 120 seconds.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 526 leaves, 15 steps):

$$-\frac{\left(2 a A b-5 a^2 B+3 b^2 B\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{3 b^2\left(a^2-b^2\right) d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{(2 A b-5 a B) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{b^3 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\left(\left(6 a^3 A b-14 a A b^3-15 a^4 B+26 a^2 b^2 B-3 b^4 B\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}\right) /$$

$$\left(3 b^3\left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\right)+\frac{2 a(A b-a B) \operatorname{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d \operatorname{Cos}[c+d x]^{5/2}(a+b \operatorname{Sec}[c+d x])^{3/2}}+$$

$$\frac{2 a\left(2 a^2 A b-6 A b^3-5 a^3 B+9 a b^2 B\right) \operatorname{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{\left(6 a^3 A b-14 a A b^3-15 a^4 B+26 a^2 b^2 B-3 b^4 B\right) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{3 b^3\left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 1, 1 leaves) :

???

Test results for the 70 problems in "4.5.4.1 (a+b sec)^m (A+B sec+C sec^2).m"

- **Problem 2: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]^5\left(A+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 98 leaves, 4 steps) :

$$\frac{(6 A+5 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{16 d}+\frac{(6 A+5 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{16 d}+\frac{(6 A+5 C) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{24 d}+\frac{C \operatorname{Sec}[c+d x]^5 \operatorname{Tan}[c+d x]}{6 d}$$

Result (type 3, 445 leaves) :

$$-\frac{3\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-\frac{5\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{16\,d}+$$
$$\frac{3\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{5\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{16\,d}+\frac{C}{48\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^6}+$$
$$\frac{A}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{C}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,A}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{5\,C}{32\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{C}{48\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^6}-\frac{A}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-$$
$$\frac{C}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,A}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{5\,C}{32\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}$$

- **Problem 8: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 24 leaves, 2 steps):

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{A\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 92 leaves):

$$-\frac{C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}$$

- **Problem 17: Result unnecessarily involves higher level functions.**

$$\int (b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 110 leaves, 4 steps):

$$-\frac{2\,b^2\,(5\,A+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{b\,\text{Sec}[c+d\,x]}}+\frac{2\,b\,(5\,A+3\,C)\,\sqrt{b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,C\,(b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 5, 180 leaves):

$$-\left(4\,i\,e^{-i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\right.$$
$$\left(-5\,A\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2-C\,\left(3+8\,e^{2\,i\,(c+d\,x)}+e^{4\,i\,(c+d\,x)}\right)+(5\,A+3\,C)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{5/2}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\left.(b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(5\,d\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\right)$$

Problem 19: Result unnecessarily involves higher level functions.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{\sqrt{b\,\text{Sec}[c + d\,x]}}\,dx$$

Optimal (type 4, 68 leaves, 3 steps):

$$\frac{2\,(A - C)\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{d\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{b\,\text{Sec}[c + d\,x]}} + \frac{2\,C\,\text{Tan}[c + d\,x]}{d\,\sqrt{b\,\text{Sec}[c + d\,x]}}$$

Result (type 5, 99 leaves):

$$-\frac{2\,i\,\left(A - 2\,C + A\,e^{2\,i\,(c+d\,x)} + 2\,(-A + C)\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)}{d\,\left(1 + e^{2\,i\,(c+d\,x)}\right)\,\sqrt{b\,\text{Sec}[c + d\,x]}}$$

Problem 21: Result unnecessarily involves higher level functions.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{(b\,\text{Sec}[c + d\,x])^{5/2}}\,dx$$

Optimal (type 4, 77 leaves, 3 steps):

$$\frac{2\,(3\,A + 5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{5\,b^2\,d\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{b\,\text{Sec}[c + d\,x]}} + \frac{2\,A\,\text{Tan}[c + d\,x]}{5\,d\,(b\,\text{Sec}[c + d\,x])^{5/2}}$$

Result (type 5, 135 leaves):

$$\frac{1}{10\,d\,(b\,\text{Sec}[c + d\,x])^{5/2}}\,e^{-i\,(2\,c+d\,x)}\,\text{Sec}[c + d\,x]^2$$
$$\left(-4\,i\,(3\,A + 5\,C) + \frac{8\,i\,(3\,A + 5\,C)\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1 + e^{2\,i\,(c+d\,x)}}} + 2\,A\,\text{Sin}[2\,(c + d\,x)]\right)\,(\text{Cos}[2\,c + d\,x] + i\,\text{Sin}[2\,c + d\,x])$$

Problem 23: Result unnecessarily involves higher level functions.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{(b\,\text{Sec}[c + d\,x])^{9/2}}\,dx$$

Optimal (type 4, 112 leaves, 4 steps):

$$\frac{2\,(7\,A + 9\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{15\,b^4\,d\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{b\,\text{Sec}[c + d\,x]}} + \frac{2\,(7\,A + 9\,C)\,\text{Sin}[c + d\,x]}{45\,b^3\,d\,(b\,\text{Sec}[c + d\,x])^{3/2}} + \frac{2\,A\,\text{Tan}[c + d\,x]}{9\,d\,(b\,\text{Sec}[c + d\,x])^{9/2}}$$

Result (type 5, 145 leaves):

$$\frac{1}{360\, b^4\, d\, \sqrt{b\, \text{Sec}[c+d\, x]}}\, e^{-i\,(2\,c+d\,x)} \left(-336\, i\, A - 432\, i\, C + \frac{96\, i\,(7\, A + 9\, C)\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2\, i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\, i\,(c+d\,x)}}} + (76\, A + 72\, C)\, \text{Sin}[2\,(c+d\,x)] + 10\, A\, \text{Sin}[4\,(c+d\,x)]\right)$$
$$(\text{Cos}[2\, c+d\, x] + i\, \text{Sin}[2\, c+d\, x])$$

- **Problem 32: Result more than twice size of optimal antiderivative.**

$$\int -\text{Cos}[e+f\, x]\, dx$$

Optimal (type 3, 11 leaves, 1 step):

$$-\frac{\text{Sin}[e+f\, x]}{f}$$

Result (type 3, 23 leaves):

$$-\frac{\text{Cos}[f\, x]\, \text{Sin}[e]}{f} - \frac{\text{Cos}[e]\, \text{Sin}[f\, x]}{f}$$

- **Problem 34: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f\, x]^3\, \left(-3+2\, \text{Sec}[e+f\, x]^2\right) dx$$

Optimal (type 3, 19 leaves, 1 step):

$$-\frac{\text{Cos}[e+f\, x]^2\, \text{Sin}[e+f\, x]}{f}$$

Result (type 3, 51 leaves):

$$\frac{2\, \text{Cos}[f\, x]\, \text{Sin}[e]}{f} + \frac{2\, \text{Cos}[e]\, \text{Sin}[f\, x]}{f} - \frac{9\, \text{Sin}[e+f\, x]}{4\, f} - \frac{\text{Sin}[3\,(e+f\, x)]}{4\, f}$$

- **Problem 36: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f\, x]^5\, \left(-5+4\, \text{Sec}[e+f\, x]^2\right) dx$$

Optimal (type 3, 19 leaves, 1 step):

$$-\frac{\text{Cos}[e+f\, x]^4\, \text{Sin}[e+f\, x]}{f}$$

Result (type 3, 44 leaves):

$$-\frac{\text{Sin}[e+f\, x]}{8\, f} - \frac{3\, \text{Sin}[3\,(e+f\, x)]}{16\, f} - \frac{\text{Sin}[5\,(e+f\, x)]}{16\, f}$$

- **Problem 37: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^3 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 85 leaves, 7 steps):

$$\frac{3 C \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{B \text{Tan}[c+d x]}{d}+\frac{3 C \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{C \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}+\frac{B \text{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 227 leaves):

$$-\frac{3 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{8 d}+\frac{3 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{8 d}+$$
$$\frac{C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{3 C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}-$$
$$\frac{3 C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{2 B \text{Tan}[c+d x]}{3 d}+\frac{B \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}$$

- **Problem 40: Result more than twice size of optimal antiderivative.**

$$\int \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 24 leaves, 4 steps):

$$\frac{B \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{C \text{Tan}[c+d x]}{d}$$

Result (type 3, 81 leaves):

$$-\frac{B \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{B \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{C \text{Tan}[c+d x]}{d}$$

- **Problem 41: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x] \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 16 leaves, 4 steps):

$$B x+\frac{C \text{ArcTanh}[\text{Sin}[c+d x]]}{d}$$

Result (type 3, 73 leaves):

$$B x-\frac{C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d x]^4 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 122 leaves, 7 steps):

$$\frac{3\,B\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d x]]}{8\,d}+\frac{(5\,A+4\,C)\,\mathrm{Tan}[c+d x]}{5\,d}+\frac{3\,B\,\mathrm{Sec}[c+d x]\,\mathrm{Tan}[c+d x]}{8\,d}+\frac{B\,\mathrm{Sec}[c+d x]^3\,\mathrm{Tan}[c+d x]}{4\,d}+\frac{C\,\mathrm{Sec}[c+d x]^4\,\mathrm{Tan}[c+d x]}{5\,d}+\frac{(5\,A+4\,C)\,\mathrm{Tan}[c+d x]^3}{15\,d}$$

Result (type 3, 285 leaves):

$$-\frac{3\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8\,d}+\frac{3\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8\,d}+\frac{B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{3\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{3\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{2\,A\,\mathrm{Tan}[c+d x]}{3\,d}+\frac{8\,C\,\mathrm{Tan}[c+d x]}{15\,d}+\frac{A\,\mathrm{Sec}[c+d x]^2\,\mathrm{Tan}[c+d x]}{3\,d}+\frac{4\,C\,\mathrm{Sec}[c+d x]^2\,\mathrm{Tan}[c+d x]}{15\,d}+\frac{C\,\mathrm{Sec}[c+d x]^4\,\mathrm{Tan}[c+d x]}{5\,d}$$

Problem 55: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d x]^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 97 leaves, 6 steps):

$$\frac{(4\,A+3\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d x]]}{8\,d}+\frac{B\,\mathrm{Tan}[c+d x]}{d}+\frac{(4\,A+3\,C)\,\mathrm{Sec}[c+d x]\,\mathrm{Tan}[c+d x]}{8\,d}+\frac{C\,\mathrm{Sec}[c+d x]^3\,\mathrm{Tan}[c+d x]}{4\,d}+\frac{B\,\mathrm{Tan}[c+d x]^3}{3\,d}$$

Result (type 3, 353 leaves):

$$-\frac{A\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2\,d}-\frac{3\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8\,d}+\frac{A\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2\,d}+\frac{3\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8\,d}+\frac{C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{A}{4\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{3\,C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{A}{4\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{3\,C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{2\,B\,\mathrm{Tan}[c+d x]}{3\,d}+\frac{B\,\mathrm{Sec}[c+d x]^2\,\mathrm{Tan}[c+d x]}{3\,d}$$

- **Problem 57: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 51 leaves, 5 steps):

$$\frac{(2 A+C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{B \text{Tan}[c+d x]}{d}+\frac{C \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 151 leaves):

$$\frac{1}{4 d}\left(-2 (2 A+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+4 A \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\right.$$
$$\left.2 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{C}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{C}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+4 B \text{Tan}[c+d x]\right)$$

- **Problem 58: Result more than twice size of optimal antiderivative.**

$$\int \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 27 leaves, 4 steps):

$$A x+\frac{B \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{C \text{Tan}[c+d x]}{d}$$

Result (type 3, 84 leaves):

$$A x-\frac{B \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{B \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{C \text{Tan}[c+d x]}{d}$$

- **Problem 59: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 27 leaves, 4 steps):

$$B x+\frac{C \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{A \text{Sin}[c+d x]}{d}$$

Result (type 3, 95 leaves):

$$B x-\frac{C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{A \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{A \text{Cos}[c] \text{Sin}[d x]}{d}$$

- **Problem 65: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int (b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 178 leaves, 8 steps):

$$-\frac{2 b^2 (5 A+3 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{5 d \sqrt{\text{Cos}[c+d x]} \sqrt{b \text{Sec}[c+d x]}}+\frac{2 b B \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{b \text{Sec}[c+d x]}}{3 d}+$$
$$\frac{2 b (5 A+3 C) \sqrt{b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{5 d}+\frac{2 B (b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d}+\frac{2 C (b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{5 d}$$

Result (type 5, 618 leaves):

$$\frac{4 B \text{Cos}[c+d x]^{7/2} \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] (b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])}-$$
$$\left(2 \sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.(b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right)\Big/\left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}\right)-$$
$$\left(6 \sqrt{2} C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.(b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right)\Big/\left(5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}\right)+$$
$$\left(\text{Cos}[c+d x]^3 (b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(\frac{4 (5 A+3 C) \text{Cos}[d x] \text{Csc}[c]}{5 d}+\frac{4 C \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{5 d}+\right.\right.$$
$$\left.\left.\frac{4 \text{Sec}[c] \text{Sec}[c+d x] (3 C \text{Sin}[c]+5 B \text{Sin}[d x])}{15 d}+\frac{4 B \text{Tan}[c]}{3 d}\right)\right)\Big/(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])$$

- **Problem 66: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{b \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 136 leaves, 7 steps):

$$-\frac{2 b B \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{b \text{Sec}[c+d x]}}+\frac{2 (3 A+C) \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{b \text{Sec}[c+d x]}}{3 d}+$$
$$\frac{2 B \sqrt{b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{d}+\frac{2 C \sqrt{b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3 d}$$

Result (type 5, 302 leaves):

$$\left(4\sqrt{b\,\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(-1\Big/\left(-1+e^{2\,i\,c}\right)i\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\left(3\,B\left(1+e^{2\,i\,(c+d\,x)}\right)+3\,B\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+(3\,A+C)\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(3\,B\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]+C\,\mathrm{Tan}[c+d\,x]\right)\right)\right)\Big/\left(3\,d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,(c+d\,x)]\right)\,\mathrm{Sec}[c+d\,x]^{5/2}\right)$$

Problem 67: Result unnecessarily involves higher level functions.

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2}{\sqrt{b\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 110 leaves, 6 steps):

$$\frac{2\,(A-C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{b\,\mathrm{Sec}[c+d\,x]}}+\frac{2\,B\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{b\,\mathrm{Sec}[c+d\,x]}}{b\,d}+\frac{2\,C\,\mathrm{Tan}[c+d\,x]}{d\sqrt{b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 135 leaves):

$$\frac{1}{b\,d}e^{-i\,(c+d\,x)}\left(2\,B\,e^{i\,(c+d\,x)}\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]-i\left(A-2\,C+A\,e^{2\,i\,(c+d\,x)}+2\,(-A+C)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right)\sqrt{b\,\mathrm{Sec}[c+d\,x]}$$

Problem 68: Result unnecessarily involves higher level functions.

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2}{(b\,\mathrm{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 117 leaves, 6 steps):

$$\frac{2\,B\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{b\,d\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{b\,\mathrm{Sec}[c+d\,x]}}+\frac{2\,(A+3\,C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{b\,\mathrm{Sec}[c+d\,x]}}{3\,b^2\,d}+\frac{2\,A\,\mathrm{Tan}[c+d\,x]}{3\,d\,(b\,\mathrm{Sec}[c+d\,x])^{3/2}}$$

Result (type 5, 143 leaves):

$$\left(2\left(6\,i\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-2\,i\,(A+3\,C)\,e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]+\sqrt{1+e^{2\,i\,(c+d\,x)}}\,(-3\,i\,B+A\,\text{Sin}[c+d\,x])\right)\right)\Big/\left(3\,b\,d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\sqrt{b\,\text{Sec}[c+d\,x]}\right)$$

Problem 69: Result unnecessarily involves higher level functions.

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 150 leaves, 7 steps):

$$\frac{2\,(3\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{b\,\text{Sec}[c+d\,x]}}+\frac{2\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{b\,\text{Sec}[c+d\,x]}}{3\,b^3\,d}+\frac{2\,B\,\text{Sin}[c+d\,x]}{3\,b^2\,d\,\sqrt{b\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\text{Tan}[c+d\,x]}{5\,d\,(b\,\text{Sec}[c+d\,x])^{5/2}}$$

Result (type 5, 183 leaves):

$$\frac{1}{30\,b^3\,d}e^{-i\,(2\,c+d\,x)}\,\sqrt{b\,\text{Sec}[c+d\,x]}\left(20\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]+12\,i\,(3\,A+5\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-6\,i\,(3\,A+5\,C)+10\,B\,\text{Sin}[c+d\,x]+3\,A\,\text{Sin}[2\,(c+d\,x)])\right)\,(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x])$$

Problem 70: Result unnecessarily involves higher level functions.

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(b\,\text{Sec}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 185 leaves, 8 steps):

$$\frac{6\,B\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,b^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{b\,\text{Sec}[c+d\,x]}}+\frac{2\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{b\,\text{Sec}[c+d\,x]}}{21\,b^4\,d}+\frac{2\,B\,\text{Sin}[c+d\,x]}{5\,b^2\,d\,(b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,(5\,A+7\,C)\,\text{Sin}[c+d\,x]}{21\,b^3\,d\,\sqrt{b\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\text{Tan}[c+d\,x]}{7\,d\,(b\,\text{Sec}[c+d\,x])^{7/2}}$$

Result (type 5, 177 leaves):

$$\left(504\,i\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]-40\,i\,(5\,A+7\,C)\,e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]+\sqrt{1+e^{2\,i\,(c+d\,x)}}\,(5\,(23\,A+28\,C)\,\text{Sin}[c+d\,x]+3\,(-84\,i\,B+14\,B\,\text{Sin}[2\,(c+d\,x)]+5\,A\,\text{Sin}[3\,(c+d\,x)]))\right)\Big/\left(210\,b^3\,d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\sqrt{b\,\text{Sec}[c+d\,x]}\right)$$

Test results for the 1373 problems in "4.5.4.2 (a+b sec)^m (d sec)^n (A+B sec+C sec^2).m"

- **Problem 1: Result unnecessarily involves imaginary or complex numbers.**

$$\int \mathrm{Sec}[c+d\,x]^2\,(b\,\mathrm{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 95 leaves, 4 steps):

$$\frac{3\,(10\,A+7\,C)\,\mathrm{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^{4/3}\,\mathrm{Sin}[c+d\,x]}{40\,b\,d\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\mathrm{Sec}[c+d\,x])^{7/3}\,\mathrm{Tan}[c+d\,x]}{10\,b^2\,d}$$

Result (type 5, 189 leaves):

$$\left(3\,(b\,\mathrm{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(-2\,i\,2^{1/3}\,(10\,A+7\,C)\,\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]+\right.\right.$$
$$\left.\left.(5\,(2\,A+3\,C)+(10\,A+7\,C)\,\mathrm{Cos}[2\,(c+d\,x)])\,\mathrm{Sec}[c+d\,x]^{10/3}\,\mathrm{Sin}[c+d\,x]\right)\right)\Big/\left(40\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,(c+d\,x)])\,\mathrm{Sec}[c+d\,x]^{7/3}\right)$$

- **Problem 2: Result unnecessarily involves imaginary or complex numbers.**

$$\int \mathrm{Sec}[c+d\,x]\,(b\,\mathrm{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 92 leaves, 4 steps):

$$\frac{3\,(7\,A+4\,C)\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{2},\frac{5}{6},\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Sin}[c+d\,x]}{7\,d\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\mathrm{Sec}[c+d\,x])^{4/3}\,\mathrm{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 5, 183 leaves):

$$-\left(6\,i\,e^{-i\,(c+d\,x)}\,\mathrm{Cos}[c+d\,x]^3\right.$$
$$\left(-7\,A\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2-2\,C\,\left(2+5\,e^{2\,i\,(c+d\,x)}+e^{4\,i\,(c+d\,x)}\right)+(7\,A+4\,C)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{7/3}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\left.(b\,\mathrm{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(7\,b\,d\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2\,(A+2\,C+A\,\mathrm{Cos}[2\,(c+d\,x)])\right)$$

- **Problem 3: Result unnecessarily involves imaginary or complex numbers.**

$$\int (b\,\mathrm{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 88 leaves, 3 steps):

$$-\frac{3\,b\,(4\,A+C)\,\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{1}{2},\frac{4}{3},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{8\,d\,(b\,\text{Sec}[c+d\,x])^{2/3}\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 5, 162 leaves):

$$\left(3\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-i\,2^{1/3}\,(4\,A+C)\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]+C\,\text{Sec}[c+d\,x]^{4/3}\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(2\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{7/3}\right)$$

- **Problem 6: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^2\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 95 leaves, 4 steps):

$$\frac{3\,(13\,A+10\,C)\,\text{Hypergeometric2F1}\left[-\frac{7}{6},\frac{1}{2},-\frac{1}{6},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{7/3}\,\text{Sin}[c+d\,x]}{91\,b\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{10/3}\,\text{Tan}[c+d\,x]}{13\,b^2\,d}$$

Result (type 5, 235 leaves):

$$-\left(12\,i\,e^{-i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\left(-13\,A\left(1+e^{2\,i\,(c+d\,x)}\right)^2\left(2+5\,e^{2\,i\,(c+d\,x)}+e^{4\,i\,(c+d\,x)}\right)-2\,C\left(10+45\,e^{2\,i\,(c+d\,x)}+79\,e^{4\,i\,(c+d\,x)}+21\,e^{6\,i\,(c+d\,x)}+5\,e^{8\,i\,(c+d\,x)}\right)+2\,(13\,A+10\,C)\left(1+e^{2\,i\,(c+d\,x)}\right)^{13/3}\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]\right)(b\,\text{Sec}[c+d\,x])^{4/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(91\,d\left(1+e^{2\,i\,(c+d\,x)}\right)^4(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\right)$$

- **Problem 7: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 92 leaves, 4 steps):

$$\frac{3\,(10\,A+7\,C)\,\text{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Sin}[c+d\,x]}{40\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{7/3}\,\text{Tan}[c+d\,x]}{10\,b\,d}$$

Result (type 5, 192 leaves):

$$\left(3\,(b\,\text{Sec}[c+d\,x])^{7/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-2\,\mathrm{i}\,2^{1/3}\,(10\,A+7\,C)\,\left(\frac{e^{\mathrm{i}\,(c+d\,x)}}{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right)^{1/3}\,\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^{1/3}\,\text{Hypergeometric2F1}\left[\frac{1}{6},\,\frac{1}{3},\,\frac{7}{6},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+\right.\right.$$
$$\left.\left.(5\,(2\,A+3\,C)+(10\,A+7\,C)\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{10/3}\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(40\,b\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{13/3}\right)$$

- **Problem 8: Result unnecessarily involves imaginary or complex numbers.**

$$\int (b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 90 leaves, 3 steps):

$$\frac{3\,b\,(7\,A+4\,C)\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\,\frac{1}{2},\,\frac{5}{6},\,\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{7\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Tan}[c+d\,x]}{7\,d}$$

Result (type 5, 180 leaves):

$$-\left(6\,\mathrm{i}\,e^{-\mathrm{i}\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\right.$$
$$\left(-7\,A\,\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^2-2\,C\,\left(2+5\,e^{2\,\mathrm{i}\,(c+d\,x)}+e^{4\,\mathrm{i}\,(c+d\,x)}\right)+(7\,A+4\,C)\,\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^{7/3}\,\text{Hypergeometric2F1}\left[-\frac{1}{3},\,\frac{1}{3},\,\frac{2}{3},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]\right)$$
$$\left.(b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(7\,d\,\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^2\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\right)$$

- **Problem 9: Result unnecessarily involves imaginary or complex numbers.**

$$\int \text{Cos}[c+d\,x]\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 91 leaves, 4 steps):

$$-\frac{3\,b^2\,(4\,A+C)\,\text{Hypergeometric2F1}\left[\frac{1}{3},\,\frac{1}{2},\,\frac{4}{3},\,\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{8\,d\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,b\,C\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 5, 163 leaves):

$$\left(3\,b\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(-\mathrm{i}\,2^{1/3}\,(4\,A+C)\,\left(\frac{e^{\mathrm{i}\,(c+d\,x)}}{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right)^{1/3}\,\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^{1/3}\,\text{Hypergeometric2F1}\left[\frac{1}{6},\,\frac{1}{3},\,\frac{7}{6},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+C\,\text{Sec}[c+d\,x]^{4/3}\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(2\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{7/3}\right)$$

- **Problem 11: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 5, 95 leaves, 4 steps):

$$\frac{3\,(8A+5C)\,\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{2},\frac{2}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{16\,b\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{5/3}\,\text{Tan}[c+d\,x]}{8\,b^2\,d}$$

Result (type 5, 207 leaves):

$$-\left(3\,i\left(-8A\left(1+e^{2i(c+dx)}\right)^2-C\left(5+14\,e^{2i(c+dx)}+e^{4i(c+dx)}\right)+(8A+5C)\left(1+e^{2i(c+dx)}\right)^{8/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2i(c+dx)}\right]\right)\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Bigg/\left(4\times 2^{1/3}\,d\left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{1/3}\left(1+e^{2i(c+dx)}\right)^3(A+2C+A\,\text{Cos}[2(c+d\,x)])\,\text{Sec}[c+d\,x]^{5/3}\,(b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

Problem 12: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 5, 92 leaves, 4 steps):

$$-\frac{3\,(5A+2C)\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{5\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,b\,d}$$

Result (type 5, 168 leaves):

$$\left(3\,(b\,\text{Sec}[c+d\,x])^{2/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-i\,2^{2/3}\,(5A+2C)\left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{2/3}\left(1+e^{2i(c+dx)}\right)^{2/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2i(c+dx)}\right]+2\,C\,\text{Sec}[c+d\,x]^{5/3}\,\text{Sin}[c+d\,x]\right)\right)\Bigg/\left(5\,b\,d\,(A+2C+A\,\text{Cos}[2(c+d\,x)])\,\text{Sec}[c+d\,x]^{8/3}\right)$$

Problem 13: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{(b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 5, 90 leaves, 3 steps):

$$-\frac{3\,b\,(2A-C)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{5}{3},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{8\,d\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,\text{Tan}[c+d\,x]}{2\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 5, 98 leaves):

$$-\frac{3\,i\left(A-C+A\,e^{2i(c+dx)}+(-2A+C)\left(1+e^{2i(c+dx)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2i(c+dx)}\right]\right)}{d\left(1+e^{2i(c+dx)}\right)(b\,\text{Sec}[c+d\,x])^{1/3}}$$

Problem 14: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(b \text{Sec}[c+d x])^{1/3}} \, dx$$

Optimal (type 5, 88 leaves, 4 steps):

$$-\frac{3 (A+4 C) \text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]}{4 d (b \text{Sec}[c+d x])^{1/3} \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 A b \text{Tan}[c+d x]}{4 d (b \text{Sec}[c+d x])^{4/3}}$$

Result (type 5, 121 leaves):

$$-\left(3 i e^{-i (c+d x)} \left(A \left(-1+e^{4 i (c+d x)}\right)+2 (A+4 C) e^{2 i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{2/3} \text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2 i (c+d x)}\right]\right)\right) \Big/ \left(8 d \left(1+e^{2 i (c+d x)}\right) (b \text{Sec}[c+d x])^{1/3}\right)$$

Problem 16: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{(b \text{Sec}[c+d x])^{4/3}} \, dx$$

Optimal (type 5, 95 leaves, 4 steps):

$$-\frac{3 (5 A+2 C) \text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]}{5 b d (b \text{Sec}[c+d x])^{1/3} \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 C (b \text{Sec}[c+d x])^{2/3} \text{Tan}[c+d x]}{5 b^2 d}$$

Result (type 5, 165 leaves):

$$\left(3 \left(A+C \text{Sec}[c+d x]^2\right) \left(-i 2^{2/3} (5 A+2 C) \left(\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}\right)^{2/3} \left(1+e^{2 i (c+d x)}\right)^{2/3} \text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2 i (c+d x)}\right]+2 C \text{Sec}[c+d x]^{5/3} \text{Sin}[c+d x]\right)\right) \Big/ \left(5 d (A+2 C+A \text{Cos}[2 (c+d x)]) \text{Sec}[c+d x]^{2/3} (b \text{Sec}[c+d x])^{4/3}\right)$$

Problem 17: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(b \text{Sec}[c+d x])^{4/3}} \, dx$$

Optimal (type 5, 92 leaves, 4 steps):

$$-\frac{3 (2 A-C) \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{5}{3},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]}{8 d (b \text{Sec}[c+d x])^{4/3} \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 C \text{Tan}[c+d x]}{2 b d (b \text{Sec}[c+d x])^{1/3}}$$

Result (type 5, 101 leaves):

$$-\frac{3\,i\,\left(A-C+A\,e^{2\,i\,(c+d\,x)}+(-2\,A+C)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\,\frac{2}{3},\,\frac{5}{6},\,-e^{2\,i\,(c+d\,x)}\right]\right)}{b\,d\,\left(1+e^{2\,i\,(c+d\,x)}\right)\,(b\,\text{Sec}[c+d\,x])^{1/3}}$$

Problem 18: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+C\,\text{Sec}[c+d\,x]^2}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 90 leaves, 3 steps):

$$-\frac{3\,(A+4\,C)\,\text{Hypergeometric2F1}\left[\frac{1}{6},\,\frac{1}{2},\,\frac{7}{6},\,\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{4\,b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,A\,\text{Tan}[c+d\,x]}{4\,d\,(b\,\text{Sec}[c+d\,x])^{4/3}}$$

Result (type 5, 124 leaves):

$$-\left(3\,i\,e^{-i\,(c+d\,x)}\,\left(A\,\left(-1+e^{4\,i\,(c+d\,x)}\right)+2\,(A+4\,C)\,e^{2\,i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{3},\,\frac{2}{3},\,\frac{4}{3},\,-e^{2\,i\,(c+d\,x)}\right]\right)\right)\Big/ \left(8\,b\,d\,\left(1+e^{2\,i\,(c+d\,x)}\right)\,(b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

Problem 21: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 146 leaves, 4 steps):

$$\frac{3\,b\,C\,\text{Sec}[c+d\,x]^{2+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{d\,(7+3\,m)}+\left(3\,b\,(C\,(4+3\,m)+A\,(7+3\,m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{6}\,(-1-3\,m),\,\frac{1}{6}\,(5-3\,m),\,\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/ \left(d\,(1+3\,m)\,(7+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 333 leaves):

$$-\left(3\,i\,2^{\frac{7}{3}+m}\,e^{-\frac{1}{3}i\,d\,(4+3m)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{4}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{4}{3}+m}\left(\frac{2\,(A+2\,C)\,e^{\frac{1}{3}i\,(6\,c+d\,(10+3\,m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{5}{3}+\frac{m}{2},\,\frac{10}{3}+m,\,\frac{8}{3}+\frac{m}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{10+3\,m}+\right.\right.$$

$$\frac{A\,e^{4\,i\,c+\frac{1}{3}i\,d\,(16+3\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+\frac{m}{2},\,\frac{10}{3}+m,\,\frac{1}{6}\,(22+3\,m),\,-e^{2\,i\,(c+d\,x)}\right]}{16+3\,m}+$$

$$\left.\frac{A\,e^{\frac{1}{3}i\,d\,(4+3\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{10}{3}+m,\,\frac{1}{6}\,(4+3\,m),\,\frac{5}{3}+\frac{m}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{4+3\,m}\right)$$

$$\left.(b\,\text{Sec}[c+d\,x])^{4/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{10/3}\right)$$

- **Problem 22: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{2/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 146 leaves, 4 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{d\,(5+3\,m)}-$$

$$\left(3\,(C\,(2+3\,m)+A\,(5+3\,m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{6}\,(1-3\,m),\,\frac{1}{6}\,(7-3\,m),\,\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(1-3\,m)\,(5+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 336 leaves):

$$-\left(3\,i\,2^{\frac{5}{3}+m}\,e^{-\frac{1}{3}i\,d\,(2+3m)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{2}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{2}{3}+m}\left(\frac{A\,e^{4\,i\,c+\frac{1}{3}i\,d\,(14+3\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{7}{3}+\frac{m}{2},\,\frac{8}{3}+m,\,\frac{1}{6}\,(20+3\,m),\,-e^{2\,i\,(c+d\,x)}\right]}{14+3\,m}+\right.\right.$$

$$1/((2+3\,m)\,(8+3\,m))\,e^{\frac{1}{3}i\,d\,(2+3\,m)\,x}\left(A\,(8+3\,m)\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\,\frac{1}{6}\,(2+3\,m),\,\frac{1}{6}\,(8+3\,m),\,-e^{2\,i\,(c+d\,x)}\right]+\right.$$

$$\left.\left.2\,(A+2\,C)\,e^{2\,i\,(c+d\,x)}\,(2+3\,m)\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\,\frac{1}{6}\,(8+3\,m),\,\frac{7}{3}+\frac{m}{2},\,-e^{2\,i\,(c+d\,x)}\right]\right)\right)$$

$$\left.(b\,\text{Sec}[c+d\,x])^{2/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{8/3}\right)$$

- **Problem 23: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 144 leaves, 4 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{d\,(4+3\,m)}-\left(3\,(C+3\,C\,m+A\,(4+3\,m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(2-3\,m),\frac{1}{6}\,(8-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(2-3\,m)\,(4+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 336 leaves):

$$-\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/3}}\,3\,i\,2^{\frac{4}{3}+m}\,e^{-\frac{1}{3}\,i\,d\,(1+3\,m)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{1}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{1}{3}+m}\left(\frac{A\,e^{\frac{1}{3}\,i\,(d+3\,d\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}\,(1+3\,m),\frac{1}{6}\,(7+3\,m),-e^{2\,i\,(c+d\,x)}\right]}{d+3\,d\,m}+\frac{1}{d\,(7+3\,m)\,(13+3\,m)}\,e^{\frac{1}{3}\,i\,(6\,c+d\,(7+3\,m)\,x)}\left(2\,(A+2\,C)\,(13+3\,m)\,\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}\,(7+3\,m),\frac{1}{6}\,(13+3\,m),-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\,(7+3\,m)\,\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}\,(13+3\,m),\frac{1}{6}\,(19+3\,m),-e^{2\,i\,(c+d\,x)}\right]\right)\right)(b\,\text{Sec}[c+d\,x])^{1/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 24: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^m\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 5, 147 leaves, 4 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,\text{Sin}[c+d\,x]}{d\,(2+3\,m)\,(b\,\text{Sec}[c+d\,x])^{1/3}}+\left(3\,(C\,(1-3\,m)-A\,(2+3\,m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(4-3\,m),\frac{1}{6}\,(10-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(4-3\,m)\,(2+3\,m)\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 311 leaves):

$$-\left(\left(3\,\mathrm{i}\,2^{\frac{2}{3}+m}\left(\frac{e^{\mathrm{i}\,(c+d\,x)}}{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right)^{-\frac{1}{3}+m}\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^{-\frac{1}{3}+m}\left(A\,\left(55+48\,m+9\,m^2\right)\,\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\,\frac{1}{6}\,(-1+3\,m),\,\frac{1}{6}\,(5+3\,m),\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+\right.\right.\right.$$
$$e^{2\,\mathrm{i}\,(c+d\,x)}\,(-1+3\,m)\,\left(2\,(A+2\,C)\,(11+3\,m)\,\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\,\frac{1}{6}\,(5+3\,m),\,\frac{1}{6}\,(11+3\,m),\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+\right.$$
$$\left.\left.\left.A\,e^{2\,\mathrm{i}\,(c+d\,x)}\,(5+3\,m)\,\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\,\frac{1}{6}\,(11+3\,m),\,\frac{1}{6}\,(17+3\,m),\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]\right)\right)\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(-1+3\,m)\,(5+3\,m)\,(11+3\,m)\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/3}\,(b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

Problem 25: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^m\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 5, 145 leaves, 4 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,\text{Sin}[c+d\,x]}{d\,(1+3\,m)\,(b\,\text{Sec}[c+d\,x])^{2/3}}-$$
$$\left(3\,(A-C\,(2-3\,m)+3\,A\,m)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{6}\,(5-3\,m),\,\frac{1}{6}\,(11-3\,m),\,\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^{-1+m}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(5-3\,m)\,(1+3\,m)\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 311 leaves):

$$-\left(\left(3\,\mathrm{i}\,2^{\frac{1}{3}+m}\left(\frac{e^{\mathrm{i}\,(c+d\,x)}}{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right)^{-\frac{2}{3}+m}\left(1+e^{2\,\mathrm{i}\,(c+d\,x)}\right)^{-\frac{2}{3}+m}\left(A\,e^{4\,\mathrm{i}\,(c+d\,x)}\,\left(-8+6\,m+9\,m^2\right)\,\text{Hypergeometric2F1}\left[\frac{5}{3}+\frac{m}{2},\,\frac{4}{3}+m,\,\frac{8}{3}+\frac{m}{2},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+\right.\right.\right.$$
$$(10+3\,m)\,\left(A\,(4+3\,m)\,\text{Hypergeometric2F1}\left[\frac{4}{3}+m,\,\frac{1}{6}\,(-2+3\,m),\,\frac{1}{6}\,(4+3\,m),\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+\right.$$
$$\left.\left.\left.2\,(A+2\,C)\,e^{2\,\mathrm{i}\,(c+d\,x)}\,(-2+3\,m)\,\text{Hypergeometric2F1}\left[\frac{4}{3}+m,\,\frac{1}{6}\,(4+3\,m),\,\frac{5}{3}+\frac{m}{2},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]\right)\right)\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(-2+3\,m)\,(4+3\,m)\,(10+3\,m)\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{4/3}\,(b\,\text{Sec}[c+d\,x])^{2/3}\right)$$

Problem 26: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^m\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 148 leaves, 4 steps):

$$-\frac{3\,C\,\text{Sec}[c+d\,x]^m\,\text{Sin}[c+d\,x]}{b\,d\,(1-3\,m)\,(b\,\text{Sec}[c+d\,x])^{1/3}}-\left(3\,(A+C\,(4-3\,m)-3\,A\,m)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(7-3\,m),\frac{1}{6}\,(13-3\,m),\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^{-2+m}\,\text{Sin}[c+d\,x]\right)\Big/\left(b\,d\,(1-3\,m)\,(7-3\,m)\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 340 leaves):

$$-\left(3\,i\,2^{-\frac{1}{3}+m}\,e^{-\frac{1}{3}\,i\,(6\,c+d\,(2+3\,m)\,x)}\,\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{2}{3}+m}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{2}{3}+m}\,\left(\frac{A\,e^{\frac{1}{3}\,i\,d\,(-4+3\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}\,(-4+3\,m),\frac{1}{6}\,(2+3\,m),-e^{2\,i\,(c+d\,x)}\right]}{-4+3\,m}+1\Big/\left((2+3\,m)\,(8+3\,m)\right)\,e^{\frac{1}{3}\,i\,(6\,c+d\,(2+3\,m)\,x)}\,\left(2\,(A+2\,C)\,(8+3\,m)\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}\,(2+3\,m),\frac{1}{6}\,(8+3\,m),-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\,(2+3\,m)\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}\,(8+3\,m),\frac{7}{3}+\frac{m}{2},-e^{2\,i\,(c+d\,x)}\right]\right)\right)\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{2/3}\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)$$

Problem 27: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 145 leaves, 4 steps):

$$\frac{C\,\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(1+m+n)}-\left((C\,(m+n)+A\,(1+m+n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}\,(1-m-n),\frac{1}{2}\,(3-m-n),\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1-m-n)\,(1+m+n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 303 leaves):

$$-\frac{1}{d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}$$

$$i\,2^{1+m+n}\,e^{-i\,d\,(m+n)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{m+n}\left(1+e^{2\,i\,(c+d\,x)}\right)^{m+n}\left(\frac{A\,e^{i\,d\,(m+n)\,x}\,\text{Hypergeometric2F1}\left[\frac{m+n}{2},\,2+m+n,\,\frac{1}{2}\,(2+m+n),\,-e^{2\,i\,(c+d\,x)}\right]}{m+n}+\right.$$

$$e^{2\,i\,c}\left(\frac{2\,(A+2\,C)\,e^{i\,d\,(2+m+n)\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}\,(2+m+n),\,2+m+n,\,\frac{1}{2}\,(4+m+n),\,-e^{2\,i\,(c+d\,x)}\right]}{2+m+n}+\right.$$

$$\left.\left.\frac{A\,e^{i\,(2\,c+d\,(4+m+n)\,x)}\,\text{Hypergeometric2F1}\left[2+m+n,\,\frac{1}{2}\,(4+m+n),\,\frac{1}{2}\,(6+m+n),\,-e^{2\,i\,(c+d\,x)}\right]}{4+m+n}\right)\right)$$

$$\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 28: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^2\,(b\,\text{Sec}[c+d\,x])^n\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 120 leaves, 4 steps):

$$\left((C\,(2+n)+A\,(3+n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1-n),\,\frac{1-n}{2},\,\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{1+n}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(b\,d\,(1+n)\,(3+n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+\frac{C\,(b\,\text{Sec}[c+d\,x])^{2+n}\,\text{Tan}[c+d\,x]}{b^2\,d\,(3+n)}$$

Result (type 5, 289 leaves):

$$-\left(i\,2^{3+n}\,e^{2\,i\,c-i\,d\,n\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^n\left(1+e^{2\,i\,(c+d\,x)}\right)^n\right.$$

$$\left(\frac{A\,e^{i\,d\,(2+n)\,x}\,\text{Hypergeometric2F1}\left[\frac{2+n}{2},\,4+n,\,\frac{4+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{2+n}+1/((4+n)\,(6+n))\,e^{i\,(2\,c+d\,(4+n)\,x)}\left(2\,(A+2\,C)\,(6+n)\right.\right.$$

$$\left.\left.\text{Hypergeometric2F1}\left[\frac{4+n}{2},\,4+n,\,\frac{6+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\,(4+n)\,\text{Hypergeometric2F1}\left[4+n,\,\frac{6+n}{2},\,\frac{8+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]\right)\right)$$

$$\left.\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 29: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(b\,\text{Sec}[c+d\,x])^n\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 109 leaves, 4 steps):

$$\frac{(C(1+n)+A(2+n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{n}{2},\frac{2-n}{2},\text{Cos}[c+dx]^2\right](b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]}{d\,n\,(2+n)\sqrt{\text{Sin}[c+dx]^2}}+\frac{C\,(b\,\text{Sec}[c+dx])^{1+n}\,\text{Tan}[c+dx]}{b\,d\,(2+n)}$$

Result (type 5, 284 leaves) :

$$-\left(i\,2^{2+n}\,e^{i(c-d\,n\,x)}\left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^n\left(1+e^{2i(c+dx)}\right)^n\left(\frac{A\,e^{i\,d(1+n)\,x}\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},3+n,\frac{3+n}{2},-e^{2i(c+dx)}\right]}{1+n}+\frac{2\,(A+2C)\,e^{i(2c+d(3+n)x)}\,\text{Hypergeometric2F1}\left[\frac{3+n}{2},3+n,\frac{5+n}{2},-e^{2i(c+dx)}\right]}{3+n}+\frac{A\,e^{i(4c+d(5+n)x)}\,\text{Hypergeometric2F1}\left[3+n,\frac{5+n}{2},\frac{7+n}{2},-e^{2i(c+dx)}\right]}{5+n}\right)\text{Sec}[c+dx]^{-2-n}\,(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\right)$$

Problem 30: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 5, 113 leaves, 3 steps) :

$$-\frac{b\,(A+A\,n+C\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Cos}[c+dx]^2\right](b\,\text{Sec}[c+dx])^{-1+n}\,\text{Sin}[c+dx]}{d\,(1-n)\,(1+n)\sqrt{\text{Sin}[c+dx]^2}}+\frac{C\,(b\,\text{Sec}[c+dx])^n\,\text{Tan}[c+dx]}{d\,(1+n)}$$

Result (type 5, 262 leaves) :

$$-\frac{1}{d\,n\,(2+n)\,(4+n)\,(A+2C+A\,\text{Cos}[2c+2dx])}\,i\,2^{1+n}\left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^n\left(1+e^{2i(c+dx)}\right)^n\left(A\left(8+6n+n^2\right)\text{Hypergeometric2F1}\left[\frac{n}{2},2+n,\frac{2+n}{2},-e^{2i(c+dx)}\right]+2\,(A+2C)\,e^{2i(c+dx)}\,n\,(4+n)\,\text{Hypergeometric2F1}\left[\frac{2+n}{2},2+n,\frac{4+n}{2},-e^{2i(c+dx)}\right]+A\,e^{4i(c+dx)}\,n\,(2+n)\,\text{Hypergeometric2F1}\left[2+n,\frac{4+n}{2},\frac{6+n}{2},-e^{2i(c+dx)}\right]\right)\text{Sec}[c+dx]^{-2-n}\,(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)$$

Problem 31: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\text{Cos}[c+dx]\,(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 5, 117 leaves, 4 steps) :

$$\frac{b^2\,(C\,(1-n)-A\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2-n}{2},\frac{4-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-2+n}\,\text{Sin}[c+d\,x]}{d\,(2-n)\,n\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{b\,C\,(b\,\text{Sec}[c+d\,x])^{-1+n}\,\text{Tan}[c+d\,x]}{d\,n}$$

Result (type 6, 6049 leaves) : Display of huge result suppressed !

- **Problem 32: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 132 leaves, 4 steps) :

$$-\left(b^3\,(A\,(1-n)+C\,(2-n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3-n}{2},\frac{5-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-3+n}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1-n)\,(3-n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-\frac{b^2\,C\,(b\,\text{Sec}[c+d\,x])^{-2+n}\,\text{Tan}[c+d\,x]}{d\,(1-n)}$$

Result (type 6, 8395 leaves) : Display of huge result suppressed !

- **Problem 33: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 132 leaves, 4 steps) :

$$-\left(b^4\,(A\,(2-n)+C\,(3-n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{4-n}{2},\frac{6-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-4+n}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(2-n)\,(4-n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-\frac{b^3\,C\,(b\,\text{Sec}[c+d\,x])^{-3+n}\,\text{Tan}[c+d\,x]}{d\,(2-n)}$$

Result (type 6, 12 608 leaves) :

$$-\Bigg(\Bigg(\Bigg(6\,b\,\text{Sec}[c+d\,x]^{1-n}\,(b\,\text{Sec}[c+d\,x])^{-1+n}$$

$$\left(\frac{1}{2}\,A\,\text{Cos}[2\,(c+d\,x)]\,\text{Sec}[c+d\,x]^{-1+n}+\text{Cos}[c+d\,x]\,\left(\frac{1}{2}\,A\,\text{Sec}[c+d\,x]^n+C\,\text{Sec}[c+d\,x]^n\right)\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)^n$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{-4+n}\,\Bigg(\Bigg(A\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^3\Bigg)\Big/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Bigg)+$$

$$\left(C\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(6\,A\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left((-2+n)\,\text{AppellF1}\left[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(2\,C\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left((-2+n)\,\text{AppellF1}\left[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)+$$

$$\left(12\,A\,\text{AppellF1}\left[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left((-3+n)\,\text{AppellF1}\left[\frac{3}{2},n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-$$

$$\left(8\,A\,\text{AppellF1}\left[\frac{1}{2},n,4-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},n,4-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+2\left((-4+n)\,\text{AppellF1}\left[\frac{3}{2},n,5-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]+\right.$$

$$\left.\left.\left.\left.n\,\text{AppellF1}\left[\frac{3}{2},1+n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)\Big/$$

$$\left(d\left(-6(-4+n)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^n\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{-5+n}\right.\right.$$

$$\left(\left(\left(A\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^3\right)\Big/\right.\right.$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 1-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2}, n, 2-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) +$$

$$\Big(C\,\text{AppellF1}\Big[\frac{1}{2}, n, 1-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^3\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 1-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big((-1+n)\,\text{AppellF1}\Big[\frac{3}{2}, n, 2-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 1-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) -$$

$$\Big(6\,A\,\text{AppellF1}\Big[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big((-2+n)\,\text{AppellF1}\Big[\frac{3}{2}, n, 3-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) -$$

$$\Big(2\,C\,\text{AppellF1}\Big[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big((-2+n)\,\text{AppellF1}\Big[\frac{3}{2}, n, 3-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 2-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) +$$

$$\Big(12\,A\,\text{AppellF1}\Big[\frac{1}{2}, n, 3-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 3-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big((-3+n)\,\text{AppellF1}\Big[\frac{3}{2}, n, 4-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n, 3-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big) -$$

$$\Big(8\,A\,\text{AppellF1}\Big[\frac{1}{2}, n, 4-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\Big/\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, n, 4-n, \frac{3}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + 2\Big((-4+n)\,\text{AppellF1}\Big[\frac{3}{2}, n, 5-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big] + n\,\text{AppellF1}\Big[\frac{3}{2}, 1+n,$$

$$4-n, \frac{5}{2}, \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2, -\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\Big)\Big) - 3\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^n$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{-4+n}\,\left(\left(\text{A AppellF1}\left[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^3\right)\Big/\right.$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(\text{C AppellF1}\left[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^3\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-$$

$$\left(6\,\text{A AppellF1}\left[\frac{1}{2},\,n,\,2-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,2-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left((-2+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,3-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-$$

$$\left(2\,\text{C AppellF1}\left[\frac{1}{2},\,n,\,2-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,2-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left((-2+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,3-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)+$$

$$\left(12\,\text{A AppellF1}\left[\frac{1}{2},\,n,\,3-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,3-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left((-3+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,4-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,3-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-$$

$$\left(8\,\text{A AppellF1}\left[\frac{1}{2},\,n,\,4-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,4-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\left((-4+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,5-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+\right.$$

$$n\,\text{AppellF1}\left[\frac{3}{2},1+n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)-$$

$$6\,n\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{1+n}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-4+n}$$

$$\Big(\Big(A\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+$$

$$\Big(C\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(6\,A\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big((-2+n)\,\text{AppellF1}\left[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(2\,C\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big((-2+n)\,\text{AppellF1}\left[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+$$

$$\Big(12\,A\,\text{AppellF1}\left[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\Big((-3+n)\,\text{AppellF1}\left[\frac{3}{2},n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\left(8\,A\,\text{AppellF1}\left[\frac{1}{2},n,4-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\Big/\left(3\,\text{AppellF1}\left[\frac{1}{2},n,4-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+2\left((-4+n)\,\text{AppellF1}\left[\frac{3}{2},n,5-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.$$

$$\left.\left.n\,\text{AppellF1}\left[\frac{3}{2},1+n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)-$$

$$6\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^n\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-4+n}\left(\left(3\,A\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(3\,C\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(A\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\left[\right.\right.\right.$$

$$\left.\left.\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(C\left(-\frac{1}{3}(1-n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\left[\right.\right.\right.$$

$$\left.\left.\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\Big[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(12\,A\,\text{AppellF1}\Big[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+2\,\Big((-2+n)\,\text{AppellF1}\Big[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\Big[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(4\,C\,\text{AppellF1}\Big[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+2\,\Big((-2+n)\,\text{AppellF1}\Big[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\Big[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(6\,A\,\Big(-\frac{1}{3}(2-n)\,\text{AppellF1}\Big[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\Big[$$

$$\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+2\,\Big((-2+n)\,\text{AppellF1}\Big[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\Big[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)-$$

$$\Big(2\,C\,\Big(-\frac{1}{3}(2-n)\,\text{AppellF1}\Big[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\Big[$$

$$\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},n,2-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+2\,\Big((-2+n)\,\text{AppellF1}\Big[\frac{3}{2},n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\Big[\frac{3}{2},1+n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+$$

$$\Big(12\,A\,\text{AppellF1}\Big[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+2\,\Big((-3+n)\,\text{AppellF1}\Big[\frac{3}{2},n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\Big[\frac{3}{2},1+n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\Big)+$$

$$\left(12\,A\left(-\frac{1}{3}(3-n)\,\text{AppellF1}\left[\frac{3}{2},n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{3}{2},1+n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,3-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-3+n)\,\text{AppellF1}\left[\frac{3}{2},n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,3-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(8\,A\left(-\frac{1}{3}(4-n)\,\text{AppellF1}\left[\frac{3}{2},n,5-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{2},1+n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,4-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-4+n)\,\text{AppellF1}\left[\frac{3}{2},n,5-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},1+n,4-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(A\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3\right.$$

$$\left(2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\right.\right.$$

$$\left.n\,\text{AppellF1}\left[\frac{3}{2},1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\left(-\frac{1}{3}(1-n)\right.$$

$$\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}n\,\text{AppellF1}\left[\frac{3}{2},\right.$$

$$\left.\left.1+n,1-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left((-1+n)\left(-\frac{3}{5}(2-n)\,\text{AppellF1}\left[\frac{5}{2},n,3-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$\left.\frac{3}{5}n\,\text{AppellF1}\left[\frac{5}{2},1+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$n\left(-\frac{3}{5}(1-n)\,\text{AppellF1}\left[\frac{5}{2},1+n,2-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\left.\left.\left.\left.\frac{3}{5}(1+n)\,\text{AppellF1}\left[\frac{5}{2},2+n,1-n,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},n,1-n,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-1+n)\,\text{AppellF1}\left[\frac{3}{2},n,2-n,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Bigg)^2-$$

$$\Bigg(C\,\text{AppellF1}\left[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^3$$

$$\Bigg(2\,\Bigg((-1+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,\Bigg(-\frac{1}{3}\,(1-n)$$

$$\text{AppellF1}\left[\frac{3}{2},\,n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)+2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\Bigg((-1+n)\,\Bigg(-\frac{3}{5}\,(2-n)\,\text{AppellF1}\left[\frac{5}{2},\,n,\,3-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{3}{5}\,n\,\text{AppellF1}\left[\frac{5}{2},\,1+n,\,2-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)+$$

$$n\,\Bigg(-\frac{3}{5}\,(1-n)\,\text{AppellF1}\left[\frac{5}{2},\,1+n,\,2-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{3}{5}\,(1+n)\,\text{AppellF1}\left[\frac{5}{2},\,2+n,\,1-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,1-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+2\,\Bigg((-1+n)\,\text{AppellF1}\Big[\frac{3}{2},\,n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,1-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Bigg)^2+$$

$$\Bigg(6\,A\,\text{AppellF1}\left[\frac{1}{2},\,n,\,2-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2$$

$$\Bigg(2\,\Bigg((-2+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,3-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]+$$

$$n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,\Bigg(-\frac{1}{3}\,(2-n)$$

$$\text{AppellF1}\left[\frac{3}{2},\,n,\,3-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{3}\,n\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+n,\,2-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)+2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\Bigg((-2+n)\,\Bigg(-\frac{3}{5}\,(3-n)\,\text{AppellF1}\left[\frac{5}{2},\,n,\,4-n,\,\frac{7}{2},\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\frac{3}{5}\, n\, \text{AppellF1}\left[\frac{5}{2}, 1+n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg) +$$

$$n \left(-\frac{3}{5}(2-n)\, \text{AppellF1}\left[\frac{5}{2}, 1+n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] +\right.$$

$$\left.\frac{3}{5}(1+n)\, \text{AppellF1}\left[\frac{5}{2}, 2+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/$$

$$\Bigg(3\, \text{AppellF1}\left[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + 2\left((-2+n)\, \text{AppellF1}\left[\frac{3}{2}, n, 3-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + n\, \text{AppellF1}\left[\frac{3}{2}, 1+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Bigg)^2 +$$

$$\left(2\, C\, \text{AppellF1}\left[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right.$$

$$\Bigg(2\left((-2+n)\, \text{AppellF1}\left[\frac{3}{2}, n, 3-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] +\right.$$

$$\left.n\, \text{AppellF1}\left[\frac{3}{2}, 1+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] + 3\left(-\frac{1}{3}(2-n)\right.$$

$$\text{AppellF1}\left[\frac{3}{2}, n, 3-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] + \frac{1}{3}\, n\, \text{AppellF1}\left[\frac{3}{2},\right.$$

$$\left.\left.1+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) + 2\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\Bigg((-2+n)\left(-\frac{3}{5}(3-n)\, \text{AppellF1}\left[\frac{5}{2}, n, 4-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] +\right.$$

$$\left.\frac{3}{5}\, n\, \text{AppellF1}\left[\frac{5}{2}, 1+n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) +$$

$$n \left(-\frac{3}{5}(2-n)\, \text{AppellF1}\left[\frac{5}{2}, 1+n, 3-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] +\right.$$

$$\left.\frac{3}{5}(1+n)\, \text{AppellF1}\left[\frac{5}{2}, 2+n, 2-n, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/$$

$$\Bigg(3\, \text{AppellF1}\left[\frac{1}{2}, n, 2-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + 2\left((-2+n)\, \text{AppellF1}\left[\frac{3}{2}, n, 3-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2,\right.\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] + n\, \text{AppellF1}\left[\frac{3}{2}, 1+n, 2-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\Bigg)^2 -$$

$$\left(12\, A\, \text{AppellF1}\left[\frac{1}{2}, n, 3-n, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\Bigg(2\left((-3+n)\, \text{AppellF1}\left[\frac{3}{2}, n, 4-n, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2, -\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right] +\right.$$

$$n\,\text{AppellF1}[\tfrac{3}{2}, 1+n, 3-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]) \,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\, \text{Tan}[\tfrac{1}{2}(c+d\,x)] + 3\,(-\tfrac{1}{3}(3-n)$$

$$\text{AppellF1}[\tfrac{3}{2}, n, 4-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] + \tfrac{1}{3}\,n\,\text{AppellF1}[\tfrac{3}{2},$$

$$1+n, 3-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]) + 2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2$$

$$((-3+n)\,(-\tfrac{3}{5}(4-n)\,\text{AppellF1}[\tfrac{5}{2}, n, 5-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] +$$

$$\tfrac{3}{5}\,n\,\text{AppellF1}[\tfrac{5}{2}, 1+n, 4-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]) +$$

$$n\,(-\tfrac{3}{5}(3-n)\,\text{AppellF1}[\tfrac{5}{2}, 1+n, 4-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] +$$

$$\tfrac{3}{5}(1+n)\,\text{AppellF1}[\tfrac{5}{2}, 2+n, 3-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]])))))\Big/$$

$$(3\,\text{AppellF1}[\tfrac{1}{2}, n, 3-n, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2] + 2\,((-3+n)\,\text{AppellF1}[\tfrac{3}{2}, n, 4-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,$$

$$-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2] + n\,\text{AppellF1}[\tfrac{3}{2}, 1+n, 3-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2])\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2)^2 +$$

$$(8\,A\,\text{AppellF1}[\tfrac{1}{2}, n, 4-n, \tfrac{3}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,(2\,((-4+n)\,\text{AppellF1}[\tfrac{3}{2}, n, 5-n, \tfrac{5}{2},$$

$$\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2] + n\,\text{AppellF1}[\tfrac{3}{2}, 1+n, 4-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2])$$

$$\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] + 3\,(-\tfrac{1}{3}(4-n)\,\text{AppellF1}[\tfrac{3}{2}, n, 5-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]$$

$$\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] + \tfrac{1}{3}\,n\,\text{AppellF1}[\tfrac{3}{2}, 1+n, 4-n, \tfrac{5}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2,$$

$$-\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]) + 2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2$$

$$((-4+n)\,(-\tfrac{3}{5}(5-n)\,\text{AppellF1}[\tfrac{5}{2}, n, 6-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] +$$

$$\tfrac{3}{5}\,n\,\text{AppellF1}[\tfrac{5}{2}, 1+n, 5-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]) +$$

$$n\,(-\tfrac{3}{5}(4-n)\,\text{AppellF1}[\tfrac{5}{2}, 1+n, 5-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)] +$$

$$\tfrac{3}{5}(1+n)\,\text{AppellF1}[\tfrac{5}{2}, 2+n, 4-n, \tfrac{7}{2}, \text{Tan}[\tfrac{1}{2}(c+d\,x)]^2, -\text{Tan}[\tfrac{1}{2}(c+d\,x)]^2]\,\text{Sec}[\tfrac{1}{2}(c+d\,x)]^2\,\text{Tan}[\tfrac{1}{2}(c+d\,x)]])))))\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},\,n,\,4-n,\,\frac{3}{2},\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+2\left((-4+n)\,\text{AppellF1}\left[\frac{3}{2},\,n,\,5-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\right.\right.\right.$$
$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+n\,\text{AppellF1}\left[\frac{3}{2},\,1+n,\,4-n,\,\frac{5}{2},\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\right)$$

- **Problem 34: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{5/2}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 142 leaves, 4 steps):

$$\frac{2\,C\,\text{Sec}[c+d\,x]^{7/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(7+2\,n)}+$$
$$\left(2\,(C\,(5+2\,n)+A\,(7+2\,n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{4}(-3-2\,n),\,\frac{1}{4}(1-2\,n),\,\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{3/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(3+2\,n)\,(7+2\,n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 341 leaves):

$$-\frac{1}{d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}$$
$$i\,2^{\frac{9}{2}+n}\,e^{2\,i\,c-\frac{1}{2}\,i\,d\,(1+2\,n)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2}\,i\,d\,(5+2\,n)\,x}\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\,\frac{1}{4}(5+2\,n),\,\frac{1}{4}(9+2\,n),\,-e^{2\,i\,(c+d\,x)}\right]}{5+2\,n}+\right.$$
$$\frac{1}{(9+2\,n)\,(13+2\,n)}e^{\frac{1}{2}\,i\,(4\,c+d\,(9+2\,n)\,x)}\left(2\,(A+2\,C)\,(13+2\,n)\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\,\frac{1}{4}(9+2\,n),\,\frac{1}{4}(13+2\,n),\,-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\right.$$
$$\left.\left.(9+2\,n)\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\,\frac{1}{4}(13+2\,n),\,\frac{1}{4}(17+2\,n),\,-e^{2\,i\,(c+d\,x)}\right]\right)\right)\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 35: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{3/2}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 142 leaves, 4 steps):

$$\frac{2\,C\,\mathrm{Sec}[c+d\,x]^{5/2}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]}{d\,(5+2\,n)}+$$
$$\left(2\,(C\,(3+2\,n)+A\,(5+2\,n))\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(-1-2\,n),\frac{1}{4}(3-2\,n),\mathrm{Cos}[c+d\,x]^2\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(1+2\,n)\,(5+2\,n)\,\sqrt{\mathrm{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 335 leaves) :

$$-\frac{1}{d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])}$$
$$i\,2^{\frac{7}{2}+n}\,e^{-\frac{1}{2}i\,d\,(3+2\,n)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{3}{2}+n}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{3}{2}+n}\left(\frac{A\,e^{\frac{1}{2}i\,d\,(3+2\,n)\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}(3+2\,n),\frac{1}{4}(7+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{3+2\,n}+\right.$$
$$\frac{1}{(7+2\,n)\,(11+2\,n)}e^{\frac{1}{2}i\,(4\,c+d\,(7+2\,n)\,x)}\left(2\,(A+2\,C)\,(11+2\,n)\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}(7+2\,n),\frac{1}{4}(11+2\,n),-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\right.$$
$$\left.\left.(7+2\,n)\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}(11+2\,n),\frac{1}{4}(15+2\,n),-e^{2\,i\,(c+d\,x)}\right]\right)\right)\mathrm{Sec}[c+d\,x]^{-2-n}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

- **Problem 36: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\mathrm{Sec}[c+d\,x]}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 140 leaves, 4 steps) :

$$\frac{2\,C\,\mathrm{Sec}[c+d\,x]^{3/2}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]}{d\,(3+2\,n)}-$$
$$\left(2\,(C+2\,C\,n+A\,(3+2\,n))\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(1-2\,n),\frac{1}{4}(5-2\,n),\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(1-2\,n)\,(3+2\,n)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{\mathrm{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 336 leaves) :

$$-\frac{1}{A+2C+A\,\text{Cos}[2c+2dx]}$$

$$\mathrm{i}\,2^{\frac{5}{2}+n}\,e^{-\frac{1}{2}\mathrm{i}\,d\,(1+2n)\,x}\left(\frac{e^{\mathrm{i}\,(c+d x)}}{1+e^{2\mathrm{i}\,(c+d x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2\mathrm{i}\,(c+d x)}\right)^{\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2}\mathrm{i}\,(d+2dn)\,x}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(1+2n),\frac{1}{4}(5+2n),-e^{2\mathrm{i}\,(c+d x)}\right]}{d+2dn}+\right.$$

$$\frac{1}{d\,(5+2n)\,(9+2n)}e^{\frac{1}{2}\mathrm{i}\,(4c+d\,(5+2n)\,x)}\left(2\,(A+2C)\,(9+2n)\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(5+2n),\frac{1}{4}(9+2n),-e^{2\mathrm{i}\,(c+d x)}\right]+A\,e^{2\mathrm{i}\,(c+d x)}\right.$$

$$\left.\left.(5+2n)\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(9+2n),\frac{1}{4}(13+2n),-e^{2\mathrm{i}\,(c+d x)}\right]\right)\right)\text{Sec}[c+dx]^{-2-n}\,(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)$$

- **Problem 37: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)}{\sqrt{\text{Sec}[c+dx]}}\,dx$$

Optimal (type 5, 141 leaves, 4 steps):

$$\frac{2\,C\,\sqrt{\text{Sec}[c+dx]}\,(b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]}{d\,(1+2n)}-$$

$$\left(2\,(A-C\,(1-2n)+2An)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(3-2n),\frac{1}{4}(7-2n),\text{Cos}[c+dx]^2\right](b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]\right)\Big/$$

$$\left(d\,(3-2n)\,(1+2n)\,\text{Sec}[c+dx]^{3/2}\sqrt{\text{Sin}[c+dx]^2}\right)$$

Result (type 5, 311 leaves):

$$-\frac{1}{d\,(-1+2n)\,(3+2n)\,(7+2n)\,(A+2C+A\,\text{Cos}[2c+2dx])}$$

$$\mathrm{i}\,2^{\frac{3}{2}+n}\left(\frac{e^{\mathrm{i}\,(c+d x)}}{1+e^{2\mathrm{i}\,(c+d x)}}\right)^{-\frac{1}{2}+n}\left(1+e^{2\mathrm{i}\,(c+d x)}\right)^{-\frac{1}{2}+n}\left(A\left(21+20n+4n^2\right)\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{1}{4}(-1+2n),\frac{1}{4}(3+2n),-e^{2\mathrm{i}\,(c+d x)}\right]+\right.$$

$$e^{2\mathrm{i}\,(c+d x)}\,(-1+2n)\left(2\,(A+2C)\,(7+2n)\,\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{1}{4}(3+2n),\frac{1}{4}(7+2n),-e^{2\mathrm{i}\,(c+d x)}\right]+A\,e^{2\mathrm{i}\,(c+d x)}\,(3+2n)\right.$$

$$\left.\left.\text{Hypergeometric2F1}\left[\frac{3}{2}+n,\frac{1}{4}(7+2n),\frac{1}{4}(11+2n),-e^{2\mathrm{i}\,(c+d x)}\right]\right)\right)\text{Sec}[c+dx]^{-2-n}\,(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)$$

- **Problem 38: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(b\,\text{Sec}[c+dx])^n\left(A+C\,\text{Sec}[c+dx]^2\right)}{\text{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 5, 140 leaves, 4 steps):

$$-\frac{2\,C\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(1-2\,n)\,\sqrt{\text{Sec}[c+d\,x]}}-\left(2\,(A+C\,(3-2\,n)-2\,A\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(5-2\,n),\frac{1}{4}\,(9-2\,n),\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1-2\,n)\,(5-2\,n)\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 343 leaves) :

$$-\frac{1}{A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]}\,i\,2^{\frac{1}{2}+n}\,e^{-\frac{1}{2}\,i\,(4\,c+d\,(1+2\,n)\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2}\,i\,d\,(-3+2\,n)\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\frac{1}{4}\,(-3+2\,n),\frac{1}{4}\,(1+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{d\,(-3+2\,n)}+\frac{1}{d\,(1+2\,n)\,(5+2\,n)}e^{\frac{1}{2}\,i\,(4\,c+d\,(1+2\,n)\,x)}\left(2\,(A+2\,C)\,(5+2\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\frac{1}{4}\,(1+2\,n),\frac{1}{4}\,(5+2\,n),-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\,(1+2\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n,\frac{1}{4}\,(5+2\,n),\frac{1}{4}\,(9+2\,n),-e^{2\,i\,(c+d\,x)}\right]\right)\right)\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 39: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(b\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 5, 142 leaves, 4 steps) :

$$-\frac{2\,C\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(3-2\,n)\,\text{Sec}[c+d\,x]^{3/2}}-\left(2\,(A\,(3-2\,n)+C\,(5-2\,n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(7-2\,n),\frac{1}{4}\,(11-2\,n),\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(3-2\,n)\,(7-2\,n)\,\text{Sec}[c+d\,x]^{7/2}\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 338 leaves) :

$$-\frac{1}{d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,i\,2^{-\frac{1}{2}+n}\,e^{-\frac{1}{2}\,i\,(4\,c+d\,(-1+2\,n)\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{-\frac{1}{2}+n}$$

$$\left(1+e^{2\,i\,(c+d\,x)}\right)^{-\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2}\,i\,d\,(-5+2\,n)\,x}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}\,(-5+2\,n),\frac{1}{4}\,(-1+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{-5+2\,n}+\frac{1}{-3+4\,n+4\,n^2}\right.$$

$$e^{\frac{1}{2}\,i\,(4\,c+d\,(-1+2\,n)\,x)}\left(2\,(A+2\,C)\,(3+2\,n)\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}\,(-1+2\,n),\frac{1}{4}\,(3+2\,n),-e^{2\,i\,(c+d\,x)}\right]+A\,e^{2\,i\,(c+d\,x)}\,(-1+2\,n)\right.$$

$$\left.\left.\mathrm{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}\,(3+2\,n),\frac{1}{4}\,(7+2\,n),-e^{2\,i\,(c+d\,x)}\right]\right)\right)\,\mathrm{Sec}[c+d\,x]^{-2-n}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

- **Problem 41: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^2\,(b\,\mathrm{Sec}[c+d\,x])^{2/3}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 154 leaves, 7 steps):

$$\frac{3\,(11\,A+8\,C)\,\mathrm{Hypergeometric2F1}\left[-\frac{5}{6},\frac{1}{2},\frac{1}{6},\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^{5/3}\,\mathrm{Sin}[c+d\,x]}{55\,b\,d\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+$$

$$\frac{3\,B\,\mathrm{Hypergeometric2F1}\left[-\frac{4}{3},\frac{1}{2},-\frac{1}{3},\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^{8/3}\,\mathrm{Sin}[c+d\,x]}{8\,b^2\,d\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\mathrm{Sec}[c+d\,x])^{8/3}\,\mathrm{Tan}[c+d\,x]}{11\,b^2\,d}$$

Result (type 5, 461 leaves):

$$-\left(\left(3\,i\,e^{-i\,(c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{2/3}\left(275\,B\,\left(1+e^{2\,i\,(c+d\,x)}\right)+275\,B\,\left(-1+e^{2\,i\,c}\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]+\right.\right.\right.$$

$$\left.16\,(11\,A+8\,C)\,e^{i\,(c+d\,x)}\,\left(-1+e^{2\,i\,c}\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\,(b\,\mathrm{Sec}[c+d\,x])^{2/3}$$

$$\left.\left.\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(220\times 2^{1/3}\,d\,\left(-1+e^{2\,i\,c}\right)\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{8/3}\right)\right)+$$

$$\left(\mathrm{Cos}[c+d\,x]^2\,(b\,\mathrm{Sec}[c+d\,x])^{2/3}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{15\,B\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]}{8\,d}+\frac{6\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}[d\,x]}{11\,d}+\frac{3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(8\,C\,\mathrm{Sin}[c]+11\,B\,\mathrm{Sin}[d\,x])}{44\,d}+\right.$$

$$\left.\left.\frac{3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(55\,B\,\mathrm{Sin}[c]+88\,A\,\mathrm{Sin}[d\,x]+64\,C\,\mathrm{Sin}[d\,x])}{220\,d}+\frac{6\,(11\,A+8\,C)\,\mathrm{Tan}[c]}{55\,d}\right)\right)\Big/\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)$$

Problem 42: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (b \text{Sec}[c+d x])^{2/3} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 5, 151 leaves, 7 steps):

$$\frac{3 (8 A+5 C) \text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{2},\frac{2}{3},\text{Cos}[c+d x]^2\right] (b \text{Sec}[c+d x])^{2/3} \text{Sin}[c+d x]}{16 d \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 B \text{Hypergeometric2F1}\left[-\frac{5}{6},\frac{1}{2},\frac{1}{6},\text{Cos}[c+d x]^2\right] (b \text{Sec}[c+d x])^{5/3} \text{Sin}[c+d x]}{5 b d \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 C (b \text{Sec}[c+d x])^{5/3} \text{Tan}[c+d x]}{8 b d}$$

Result (type 5, 689 leaves):

$$\frac{1}{b}\left(-\left(3 A e^{-i (2 c+d x)} \left(\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}\right)^{2/3} \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \left(1+e^{2 i (c+d x)}\right)^{2/3} \text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2 i (c+d x)}\right]\right) (b \text{Sec}[c+d x])^{5/3} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(2^{1/3} d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{11/3}\right)-\left(15 C e^{-i (2 c+d x)} \left(\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}\right)^{2/3} \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \left(1+e^{2 i (c+d x)}\right)^{2/3} \text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2 i (c+d x)}\right]\right) (b \text{Sec}[c+d x])^{5/3} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(8\times 2^{1/3} d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{11/3}\right)-\left(6 i 2^{2/3} B \left(\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}\right)^{2/3} \left(1+e^{2 i (c+d x)}\right)^{2/3} \text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2 i (c+d x)}\right] (b \text{Sec}[c+d x])^{5/3} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{11/3}\right)+\left(\text{Cos}[c+d x]^3 (b \text{Sec}[c+d x])^{5/3} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(\frac{3 (8 A+5 C) \text{Cos}[d x] \text{Csc}[c]}{8 d}+\frac{3 C \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{4 d}+\frac{3 \text{Sec}[c] \text{Sec}[c+d x] (5 C \text{Sin}[c]+8 B \text{Sin}[d x])}{20 d}+\frac{6 B \text{Tan}[c]}{5 d}\right)\right) \Big/ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\right)$$

Problem 43: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (b \text{Sec}[c+d x])^{2/3} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 5, 146 leaves, 6 steps):

$$-\frac{3\,b\,(5\,A+2\,C)\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{5\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{2},\frac{2}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 5, 311 leaves):

$$\Bigg((b\,\text{Sec}[c+d\,x])^{2/3}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\Bigg(-\Bigg(3\,i\,2^{2/3}\,e^{-i\,(c+d\,x)}\,\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{2/3}\,\Bigg(5\,B\,\left(1+e^{2\,i\,(c+d\,x)}\right)+5\,B\,\left(-1+e^{2\,i\,c}\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]+$$

$$(5\,A+2\,C)\,e^{i\,(c+d\,x)}\,\left(-1+e^{2\,i\,c}\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\Bigg)\Bigg)\Bigg/\left(d\,\left(-1+e^{2\,i\,c}\right)\,\text{Sec}[c+d\,x]^{8/3}\right)+$$

$$\frac{3\,\text{Cos}[c+d\,x]\,(5\,B\,\text{Cos}[d\,x]\,\text{Cos}[c+d\,x]\,\text{Csc}[c]+2\,C\,\text{Sin}[c+d\,x])}{d}\Bigg)\Bigg)\Bigg/\,(5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)]))$$

Problem 47: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^2\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 154 leaves, 7 steps):

$$\frac{3\,(13\,A+10\,C)\,\text{Hypergeometric2F1}\left[-\frac{7}{6},\frac{1}{2},-\frac{1}{6},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{7/3}\,\text{Sin}[c+d\,x]}{91\,b\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{5}{3},\frac{1}{2},-\frac{2}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{10/3}\,\text{Sin}[c+d\,x]}{10\,b^2\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{10/3}\,\text{Tan}[c+d\,x]}{13\,b^2\,d}$$

Result (type 5, 759 leaves):

$$-\left(12\times 2^{1/3}\,A\,e^{-i\,(2\,c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\mathrm{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.(b\,\mathrm{Sec}[c+d\,x])^{4/3}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(7\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{10/3}\right)-$$

$$\left(120\times 2^{1/3}\,C\,e^{-i\,(2\,c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\mathrm{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\mathrm{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.(b\,\mathrm{Sec}[c+d\,x])^{4/3}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(91\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{10/3}\right)-$$

$$\left(21\,i\,B\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\mathrm{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right](b\,\mathrm{Sec}[c+d\,x])^{4/3}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(10\times 2^{2/3}\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{10/3}\right)+$$

$$\left(\mathrm{Cos}[c+d\,x]^3\,(b\,\mathrm{Sec}[c+d\,x])^{4/3}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{24\,(13\,A+10\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]}{91\,d}+\frac{6\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^4\,\mathrm{Sin}[d\,x]}{13\,d}+\right.\right.$$

$$\frac{3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,(10\,C\,\mathrm{Sin}[c]+13\,B\,\mathrm{Sin}[d\,x])}{65\,d}+\frac{3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(520\,A\,\mathrm{Sin}[c]+400\,C\,\mathrm{Sin}[c]+637\,B\,\mathrm{Sin}[d\,x])}{1820\,d}+$$

$$\left.\left.\frac{3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(91\,B\,\mathrm{Sin}[c]+130\,A\,\mathrm{Sin}[d\,x]+100\,C\,\mathrm{Sin}[d\,x])}{455\,d}+\frac{21\,B\,\mathrm{Tan}[c]}{20\,d}\right)\right)\Big/\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])$$

- **Problem 48: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]\,(b\,\mathrm{Sec}[c+d\,x])^{4/3}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 151 leaves, 7 steps):

$$\frac{3\,(10\,A+7\,C)\,\mathrm{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\mathrm{Cos}[c+d\,x]^2\right](b\,\mathrm{Sec}[c+d\,x])^{4/3}\,\mathrm{Sin}[c+d\,x]}{40\,d\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+$$

$$\frac{3\,B\,\mathrm{Hypergeometric2F1}\left[-\frac{7}{6},\frac{1}{2},-\frac{1}{6},\mathrm{Cos}[c+d\,x]^2\right](b\,\mathrm{Sec}[c+d\,x])^{7/3}\,\mathrm{Sin}[c+d\,x]}{7\,b\,d\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\mathrm{Sec}[c+d\,x])^{7/3}\,\mathrm{Tan}[c+d\,x]}{10\,b\,d}$$

Result (type 5, 465 leaves):

$$\frac{1}{b}\left(-\left(\left(3\,i\,e^{-i\,(c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\left(160\,B\left(1+e^{2\,i\,(c+d\,x)}\right)+160\,B\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]+7\,(10\,A+7\,C)\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]\right)(b\,\text{Sec}[c+d\,x])^{7/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(70\times 2^{2/3}\,d\left(-1+e^{2\,i\,c}\right)(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{13/3}\right)+\left(\text{Cos}[c+d\,x]^4\,(b\,\text{Sec}[c+d\,x])^{7/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{24\,B\,\text{Cos}[d\,x]\,\text{Csc}[c]}{7\,d}+\frac{3\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(7\,C\,\text{Sin}[c]+10\,B\,\text{Sin}[d\,x])}{35\,d}+\frac{3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(40\,B\,\text{Sin}[c]+70\,A\,\text{Sin}[d\,x]+49\,C\,\text{Sin}[d\,x])}{140\,d}+\frac{3\,(10\,A+7\,C)\,\text{Tan}[c]}{20\,d}\right)\right)\Big/\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\right)$$

Problem 49: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (b\,\text{Sec}[c+d\,x])^{4/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 146 leaves, 6 steps):

$$\frac{3\,b\,(7\,A+4\,C)\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{2},\frac{5}{6},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{7\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Tan}[c+d\,x]}{7\,d}$$

Result (type 5, 683 leaves):

$$-\left(3\times 2^{1/3} A\, e^{-i(2c+dx)} \left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{1/3} \mathrm{Csc}[c] \left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\left(1+e^{2i(c+dx)}\right)^{1/3} \mathrm{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2i(c+dx)}\right]\right) (b\,\mathrm{Sec}[c+dx])^{4/3} \left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right) \Big/ \left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,\mathrm{Sec}[c+dx]^{10/3}\right) -$$

$$\left(12\times 2^{1/3} C\, e^{-i(2c+dx)} \left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{1/3} \mathrm{Csc}[c] \left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\left(1+e^{2i(c+dx)}\right)^{1/3} \mathrm{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2i(c+dx)}\right]\right) (b\,\mathrm{Sec}[c+dx])^{4/3} \left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right) \Big/ \left(7d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,\mathrm{Sec}[c+dx]^{10/3}\right) -$$

$$\left(3\,i\,B \left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{1/3} \left(1+e^{2i(c+dx)}\right)^{1/3} \mathrm{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2i(c+dx)}\right] (b\,\mathrm{Sec}[c+dx])^{4/3} \left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right) \Big/ \left(2^{2/3} d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,\mathrm{Sec}[c+dx]^{10/3}\right) +$$

$$\left(\mathrm{Cos}[c+dx]^3 (b\,\mathrm{Sec}[c+dx])^{4/3} \left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right) \left(\frac{6(7A+4C)\,\mathrm{Cos}[dx]\,\mathrm{Csc}[c]}{7d}+\frac{6C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^2\,\mathrm{Sin}[dx]}{7d}+\frac{3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]\,(4C\,\mathrm{Sin}[c]+7B\,\mathrm{Sin}[dx])}{14d}+\frac{3B\,\mathrm{Tan}[c]}{2d}\right)\right) \Big/ (A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])$$

- **Problem 50: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+dx]\,(b\,\mathrm{Sec}[c+dx])^{4/3} \left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right) dx$$

Optimal (type 5, 146 leaves, 7 steps):

$$-\frac{3b^2(4A+C)\,\mathrm{Hypergeometric2F1}\left[\frac{1}{3},\frac{1}{2},\frac{4}{3},\mathrm{Cos}[c+dx]^2\right]\mathrm{Sin}[c+dx]}{8d\,(b\,\mathrm{Sec}[c+dx])^{2/3}\sqrt{\mathrm{Sin}[c+dx]^2}}+\frac{3bB\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{2},\frac{5}{6},\mathrm{Cos}[c+dx]^2\right](b\,\mathrm{Sec}[c+dx])^{1/3}\,\mathrm{Sin}[c+dx]}{d\sqrt{\mathrm{Sin}[c+dx]^2}}+\frac{3bC\,(b\,\mathrm{Sec}[c+dx])^{1/3}\,\mathrm{Tan}[c+dx]}{4d}$$

Result (type 5, 303 leaves):

$$\left(3b\,(b\,\mathrm{Sec}[c+dx])^{1/3}\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right) \left(-1\Big/\left(-1+e^{2ic}\right) i\, 2^{1/3} e^{-i(c+dx)} \left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{1/3} \left(4B\left(1+e^{2i(c+dx)}\right)+4B\left(-1+e^{2ic}\right)\left(1+e^{2i(c+dx)}\right)^{1/3}\mathrm{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2i(c+dx)}\right]+(4A+C)\,e^{i(c+dx)}\left(-1+e^{2ic}\right)\left(1+e^{2i(c+dx)}\right)^{1/3}\mathrm{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2i(c+dx)}\right]\right)+\mathrm{Sec}[c+dx]^{1/3}\,(4B\,\mathrm{Cos}[dx]\,\mathrm{Csc}[c]+C\,\mathrm{Tan}[c+dx])\right)\right) \Big/ \left(2d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2(c+dx)])\,\mathrm{Sec}[c+dx]^{7/3}\right)$$

Problem 53: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(b \text{Sec}[c+d x])^{2/3}} \, dx$$

Optimal (type 5, 154 leaves, 7 steps):

$$\frac{3 (7 A+4 C) \text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{2},\frac{5}{6},\text{Cos}[c+d x]^2\right] (b \text{Sec}[c+d x])^{1/3} \text{Sin}[c+d x]}{7 b d \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 B \text{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\text{Cos}[c+d x]^2\right] (b \text{Sec}[c+d x])^{4/3} \text{Sin}[c+d x]}{4 b^2 d \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 C (b \text{Sec}[c+d x])^{4/3} \text{Tan}[c+d x]}{7 b^2 d}$$

Result (type 5, 299 leaves):

$$-\left(\left(3 b e^{-i (2 c+d x)} \left(-1+e^{2 i c}\right) \text{Csc}[c] \left(-28 A-16 C-7 B e^{i (c+d x)}-56 A e^{2 i (c+d x)}-40 C e^{2 i (c+d x)}-28 A e^{4 i (c+d x)}-8 C e^{4 i (c+d x)}+7 B e^{5 i (c+d x)}+4 (7 A+4 C) \left(1+e^{2 i (c+d x)}\right)^{7/3} \text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2 i (c+d x)}\right]+7 B e^{i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{7/3} \text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2 i (c+d x)}\right]\right) \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(28 d \left(1+e^{2 i (c+d x)}\right)^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)]) (b \text{Sec}[c+d x])^{5/3}\right)\right)$$

Problem 54: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(b \text{Sec}[c+d x])^{2/3}} \, dx$$

Optimal (type 5, 147 leaves, 7 steps):

$$-\frac{3 (4 A+C) \text{Hypergeometric2F1}\left[\frac{1}{3},\frac{1}{2},\frac{4}{3},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]}{8 d (b \text{Sec}[c+d x])^{2/3} \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 B \text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{2},\frac{5}{6},\text{Cos}[c+d x]^2\right] (b \text{Sec}[c+d x])^{1/3} \text{Sin}[c+d x]}{b d \sqrt{\text{Sin}[c+d x]^2}}+\frac{3 C (b \text{Sec}[c+d x])^{1/3} \text{Tan}[c+d x]}{4 b d}$$

Result (type 5, 305 leaves):

$$\Bigg(3\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-1\Big/\left(-1+e^{2\,i\,c}\right)\,i\,2^{1/3}\,e^{-i\,(c+d\,x)}\,\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\,\Bigg(4\,B\,\left(1+e^{2\,i\,(c+d\,x)}\right)+4\,B\,\left(-1+e^{2\,i\,c}\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\,\text{Hypergeometric2F1}\Big[-\frac{1}{3},$$

$$\frac{1}{3},\,\frac{2}{3},\,-e^{2\,i\,(c+d\,x)}\Big]+(4\,A+C)\,e^{i\,(c+d\,x)}\,\left(-1+e^{2\,i\,c}\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\,\text{Hypergeometric2F1}\Big[\frac{1}{6},\,\frac{1}{3},\,\frac{7}{6},\,-e^{2\,i\,(c+d\,x)}\Big]\Bigg)+$$

$$\text{Sec}[c+d\,x]^{1/3}\,(4\,B\,\text{Cos}[d\,x]\,\text{Csc}[c]+C\,\text{Tan}[c+d\,x])\Bigg)\Bigg)\Big/\left(2\,b\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{7/3}\right)$$

- **Problem 55: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 5, 142 leaves, 6 steps):

$$-\frac{3\,b\,(A-2\,C)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{5}{6},\,\frac{11}{6},\,\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{5\,d\,(b\,\text{Sec}[c+d\,x])^{5/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}-$$

$$\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{3},\,\frac{1}{2},\,\frac{4}{3},\,\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{2\,d\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,\text{Tan}[c+d\,x]}{d\,(b\,\text{Sec}[c+d\,x])^{2/3}}$$

Result (type 5, 154 leaves):

$$-\frac{1}{4\,b\,d}3\,i\,e^{-i\,(c+d\,x)}\,\Bigg(A-4\,C+A\,e^{2\,i\,(c+d\,x)}-2\,(A-2\,C)\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\,\text{Hypergeometric2F1}\Big[-\frac{1}{3},\,\frac{1}{3},\,\frac{2}{3},\,-e^{2\,i\,(c+d\,x)}\Big]+$$

$$4\,B\,e^{i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\,\text{Hypergeometric2F1}\Big[\frac{1}{6},\,\frac{1}{3},\,\frac{7}{6},\,-e^{2\,i\,(c+d\,x)}\Big]\Bigg)\,(b\,\text{Sec}[c+d\,x])^{1/3}$$

- **Problem 56: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 5, 147 leaves, 7 steps):

$$-\frac{3\,(4\,A+C)\,\text{Hypergeometric2F1}\left[\frac{1}{3},\,\frac{1}{2},\,\frac{4}{3},\,\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{8\,d\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+$$

$$\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\,\frac{1}{2},\,\frac{5}{6},\,\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{b\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{4\,b\,d}$$

Result (type 5, 305 leaves):

$$\left(3\,(b\,\text{Sec}[c+d\,x])^{1/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-1\Big/\left(-1+e^{2\,i\,c}\right)i\,2^{1/3}\,e^{-i\,(c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\left(4\,B\left(1+e^{2\,i\,(c+d\,x)}\right)+4\,B\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]+(4\,A+C)\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]\right)+\text{Sec}[c+d\,x]^{1/3}\,(4\,B\,\text{Cos}[d\,x]\,\text{Csc}[c]+C\,\text{Tan}[c+d\,x])\right)\right)\Big/\left(2\,b\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{7/3}\right)$$

- **Problem 57: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 5, 154 leaves, 7 steps):

$$\frac{3\,(7\,A+4\,C)\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{1}{2},\frac{5}{6},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{7\,b\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Sin}[c+d\,x]}{4\,b^2\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Tan}[c+d\,x]}{7\,b^2\,d}$$

Result (type 5, 299 leaves):

$$-\left(\left(3\,b\,e^{-i\,(2\,c+d\,x)}\left(-1+e^{2\,i\,c}\right)\text{Csc}[c]\left(-28\,A-16\,C-7\,B\,e^{i\,(c+d\,x)}-56\,A\,e^{2\,i\,(c+d\,x)}-40\,C\,e^{2\,i\,(c+d\,x)}-28\,A\,e^{4\,i\,(c+d\,x)}-8\,C\,e^{4\,i\,(c+d\,x)}+7\,B\,e^{5\,i\,(c+d\,x)}+4\,(7\,A+4\,C)\left(1+e^{2\,i\,(c+d\,x)}\right)^{7/3}\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]+7\,B\,e^{i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{7/3}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]\right)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(28\,d\left(1+e^{2\,i\,(c+d\,x)}\right)^2(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,(b\,\text{Sec}[c+d\,x])^{5/3}\right)\right)$$

- **Problem 58: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 5, 154 leaves, 7 steps):

$$\frac{3\,(10\,A+7\,C)\,\text{Hypergeometric2F1}\left[-\frac{2}{3},\frac{1}{2},\frac{1}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{4/3}\,\text{Sin}[c+d\,x]}{40\,b^2\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+$$

$$\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{7}{6},\frac{1}{2},-\frac{1}{6},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{7/3}\,\text{Sin}[c+d\,x]}{7\,b^3\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{7/3}\,\text{Tan}[c+d\,x]}{10\,b^3\,d}$$

Result (type 5, 333 leaves) :

$$\Bigg(\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(-\Bigg(3\,i\,2^{1/3}\,e^{-i\,(c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{1/3}\Bigg(160\,B\left(1+e^{2\,i\,(c+d\,x)}\right)+160\,B\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{3},\frac{2}{3},-e^{2\,i\,(c+d\,x)}\right]+$$
$$7\,(10\,A+7\,C)\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{3},\frac{7}{6},-e^{2\,i\,(c+d\,x)}\right]\Bigg)\Bigg)\Bigg/\left(d\left(-1+e^{2\,i\,c}\right)\text{Sec}[c+d\,x]^{4/3}\right)+$$
$$1/d3\,(160\,B\,\text{Cos}[d\,x]\,\text{Cos}[c+d\,x]\,\text{Csc}[c]+7\,(10\,A+7\,C)\,\text{Sin}[c+d\,x]+4\,(10\,B+7\,C\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x])\Bigg)\Bigg)\Bigg/$$
$$\left(140\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,(b\,\text{Sec}[c+d\,x])^{2/3}\right)$$

- **Problem 59: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 154 leaves, 7 steps) :

$$-\frac{3\,(5\,A+2\,C)\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]}{5\,b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{\text{Sin}[c+d\,x]^2}}+$$

$$\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{2},\frac{2}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{2\,b^2\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,b^2\,d}$$

Result (type 5, 299 leaves) :

$$\int \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\left(3\,\text{i}\,2^{2/3}\,e^{-\text{i}\,(c+d\,x)}\left(\frac{e^{\text{i}\,(c+d\,x)}}{1+e^{2\,\text{i}\,(c+d\,x)}}\right)^{2/3}\left(5\,B\left(1+e^{2\,\text{i}\,(c+d\,x)}\right)+5\,B\left(-1+e^{2\,\text{i}\,c}\right)\left(1+e^{2\,\text{i}\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,\text{i}\,(c+d\,x)}\right]+\right.\right.\right.$$

$$\left.\left.(5\,A+2\,C)\,e^{\text{i}\,(c+d\,x)}\left(-1+e^{2\,\text{i}\,c}\right)\left(1+e^{2\,\text{i}\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,\text{i}\,(c+d\,x)}\right]\right)\right)\Big/\left(d\left(-1+e^{2\,\text{i}\,c}\right)\text{Sec}[c+d\,x]^{2/3}\right)+$$

$$\left.\left.\frac{3\,(5\,B\,\text{Cos}[d\,x]\,\text{Csc}[c]+2\,C\,\text{Tan}[c+d\,x])}{d}\right)\right)\Big/\left(5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)$$

Problem 60: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 149 leaves, 7 steps):

$$-\frac{3\,(2\,A-C)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{5}{3},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{8\,d\,(b\,\text{Sec}[c+d\,x])^{4/3}\sqrt{\text{Sin}[c+d\,x]^2}}-$$

$$\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,\text{Tan}[c+d\,x]}{2\,b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 5, 174 leaves):

$$\frac{1}{2\,b^2\,d}3\,e^{-\text{i}\,(3\,c+2\,d\,x)}\left(A-C+A\,e^{2\,\text{i}\,(c+d\,x)}+(-2\,A+C)\left(1+e^{2\,\text{i}\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,\text{i}\,(c+d\,x)}\right]+\right.$$

$$\left.B\,e^{\text{i}\,(c+d\,x)}\left(1+e^{2\,\text{i}\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,\text{i}\,(c+d\,x)}\right]\right)(b\,\text{Sec}[c+d\,x])^{2/3}\,(-\text{i}\,\text{Cos}[2\,c+d\,x]+\text{Sin}[2\,c+d\,x])$$

Problem 61: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 146 leaves, 6 steps):

$$-\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{5}{3},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{4\,d\,(b\,\text{Sec}[c+d\,x])^{4/3}\sqrt{\text{Sin}[c+d\,x]^2}}-$$

$$\frac{3\,(A+4\,C)\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{4\,b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,A\,\text{Tan}[c+d\,x]}{4\,d\,(b\,\text{Sec}[c+d\,x])^{4/3}}$$

Result (type 5, 143 leaves) :

$$\left(3\left(8\,i\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]-i\,(A+4\,C)\,e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]+\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}(-4\,i\,B+A\,\text{Sin}[c+d\,x])\right)\right)\Big/\left(4\,b\,d\left(1+e^{2\,i\,(c+d\,x)}\right)^{1/3}(b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

- **Problem 62: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 149 leaves, 7 steps) :

$$-\frac{3\,(2\,A-C)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2}{3},\frac{5}{3},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{8\,d\,(b\,\text{Sec}[c+d\,x])^{4/3}\sqrt{\text{Sin}[c+d\,x]^2}}-\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,\text{Tan}[c+d\,x]}{2\,b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 5, 174 leaves) :

$$\frac{1}{2\,b^2\,d}3\,e^{-i\,(3\,c+2\,d\,x)}\left(A-C+A\,e^{2\,i\,(c+d\,x)}+(-2\,A+C)\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]+B\,e^{i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\right)(b\,\text{Sec}[c+d\,x])^{2/3}\,(-i\,\text{Cos}[2\,c+d\,x]+\text{Sin}[2\,c+d\,x])$$

- **Problem 63: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 154 leaves, 7 steps) :

$$-\frac{3\,(5\,A+2\,C)\,\text{Hypergeometric2F1}\left[\frac{1}{6},\frac{1}{2},\frac{7}{6},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]}{5\,b\,d\,(b\,\text{Sec}[c+d\,x])^{1/3}\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{2},\frac{2}{3},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{2\,b^2\,d\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,b^2\,d}$$

Result (type 5, 299 leaves) :

$$\left(\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\left(3\,i\,2^{2/3}\,e^{-i\,(c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{2/3}\left(5\,B\left(1+e^{2\,i\,(c+d\,x)}\right)+5\,B\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]+(5\,A+2\,C)\,e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\right)\right)\Big/\left(d\left(-1+e^{2\,i\,c}\right)\text{Sec}[c+d\,x]^{2/3}\right)+\frac{3\,(5\,B\,\text{Cos}[d\,x]\,\text{Csc}[c]+2\,C\,\text{Tan}[c+d\,x])}{d}\right)\right)\Big/\left(5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)$$

- **Problem 64: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{4/3}}\,dx$$

Optimal (type 5, 154 leaves, 7 steps):

$$\frac{3\,(8\,A+5\,C)\,\text{Hypergeometric2F1}\left[-\frac{1}{3},\frac{1}{2},\frac{2}{3},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{16\,b^2\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,B\,\text{Hypergeometric2F1}\left[-\frac{5}{6},\frac{1}{2},\frac{1}{6},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{5/3}\,\text{Sin}[c+d\,x]}{5\,b^3\,d\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{3\,C\,(b\,\text{Sec}[c+d\,x])^{5/3}\,\text{Tan}[c+d\,x]}{8\,b^3\,d}$$

Result (type 5, 677 leaves):

$$-\left(3\,A\,e^{-i\,(2c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{2/3}\text{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]\right)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(2^{1/3}\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{2/3}\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)-$$

$$\left(15\,C\,e^{-i\,(2c+d\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{2/3}\text{Csc}[c]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[-\frac{1}{6},\frac{2}{3},\frac{5}{6},-e^{2\,i\,(c+d\,x)}\right]\right)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(8\times 2^{1/3}\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{2/3}\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)-$$

$$\left(6\,i\,2^{2/3}\,B\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{2/3}\left(1+e^{2\,i\,(c+d\,x)}\right)^{2/3}\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{4}{3},-e^{2\,i\,(c+d\,x)}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{2/3}\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)+\left(\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{3\,(8\,A+5\,C)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{8\,d}+\frac{3\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{4\,d}+\frac{3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,C\,\text{Sin}[c]+8\,B\,\text{Sin}[d\,x])}{20\,d}+\frac{6\,B\,\text{Tan}[c]}{5\,d}\right)\right)\Big/\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)$$

- **Problem 65: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{4/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 230 leaves, 7 steps):

$$\frac{3\,b\,C\,\text{Sec}[c+d\,x]^{2+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{d\,(7+3\,m)}+$$

$$\left(3\,b\,(C\,(4+3\,m)+A\,(7+3\,m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(-1-3\,m),\frac{1}{6}\,(5-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1+3\,m)\,(7+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$

$$\left(3\,b\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(-4-3\,m),\frac{1}{6}\,(2-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(4+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 484 leaves):

$$-\frac{1}{d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{10/3}}$$

$$3\,i\,2^{\frac{7}{3}+m}\,e^{-\frac{1}{3}i\,d\,(4+3m)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{4}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{4}{3}+m}\left(\frac{2\,(A+2C)\,e^{\frac{1}{3}i\,(6c+d\,(10+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{5}{3}+\frac{m}{2},\,\frac{10}{3}+m,\,\frac{8}{3}+\frac{m}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{10+3m}+\right.$$

$$\frac{A\,e^{4\,i\,c+\frac{1}{3}i\,d\,(16+3m)\,x}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+\frac{m}{2},\,\frac{10}{3}+m,\,\frac{1}{6}\,(22+3m),\,-e^{2\,i\,(c+d\,x)}\right]}{16+3m}+$$

$$\frac{A\,e^{\frac{1}{3}i\,d\,(4+3m)\,x}\,\text{Hypergeometric2F1}\left[\frac{10}{3}+m,\,\frac{1}{6}\,(4+3m),\,\frac{5}{3}+\frac{m}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{4+3m}+$$

$$\frac{2B\,e^{\frac{1}{3}i\,(3c+d\,(7+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{10}{3}+m,\,\frac{1}{6}\,(7+3m),\,\frac{1}{6}\,(13+3m),\,-e^{2\,i\,(c+d\,x)}\right]}{7+3m}+$$

$$\left.\frac{2B\,e^{\frac{1}{3}i\,(9c+d\,(13+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{10}{3}+m,\,\frac{1}{6}\,(13+3m),\,\frac{1}{6}\,(19+3m),\,-e^{2\,i\,(c+d\,x)}\right]}{13+3m}\right)$$

$$(b\,\text{Sec}[c+d\,x])^{4/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 66: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{2/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 227 leaves, 7 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]}{d\,(5+3m)}-$$

$$\left(3\,(C\,(2+3m)+A\,(5+3m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{6}\,(1-3m),\,\frac{1}{6}\,(7-3m),\,\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(1-3m)\,(5+3m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$

$$\left(3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{6}\,(-2-3m),\,\frac{1}{6}\,(4-3m),\,\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(2+3m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 547 leaves):

$$-\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{8/3}}$$

$$3\,i\,2^{\frac{5}{3}+m}\,e^{-\frac{1}{3}\,i\,d\,(2+3\,m)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{2}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{2}{3}+m}\left(\frac{A\,e^{4\,i\,c+\frac{1}{3}\,i\,d\,(14+3\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{7}{3}+\frac{m}{2},\frac{8}{3}+m,\frac{1}{6}\,(20+3\,m),-e^{2\,i\,(c+d\,x)}\right]}{14+3\,m}+\right.$$

$$\frac{A\,e^{\frac{1}{3}\,i\,d\,(2+3\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\frac{1}{6}\,(2+3\,m),\frac{1}{6}\,(8+3\,m),-e^{2\,i\,(c+d\,x)}\right]}{2+3\,m}+$$

$$\frac{2\,B\,e^{\frac{1}{3}\,i\,(3\,c+d\,(5+3\,m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\frac{1}{6}\,(5+3\,m),\frac{1}{6}\,(11+3\,m),-e^{2\,i\,(c+d\,x)}\right]}{5+3\,m}+$$

$$\frac{2\,A\,e^{\frac{1}{3}\,i\,(6\,c+d\,(8+3\,m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\frac{1}{6}\,(8+3\,m),\frac{7}{3}+\frac{m}{2},-e^{2\,i\,(c+d\,x)}\right]}{8+3\,m}+$$

$$\frac{4\,C\,e^{\frac{1}{3}\,i\,(6\,c+d\,(8+3\,m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\frac{1}{6}\,(8+3\,m),\frac{7}{3}+\frac{m}{2},-e^{2\,i\,(c+d\,x)}\right]}{8+3\,m}+$$

$$\left.\frac{2\,B\,e^{\frac{1}{3}\,i\,(9\,c+d\,(11+3\,m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{8}{3}+m,\frac{1}{6}\,(11+3\,m),\frac{1}{6}\,(17+3\,m),-e^{2\,i\,(c+d\,x)}\right]}{11+3\,m}\right)$$

$$(b\,\text{Sec}[c+d\,x])^{2/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 67: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 225 leaves, 7 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]}{d\,(4+3\,m)}-$$

$$\left(3\,(C+3\,C\,m+A\,(4+3\,m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(2-3\,m),\frac{1}{6}\,(8-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(2-3\,m)\,(4+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$

$$\left(3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}\,(-1-3\,m),\frac{1}{6}\,(5-3\,m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1+3\,m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 494 leaves):

$$-\frac{1}{(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{7/3}}$$

$$3\,\text{i}\,2^{\frac{4}{3}+m}\,e^{-\frac{1}{3}\text{i}\,d\,(1+3m)\,x}\left(\frac{e^{\text{i}\,(c+d\,x)}}{1+e^{2\,\text{i}\,(c+d\,x)}}\right)^{\frac{1}{3}+m}\left(1+e^{2\,\text{i}\,(c+d\,x)}\right)^{\frac{1}{3}+m}\left(\frac{2\,B\,e^{\frac{1}{3}\text{i}\,(9c+d\,(10+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{5}{3}+\frac{m}{2},\frac{7}{3}+m,\frac{8}{3}+\frac{m}{2},-e^{2\,\text{i}\,(c+d\,x)}\right]}{d\,(10+3m)}+\right.$$

$$\frac{A\,e^{\frac{1}{3}\text{i}\,(d+3d\,m)\,x}\,\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}(1+3m),\frac{1}{6}(7+3m),-e^{2\,\text{i}\,(c+d\,x)}\right]}{d+3d\,m}+\frac{1}{d}$$

$$e^{\text{i}\,c}\left(\frac{2\,B\,e^{\frac{1}{3}\text{i}\,d\,(4+3m)\,x}\,\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}(4+3m),\frac{5}{3}+\frac{m}{2},-e^{2\,\text{i}\,(c+d\,x)}\right]}{4+3m}+1/((7+3m)\,(13+3m))\,e^{\frac{1}{3}\text{i}\,(3c+d\,(7+3m)\,x)}\right.$$

$$\left(2\,(A+2C)\,(13+3m)\,\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}(7+3m),\frac{1}{6}(13+3m),-e^{2\,\text{i}\,(c+d\,x)}\right]+A\,e^{2\,\text{i}\,(c+d\,x)}\,(7+3m)\right.$$

$$\left.\left.\left.\text{Hypergeometric2F1}\left[\frac{7}{3}+m,\frac{1}{6}(13+3m),\frac{1}{6}(19+3m),-e^{2\,\text{i}\,(c+d\,x)}\right]\right)\right)\right)(b\,\text{Sec}[c+d\,x])^{1/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

Problem 68: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^m\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 5, 228 leaves, 7 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,\text{Sin}[c+d\,x]}{d\,(2+3m)\,(b\,\text{Sec}[c+d\,x])^{1/3}}+$$

$$\left(3\,(C\,(1-3m)-A\,(2+3m))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(4-3m),\frac{1}{6}(10-3m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(4-3m)\,(2+3m)\,(b\,\text{Sec}[c+d\,x])^{1/3}\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$

$$\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(1-3m),\frac{1}{6}(7-3m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^m\,\text{Sin}[c+d\,x]}{d\,(1-3m)\,(b\,\text{Sec}[c+d\,x])^{1/3}\sqrt{\text{Sin}[c+d\,x]^2}}$$

Result (type 5, 548 leaves):

$$-\left(\left(3\,i\,2^{\frac{2}{3}+m}\,e^{-\frac{1}{3}i\,(3c+d\,(2+3m)\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{2}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{2}{3}+m}\right.\right.$$
$$\left(A\,e^{\frac{1}{3}i\,d\,(-1+3m)\,x}\left(880+2418\,m+2079\,m^2+702\,m^3+81\,m^4\right)\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\frac{1}{6}(-1+3m),\frac{1}{6}(5+3m),-e^{2\,i\,(c+d\,x)}\right]+\right.$$
$$e^{i\,c}\,(-1+3m)\left(2\,B\,e^{\frac{1}{3}i\,d\,(2+3m)\,x}\left(440+549\,m+216\,m^2+27\,m^3\right)\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\frac{1}{6}(2+3m),\frac{1}{6}(8+3m),-e^{2\,i\,(c+d\,x)}\right]+\right.$$
$$e^{\frac{1}{3}i\,(3c+d\,(5+3m)\,x)}\,(2+3m)\left(2\,(A+2\,C)\left(88+57\,m+9\,m^2\right)\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\frac{1}{6}(5+3m),\frac{1}{6}(11+3m),-e^{2\,i\,(c+d\,x)}\right]+\right.$$
$$e^{i\,(c+d\,x)}\,(5+3m)\left(2\,B\,(11+3m)\,\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\frac{1}{6}(8+3m),\frac{7}{3}+\frac{m}{2},-e^{2\,i\,(c+d\,x)}\right]+A\,e^{i\,(c+d\,x)}\,(8+3m)\right.$$
$$\left.\left.\left.\left.\left.\text{Hypergeometric2F1}\left[\frac{5}{3}+m,\frac{1}{6}(11+3m),\frac{1}{6}(17+3m),-e^{2\,i\,(c+d\,x)}\right]\right)\right)\right)\right)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(-1+3m)\,(2+3m)\,(5+3m)\,(8+3m)\,(11+3m)\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/3}\right.$$
$$\left.(b\,\text{Sec}[c+d\,x])^{1/3}\right)$$

- **Problem 69: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^m\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 5, 226 leaves, 7 steps):

$$\frac{3\,C\,\text{Sec}[c+d\,x]^{1+m}\,\text{Sin}[c+d\,x]}{d\,(1+3m)\,(b\,\text{Sec}[c+d\,x])^{2/3}}-$$
$$\left(3\,(A-C\,(2-3m)+3\,A\,m)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(5-3m),\frac{1}{6}(11-3m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{-1+m}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(5-3m)\,(1+3m)\,(b\,\text{Sec}[c+d\,x])^{2/3}\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(2-3m),\frac{1}{6}(8-3m),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^m\,\text{Sin}[c+d\,x]}{d\,(2-3m)\,(b\,\text{Sec}[c+d\,x])^{2/3}\sqrt{\text{Sin}[c+d\,x]^2}}$$

Result (type 5, 545 leaves):

$$-\left(\left(3\,i\,2^{\frac{1}{3}+m}\,e^{-\frac{1}{3}i(3c+d(1+3m)x)}\left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{\frac{1}{3}+m}\left(1+e^{2i(c+dx)}\right)^{\frac{1}{3}+m}\right.\right.$$
$$\left(A\,e^{4ic+\frac{1}{3}id(10+3m)x}\left(-56-150m+135m^2+270m^3+81m^4\right)\text{Hypergeometric2F1}\left[\frac{5}{3}+\frac{m}{2},\frac{4}{3}+m,\frac{8}{3}+\frac{m}{2},-e^{2i(c+dx)}\right]+\right.$$
$$(10+3m)\left(A\,e^{\frac{1}{3}id(-2+3m)x}\left(28+117m+108m^2+27m^3\right)\text{Hypergeometric2F1}\left[\frac{4}{3}+m,\frac{1}{6}(-2+3m),\frac{1}{6}(4+3m),-e^{2i(c+dx)}\right]+\right.$$
$$2\,e^{\frac{1}{3}i(3c+d(1+3m)x)}(-2+3m)\left(B\left(28+33m+9m^2\right)\text{Hypergeometric2F1}\left[\frac{4}{3}+m,\frac{1}{6}(1+3m),\frac{1}{6}(7+3m),-e^{2i(c+dx)}\right]+\right.$$
$$e^{i(c+dx)}(1+3m)\left((A+2C)(7+3m)\text{Hypergeometric2F1}\left[\frac{4}{3}+m,\frac{1}{6}(4+3m),\frac{5}{3}+\frac{m}{2},-e^{2i(c+dx)}\right]+B\,e^{i(c+dx)}(4+3m)\right.$$
$$\left.\left.\left.\left.\left.\text{Hypergeometric2F1}\left[\frac{4}{3}+m,\frac{1}{6}(7+3m),\frac{1}{6}(13+3m),-e^{2i(c+dx)}\right]\right)\right)\right)\right)\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d(-2+3m)(1+3m)(4+3m)(7+3m)(10+3m)(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{4/3}\right.$$
$$\left.(b\,\text{Sec}[c+dx])^{2/3}\right)$$

- **Problem 70: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^m\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(b\,\text{Sec}[c+dx])^{4/3}}\,dx$$

Optimal (type 5, 234 leaves, 7 steps):

$$-\frac{3\,C\,\text{Sec}[c+dx]^m\,\text{Sin}[c+dx]}{b\,d\,(1-3m)\,(b\,\text{Sec}[c+dx])^{1/3}}-$$
$$\left(3\,(A+C\,(4-3m)-3\,A\,m)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(7-3m),\frac{1}{6}(13-3m),\text{Cos}[c+dx]^2\right]\text{Sec}[c+dx]^{-2+m}\,\text{Sin}[c+dx]\right)\Big/$$
$$\left(b\,d\,(1-3m)\,(7-3m)\,(b\,\text{Sec}[c+dx])^{1/3}\sqrt{\text{Sin}[c+dx]^2}\right)-$$
$$\frac{3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{6}(4-3m),\frac{1}{6}(10-3m),\text{Cos}[c+dx]^2\right]\text{Sec}[c+dx]^{-1+m}\,\text{Sin}[c+dx]}{b\,d\,(4-3m)\,(b\,\text{Sec}[c+dx])^{1/3}\sqrt{\text{Sin}[c+dx]^2}}$$

Result (type 5, 492 leaves):

$$-\Bigg(\Bigg(3\,i\,2^{-\frac{1}{3}+m}\,e^{-\frac{1}{3}i\,(6c+d\,(2+3m)\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{2}{3}+m}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{2}{3}+m}\Bigg(\frac{A\,e^{\frac{1}{3}i\,d\,(-4+3m)\,x}\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}(-4+3m),\frac{1}{6}(2+3m),-e^{2\,i\,(c+d\,x)}\right]}{-4+3m}+$$

$$\frac{2\,B\,e^{\frac{1}{3}i\,(3c+d\,(-1+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}(-1+3m),\frac{1}{6}(5+3m),-e^{2\,i\,(c+d\,x)}\right]}{-1+3m}+$$

$$e^{2\,i\,c}\left(\frac{2\,(A+2C)\,e^{\frac{1}{3}i\,d\,(2+3m)\,x}\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}(2+3m),\frac{1}{6}(8+3m),-e^{2\,i\,(c+d\,x)}\right]}{2+3m}+\right.$$

$$\frac{2\,B\,e^{\frac{1}{3}i\,(3c+d\,(5+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}(5+3m),\frac{1}{6}(11+3m),-e^{2\,i\,(c+d\,x)}\right]}{5+3m}+$$

$$\left.\frac{A\,e^{\frac{1}{3}i\,(6c+d\,(8+3m)\,x)}\,\text{Hypergeometric2F1}\left[\frac{2}{3}+m,\frac{1}{6}(8+3m),\frac{7}{3}+\frac{m}{2},-e^{2\,i\,(c+d\,x)}\right]}{8+3m}\right)\Bigg)\Bigg)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Bigg)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{2/3}\,(b\,\text{Sec}[c+d\,x])^{4/3}\right)$$

- **Problem 71: Result unnecessarily involves imaginary or complex numbers.**

$$\int \text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 226 leaves, 7 steps):

$$\frac{C\,\text{Sec}[c+d\,x]^{1+m}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(1+m+n)}-$$

$$\left((C\,(m+n)+A\,(1+m+n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(1-m-n),\frac{1}{2}(3-m-n),\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^{-1+m}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(1-m-n)\,(1+m+n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+\frac{1}{d\,(m+n)\,\sqrt{\text{Sin}[c+d\,x]^2}}$$

$$B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(-m-n),\frac{1}{2}(2-m-n),\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^m\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]$$

Result (type 5, 436 leaves):

$$-\frac{1}{d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2 d x])}\,\mathbb{i}\,2^{1+m+n}\,e^{-\mathbb{i} d (m+n) x}\left(\frac{e^{\mathbb{i}(c+d x)}}{1+e^{2\mathbb{i}(c+d x)}}\right)^{m+n}\left(1+e^{2\mathbb{i}(c+d x)}\right)^{m+n}\left(\frac{A\,e^{\mathbb{i} d (m+n) x}\,\text{Hypergeometric2F1}\left[\frac{m+n}{2},2+m+n,\frac{1}{2}(2+m+n),-e^{2\mathbb{i}(c+d x)}\right]}{m+n}+\frac{2B\,e^{\mathbb{i}(c+d(1+m+n)x)}\,\text{Hypergeometric2F1}\left[\frac{1}{2}(1+m+n),2+m+n,\frac{1}{2}(3+m+n),-e^{2\mathbb{i}(c+d x)}\right]}{1+m+n}+e^{2\mathbb{i}c}\left(\frac{2(A+2C)\,e^{\mathbb{i} d (2+m+n) x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}(2+m+n),2+m+n,\frac{1}{2}(4+m+n),-e^{2\mathbb{i}(c+d x)}\right]}{2+m+n}+\frac{2B\,e^{\mathbb{i}(c+d(3+m+n)x)}\,\text{Hypergeometric2F1}\left[2+m+n,\frac{1}{2}(3+m+n),\frac{1}{2}(5+m+n),-e^{2\mathbb{i}(c+d x)}\right]}{3+m+n}+\frac{A\,e^{\mathbb{i}(2c+d(4+m+n)x)}\,\text{Hypergeometric2F1}\left[2+m+n,\frac{1}{2}(4+m+n),\frac{1}{2}(6+m+n),-e^{2\mathbb{i}(c+d x)}\right]}{4+m+n}\right)\right)$$

$$\text{Sec}[c+d x]^{-2-n}\,(b\,\text{Sec}[c+d x])^n\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

- **Problem 72: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^2\,(b\,\text{Sec}[c+d x])^n\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,dx$$

Optimal (type 5, 189 leaves, 7 steps):

$$\left((C(2+n)+A(3+n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(-1-n),\frac{1-n}{2},\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^{1+n}\,\text{Sin}[c+d x]\right)\Big/\left(b\,d\,(1+n)\,(3+n)\,\sqrt{\text{Sin}[c+d x]^2}\right)+\frac{B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(-2-n),-\frac{n}{2},\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^{2+n}\,\text{Sin}[c+d x]}{b^2\,d\,(2+n)\,\sqrt{\text{Sin}[c+d x]^2}}+\frac{C\,(b\,\text{Sec}[c+d x])^{2+n}\,\text{Tan}[c+d x]}{b^2\,d\,(3+n)}$$

Result (type 5, 462 leaves):

$$-\frac{1}{d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,i\,2^{3+n}\,e^{2\,i\,c-i\,d\,n\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^n\left(1+e^{2\,i\,(c+d\,x)}\right)^n$$
$$\left(\frac{A\,e^{i\,d\,(2+n)\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{2+n}{2},\,4+n,\,\frac{4+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{2+n}+\frac{2\,B\,e^{i\,(c+d\,(3+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{3+n}{2},\,4+n,\,\frac{5+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{3+n}+\right.$$
$$\frac{2\,A\,e^{i\,(2\,c+d\,(4+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{4+n}{2},\,4+n,\,\frac{6+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{4+n}+\frac{4\,C\,e^{i\,(2\,c+d\,(4+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{4+n}{2},\,4+n,\,\frac{6+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{4+n}+$$
$$\left.\frac{2\,B\,e^{i\,(3\,c+d\,(5+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[4+n,\,\frac{5+n}{2},\,\frac{7+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{5+n}+\frac{A\,e^{i\,(4\,c+d\,(6+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[4+n,\,\frac{6+n}{2},\,\frac{8+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{6+n}\right)$$
$$\mathrm{Sec}[c+d\,x]^{-2-n}\,(b\,\mathrm{Sec}[c+d\,x])^n\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

- **Problem 73: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]\,(b\,\mathrm{Sec}[c+d\,x])^n\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 182 leaves, 7 steps):

$$\frac{(C\,(1+n)+A\,(2+n))\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\,-\frac{n}{2},\,\frac{2-n}{2},\,\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]}{d\,n\,(2+n)\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+$$
$$\frac{B\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1-n),\,\frac{1-n}{2},\,\mathrm{Cos}[c+d\,x]^2\right]\,(b\,\mathrm{Sec}[c+d\,x])^{1+n}\,\mathrm{Sin}[c+d\,x]}{b\,d\,(1+n)\,\sqrt{\mathrm{Sin}[c+d\,x]^2}}+\frac{C\,(b\,\mathrm{Sec}[c+d\,x])^{1+n}\,\mathrm{Tan}[c+d\,x]}{b\,d\,(2+n)}$$

Result (type 5, 460 leaves):

$$-\frac{1}{d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,i\,2^{2+n}\,e^{i\,(c-d\,n\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^n\left(1+e^{2\,i\,(c+d\,x)}\right)^n$$
$$\left(\frac{A\,e^{i\,d\,(1+n)\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1+n}{2},\,3+n,\,\frac{3+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{1+n}+\frac{2\,B\,e^{i\,(c+d\,(2+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{2+n}{2},\,3+n,\,\frac{4+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{2+n}+\right.$$
$$\frac{2\,A\,e^{i\,(2\,c+d\,(3+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{3+n}{2},\,3+n,\,\frac{5+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{3+n}+\frac{4\,C\,e^{i\,(2\,c+d\,(3+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{3+n}{2},\,3+n,\,\frac{5+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{3+n}+$$
$$\left.\frac{2\,B\,e^{i\,(3\,c+d\,(4+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[3+n,\,\frac{4+n}{2},\,\frac{6+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{4+n}+\frac{A\,e^{i\,(4\,c+d\,(5+n)\,x)}\,\mathrm{Hypergeometric2F1}\left[3+n,\,\frac{5+n}{2},\,\frac{7+n}{2},\,-e^{2\,i\,(c+d\,x)}\right]}{5+n}\right)$$
$$\mathrm{Sec}[c+d\,x]^{-2-n}\,(b\,\mathrm{Sec}[c+d\,x])^n\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

- **Problem 74: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int (b\,\mathrm{Sec}[c+d\,x])^n\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 175 leaves, 6 steps):

$$-\frac{b\,(A+A\,n+C\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{-1+n}\,\text{Sin}[c+d\,x]}{d\,(1-n)\,(1+n)\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{B\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{n}{2},\frac{2-n}{2},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,n\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{C\,(b\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]}{d\,(1+n)}$$

Result (type 5, 401 leaves):

$$-\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,2^{1+n}\,e^{-i\,d\,n\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^n\left(1+e^{2\,i\,(c+d\,x)}\right)^n\left(\frac{A\,e^{i\,d\,n\,x}\,\text{Hypergeometric2F1}\left[\frac{n}{2},2+n,\frac{2+n}{2},-e^{2\,i\,(c+d\,x)}\right]}{n}+\frac{2\,B\,e^{i\,(c+d\,(1+n)\,x)}\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},2+n,\frac{3+n}{2},-e^{2\,i\,(c+d\,x)}\right]}{1+n}+e^{2\,i\,c}\left(\frac{2\,(A+2\,C)\,e^{i\,d\,(2+n)\,x}\,\text{Hypergeometric2F1}\left[\frac{2+n}{2},2+n,\frac{4+n}{2},-e^{2\,i\,(c+d\,x)}\right]}{2+n}+\frac{2\,B\,e^{i\,(c+d\,(3+n)\,x)}\,\text{Hypergeometric2F1}\left[2+n,\frac{3+n}{2},\frac{5+n}{2},-e^{2\,i\,(c+d\,x)}\right]}{3+n}+\frac{A\,e^{i\,(2\,c+d\,(4+n)\,x)}\,\text{Hypergeometric2F1}\left[2+n,\frac{4+n}{2},\frac{6+n}{2},-e^{2\,i\,(c+d\,x)}\right]}{4+n}\right)\right)\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 75: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(b\,\text{Sec}[c+d\,x])^n\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 191 leaves, 7 steps):

$$\frac{b^2\,(C\,(1-n)-A\,n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2-n}{2},\frac{4-n}{2},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{-2+n}\,\text{Sin}[c+d\,x]}{d\,(2-n)\,n\,\sqrt{\text{Sin}[c+d\,x]^2}}-\frac{b\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-n}{2},\frac{3-n}{2},\text{Cos}[c+d\,x]^2\right](b\,\text{Sec}[c+d\,x])^{-1+n}\,\text{Sin}[c+d\,x]}{d\,(1-n)\,\sqrt{\text{Sin}[c+d\,x]^2}}+\frac{b\,C\,(b\,\text{Sec}[c+d\,x])^{-1+n}\,\text{Tan}[c+d\,x]}{d\,n}$$

Result (type 6, 6083 leaves): Display of huge result suppressed!

- **Problem 76: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(b\,\text{Sec}[c+d\,x])^n\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 208 leaves, 7 steps):

$$-\left(b^3\,(A\,(1-n)+C\,(2-n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3-n}{2},\frac{5-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-3+n}\,\text{Sin}[c+d\,x]\right)\bigg/\left(d\,(1-n)\,(3-n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-\frac{b^2\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2-n}{2},\frac{4-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-2+n}\,\text{Sin}[c+d\,x]}{d\,(2-n)\,\sqrt{\text{Sin}[c+d\,x]^2}}-\frac{b^2\,C\,(b\,\text{Sec}[c+d\,x])^{-2+n}\,\text{Tan}[c+d\,x]}{d\,(1-n)}$$

Result (type 6, 12 574 leaves) : Display of huge result suppressed!

- **Problem 77: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 208 leaves, 7 steps) :

$$-\left(b^4\,(A\,(2-n)+C\,(3-n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{4-n}{2},\frac{6-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-4+n}\,\text{Sin}[c+d\,x]\right)\bigg/\left(d\,(2-n)\,(4-n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-\frac{b^3\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3-n}{2},\frac{5-n}{2},\text{Cos}[c+d\,x]^2\right]\,(b\,\text{Sec}[c+d\,x])^{-3+n}\,\text{Sin}[c+d\,x]}{d\,(3-n)\,\sqrt{\text{Sin}[c+d\,x]^2}}-\frac{b^3\,C\,(b\,\text{Sec}[c+d\,x])^{-3+n}\,\text{Tan}[c+d\,x]}{d\,(2-n)}$$

Result (type 6, 18 886 leaves) : Display of huge result suppressed!

- **Problem 78: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{5/2}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 223 leaves, 7 steps) :

$$\frac{2\,C\,\text{Sec}[c+d\,x]^{7/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(7+2\,n)}+\left(2\,(C\,(5+2\,n)+A\,(7+2\,n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(-3-2\,n),\frac{1}{4}\,(1-2\,n),\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^{3/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\bigg/\left(d\,(3+2\,n)\,(7+2\,n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+\left(2\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(-5-2\,n),\frac{1}{4}\,(-1-2\,n),\text{Cos}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^{5/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\bigg/\left(d\,(5+2\,n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 493 leaves) :

$$-\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}$$

$$i\,2^{\frac{9}{2}+n}\,e^{2\,i\,c-\frac{1}{2}\,i\,d\,(1+2\,n)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2}\,i\,d\,(5+2\,n)\,x}\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\frac{1}{4}\,(5+2\,n),\frac{1}{4}\,(9+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{5+2\,n}+\right.$$

$$\frac{2\,B\,e^{\frac{1}{2}\,i\,(2\,c+d\,(7+2\,n)\,x)}\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\frac{1}{4}\,(7+2\,n),\frac{1}{4}\,(11+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{7+2\,n}+$$

$$e^{2\,i\,c}\left(\frac{2\,(A+2\,C)\,e^{\frac{1}{2}\,i\,d\,(9+2\,n)\,x}\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\frac{1}{4}\,(9+2\,n),\frac{1}{4}\,(13+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{9+2\,n}+\right.$$

$$\frac{2\,B\,e^{\frac{1}{2}\,i\,(2\,c+d\,(11+2\,n)\,x)}\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\frac{1}{4}\,(11+2\,n),\frac{1}{4}\,(15+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{11+2\,n}+$$

$$\left.\left.\frac{A\,e^{\frac{1}{2}\,i\,(4\,c+d\,(13+2\,n)\,x)}\,\text{Hypergeometric2F1}\left[\frac{9}{2}+n,\frac{1}{4}\,(13+2\,n),\frac{1}{4}\,(17+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{13+2\,n}\right)\right)$$

$$\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 79: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{3/2}\,(b\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 223 leaves, 7 steps):

$$\frac{2\,C\,\text{Sec}[c+d\,x]^{5/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(5+2\,n)}+$$

$$\left(2\,(C\,(3+2\,n)+A\,(5+2\,n))\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(-1-2\,n),\frac{1}{4}\,(3-2\,n),\text{Cos}[c+d\,x]^2\right]\sqrt{\text{Sec}[c+d\,x]}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(1+2\,n)\,(5+2\,n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$

$$\left(2\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(-3-2\,n),\frac{1}{4}\,(1-2\,n),\text{Cos}[c+d\,x]^2\right]\text{Sec}[c+d\,x]^{3/2}\,(b\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(3+2\,n)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 487 leaves):

$$-\frac{1}{d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}$$

$$i\,2^{\frac{7}{2}+n}\,e^{-\frac{1}{2}\,i\,d\,(3+2\,n)\,x}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}\right)^{\frac{3}{2}+n}\left(1+e^{2\,i\,(c+d\,x)}\right)^{\frac{3}{2}+n}\left(\frac{A\,e^{\frac{1}{2}\,i\,d\,(3+2\,n)\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}\,(3+2\,n),\frac{1}{4}\,(7+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{3+2\,n}+\right.$$

$$\frac{2\,B\,e^{\frac{1}{2}\,i\,(2\,c+d\,(5+2\,n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}\,(5+2\,n),\frac{1}{4}\,(9+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{5+2\,n}+$$

$$e^{2\,i\,c}\left(\frac{2\,(A+2\,C)\,e^{\frac{1}{2}\,i\,d\,(7+2\,n)\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}\,(7+2\,n),\frac{1}{4}\,(11+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{7+2\,n}+\right.$$

$$\frac{2\,B\,e^{\frac{1}{2}\,i\,(2\,c+d\,(9+2\,n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}\,(9+2\,n),\frac{1}{4}\,(13+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{9+2\,n}+$$

$$\left.\left.\frac{A\,e^{\frac{1}{2}\,i\,(4\,c+d\,(11+2\,n)\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{7}{2}+n,\frac{1}{4}\,(11+2\,n),\frac{1}{4}\,(15+2\,n),-e^{2\,i\,(c+d\,x)}\right]}{11+2\,n}\right)\right)$$

$$\mathrm{Sec}[c+d\,x]^{-2-n}\,(b\,\mathrm{Sec}[c+d\,x])^n\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

- **Problem 80: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\mathrm{Sec}[c+d\,x]}\,(b\,\mathrm{Sec}[c+d\,x])^n\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 5, 221 leaves, 7 steps):

$$\frac{2\,C\,\mathrm{Sec}[c+d\,x]^{3/2}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]}{d\,(3+2\,n)}-$$

$$\left(2\,(C+2\,C\,n+A\,(3+2\,n))\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(1-2\,n),\frac{1}{4}\,(5-2\,n),\mathrm{Cos}[c+d\,x]^2\right](b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(1-2\,n)\,(3+2\,n)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{\mathrm{Sin}[c+d\,x]^2}\right)+$$

$$\left(2\,B\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}\,(-1-2\,n),\frac{1}{4}\,(3-2\,n),\mathrm{Cos}[c+d\,x]^2\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,(b\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(d\,(1+2\,n)\,\sqrt{\mathrm{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 492 leaves):

$$-\frac{1}{A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]}$$

$$i\,2^{\frac{5}{2}+n}\,e^{-\frac{1}{2} i d (1+2n) x}\left(\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}\right)^{\frac{1}{2}+n}\left(1+e^{2 i (c+d x)}\right)^{\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2} i (d+2 d n) x}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(1+2n),\frac{1}{4}(5+2n),-e^{2 i (c+d x)}\right]}{d+2 d n}+\right.$$

$$\frac{1}{d}e^{i c}\left(\frac{2 B\,e^{\frac{1}{2} i d (3+2n) x}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(3+2n),\frac{1}{4}(7+2n),-e^{2 i (c+d x)}\right]}{3+2n}+\right.$$

$$e^{i c}\left(\frac{2(A+2C)\,e^{\frac{1}{2} i d (5+2n) x}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(5+2n),\frac{1}{4}(9+2n),-e^{2 i (c+d x)}\right]}{5+2n}+\right.$$

$$\frac{2 B\,e^{\frac{1}{2} i (2c+d (7+2n) x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(7+2n),\frac{1}{4}(11+2n),-e^{2 i (c+d x)}\right]}{7+2n}+$$

$$\left.\left.\left.\frac{A\,e^{\frac{1}{2} i (4c+d (9+2n) x)}\,\text{Hypergeometric2F1}\left[\frac{5}{2}+n,\frac{1}{4}(9+2n),\frac{1}{4}(13+2n),-e^{2 i (c+d x)}\right]}{9+2n}\right)\right)\right)$$

$$\text{Sec}[c+d x]^{-2-n}\,(b\,\text{Sec}[c+d x])^n\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

- **Problem 81: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(b\,\text{Sec}[c+d x])^n\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 5, 222 leaves, 7 steps):

$$\frac{2 C\sqrt{\text{Sec}[c+d x]}\,(b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]}{d(1+2n)}-$$

$$\left(2(A-C(1-2n)+2 A n)\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(3-2n),\frac{1}{4}(7-2n),\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]\right)\Big/$$

$$\left(d(3-2n)(1+2n)\,\text{Sec}[c+d x]^{3/2}\sqrt{\text{Sin}[c+d x]^2}\right)-$$

$$\frac{2 B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{4}(1-2n),\frac{1}{4}(5-2n),\text{Cos}[c+d x]^2\right](b\,\text{Sec}[c+d x])^n\,\text{Sin}[c+d x]}{d(1-2n)\sqrt{\text{Sec}[c+d x]}\sqrt{\text{Sin}[c+d x]^2}}$$

Result (type 5, 548 leaves):

$$-\Bigg(\Bigg(i\,2^{\frac{3}{2}+n}\,e^{-\frac{1}{2}i(2c+d(1+2n)x)}\left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{\frac{1}{2}+n}\left(1+e^{2i(c+dx)}\right)^{\frac{1}{2}+n}$$
$$\Big(A\,e^{\frac{1}{2}id(-1+2n)x}\left(105+352n+344n^2+128n^3+16n^4\right)\text{Hypergeometric2F1}\Big[\frac{3}{2}+n,\frac{1}{4}(-1+2n),\frac{1}{4}(3+2n),-e^{2i(c+dx)}\Big]+$$
$$e^{ic}(-1+2n)\Big(2B\,e^{\frac{1}{2}id(1+2n)x}\left(105+142n+60n^2+8n^3\right)\text{Hypergeometric2F1}\Big[\frac{3}{2}+n,\frac{1}{4}(1+2n),\frac{1}{4}(5+2n),-e^{2i(c+dx)}\Big]+$$
$$e^{\frac{1}{2}i(2c+d(3+2n)x)}(1+2n)\Big(2(A+2C)\left(35+24n+4n^2\right)\text{Hypergeometric2F1}\Big[\frac{3}{2}+n,\frac{1}{4}(3+2n),\frac{1}{4}(7+2n),-e^{2i(c+dx)}\Big]+$$
$$e^{i(c+dx)}(3+2n)\Big(2B(7+2n)\text{Hypergeometric2F1}\Big[\frac{3}{2}+n,\frac{1}{4}(5+2n),\frac{1}{4}(9+2n),-e^{2i(c+dx)}\Big]+$$
$$A\,e^{i(c+dx)}(5+2n)\text{Hypergeometric2F1}\Big[\frac{3}{2}+n,\frac{1}{4}(7+2n),\frac{1}{4}(11+2n),-e^{2i(c+dx)}\Big]\Big)\Big)\Big)\Big)$$
$$\text{Sec}[c+dx]^{-2-n}(b\,\text{Sec}[c+dx])^n\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\Bigg)\Big/\ (d(-1+2n)(1+2n)(3+2n)(5+2n)$$
$$(7+2n)(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))\Bigg)$$

- **Problem 82: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(b\,\text{Sec}[c+dx])^n\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{\text{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 5, 221 leaves, 7 steps):

$$-\frac{2C(b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]}{d(1-2n)\sqrt{\text{Sec}[c+dx]}}-$$
$$\left(2(A+C(3-2n)-2An)\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{1}{4}(5-2n),\frac{1}{4}(9-2n),\text{Cos}[c+dx]^2\Big](b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]\right)\Big/$$
$$\left(d(1-2n)(5-2n)\,\text{Sec}[c+dx]^{5/2}\sqrt{\text{Sin}[c+dx]^2}\right)-$$
$$\frac{2B\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{1}{4}(3-2n),\frac{1}{4}(7-2n),\text{Cos}[c+dx]^2\Big](b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]}{d(3-2n)\,\text{Sec}[c+dx]^{3/2}\sqrt{\text{Sin}[c+dx]^2}}$$

Result (type 5, 502 leaves):

$$-\frac{1}{A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]} \, i\, 2^{\frac{1}{2}+n} e^{-\frac{1}{2} i (4c+d(1+2n)x)} \left(\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}\right)^{\frac{1}{2}+n} \left(1+e^{2i(c+dx)}\right)^{\frac{1}{2}+n} \left(\frac{A\, e^{\frac{1}{2} i d(-3+2n)x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1}{4}(-3+2n), \frac{1}{4}(1+2n), -e^{2i(c+dx)}\right]}{d(-3+2n)} + \right.$$

$$\frac{2B\, e^{\frac{1}{2} i (2c+d(-1+2n)x)}\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1}{4}(-1+2n), \frac{1}{4}(3+2n), -e^{2i(c+dx)}\right]}{d(-1+2n)} +$$

$$e^{2ic}\left(\frac{2(A+2C)\, e^{\frac{1}{2} i d(1+2n)x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1}{4}(1+2n), \frac{1}{4}(5+2n), -e^{2i(c+dx)}\right]}{d+2dn} + \frac{1}{d(3+2n)(5+2n)}\right.$$

$$e^{\frac{1}{2} i (2c+d(3+2n)x)}\left(2B(5+2n)\,\text{Hypergeometric2F1}\left[\frac{1}{2}+n, \frac{1}{4}(3+2n), \frac{1}{4}(7+2n), -e^{2i(c+dx)}\right] + A\, e^{i(c+dx)}(3+2n)\,\text{Hypergeometric2F1}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{1}{2}+n, \frac{1}{4}(5+2n), \frac{1}{4}(9+2n), -e^{2i(c+dx)}\right]\right)\right)\right) \text{Sec}[c+dx]^{-2-n}\,(b\,\text{Sec}[c+dx])^n\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$

Problem 83: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(b\,\text{Sec}[c+dx])^n\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{\text{Sec}[c+dx]^{5/2}}\,dx$$

Optimal (type 5, 223 leaves, 7 steps):

$$-\frac{2C\,(b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]}{d(3-2n)\,\text{Sec}[c+dx]^{3/2}} -$$

$$\left(2\left(A(3-2n)+C(5-2n)\right)\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{4}(7-2n), \frac{1}{4}(11-2n), \text{Cos}[c+dx]^2\right](b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]\right) \Big/$$

$$\left(d(3-2n)(7-2n)\,\text{Sec}[c+dx]^{7/2}\sqrt{\text{Sin}[c+dx]^2}\right) -$$

$$\frac{2B\,\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{4}(5-2n), \frac{1}{4}(9-2n), \text{Cos}[c+dx]^2\right](b\,\text{Sec}[c+dx])^n\,\text{Sin}[c+dx]}{d(5-2n)\,\text{Sec}[c+dx]^{5/2}\sqrt{\text{Sin}[c+dx]^2}}$$

Result (type 5, 502 leaves):

$$-\frac{1}{A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x]}\,i\,2^{-\frac{1}{2}+n}\,e^{-\frac{1}{2}i\,(4c+d\,(-1+2n)\,x)}\left(\frac{e^{i\,(c+d\,x)}}{1+e^{2i\,(c+d\,x)}}\right)^{-\frac{1}{2}+n}$$

$$\left(1+e^{2i\,(c+d\,x)}\right)^{-\frac{1}{2}+n}\left(\frac{A\,e^{\frac{1}{2}i\,d\,(-5+2n)\,x}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}(-5+2n),\frac{1}{4}(-1+2n),-e^{2i\,(c+d\,x)}\right]}{d\,(-5+2n)}+\right.$$

$$\frac{2B\,e^{\frac{1}{2}i\,(2c+d\,(-3+2n)\,x)}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}(-3+2n),\frac{1}{4}(1+2n),-e^{2i\,(c+d\,x)}\right]}{d\,(-3+2n)}+$$

$$e^{2i\,c}\left(\frac{2\,(A+2C)\,e^{\frac{1}{2}i\,d\,(-1+2n)\,x}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}(-1+2n),\frac{1}{4}(3+2n),-e^{2i\,(c+d\,x)}\right]}{d\,(-1+2n)}+\right.$$

$$\frac{2B\,e^{\frac{1}{2}i\,(2c+d\,x+2d\,n\,x)}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}(1+2n),\frac{1}{4}(5+2n),-e^{2i\,(c+d\,x)}\right]}{d+2d\,n}+$$

$$\left.\left.\frac{A\,e^{\frac{1}{2}i\,(4c+d\,(3+2n)\,x)}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}+n,\frac{1}{4}(3+2n),\frac{1}{4}(7+2n),-e^{2i\,(c+d\,x)}\right]}{d\,(3+2n)}\right)\right)$$

$$\text{Sec}[c+d\,x]^{-2-n}\,(b\,\text{Sec}[c+d\,x])^n\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

- **Problem 84: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 140 leaves, 7 steps) :

$$\frac{a\,(4A+3C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8d}+\frac{a\,(5A+4C)\,\text{Tan}[c+d\,x]}{5d}+\frac{a\,(4A+3C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8d}+$$
$$\frac{a\,C\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4d}+\frac{a\,C\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5d}+\frac{a\,(5A+4C)\,\text{Tan}[c+d\,x]^3}{15d}$$

Result (type 3, 426 leaves) :

$$-\frac{a A \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}-\frac{3 a C \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+$$
$$\frac{a A \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+\frac{3 a C \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$
$$\frac{a A}{4 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{3 a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-$$
$$\frac{a A}{4 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{3 a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{2 a A \,\text{Tan}[c+d x]}{3 d}+$$
$$\frac{8 a C \,\text{Tan}[c+d x]}{15 d}+\frac{a A \,\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]}{3 d}+\frac{4 a C \,\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]}{15 d}+\frac{a C \,\text{Sec}[c+d x]^4 \,\text{Tan}[c+d x]}{5 d}$$

- **Problem 85: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^2 \,(a+a \,\text{Sec}[c+d x])\left(A+C \,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 117 leaves, 7 steps):

$$\frac{a(4 A+3 C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{a(3 A+2 C)\,\text{Tan}[c+d x]}{3 d}+$$
$$\frac{a(4 A+3 C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{8 d}+\frac{a C \,\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]}{3 d}+\frac{a C \,\text{Sec}[c+d x]^3 \,\text{Tan}[c+d x]}{4 d}$$

Result (type 3, 377 leaves):

$$-\frac{a A \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}-\frac{3 a C \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{a A \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+$$
$$\frac{3 a C \,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{a A}{4 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{3 a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{a A}{4 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$
$$\frac{3 a C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{a A \,\text{Tan}[c+d x]}{d}+\frac{2 a C \,\text{Tan}[c+d x]}{3 d}+\frac{a C \,\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]}{3 d}$$

- **Problem 87: Result more than twice size of optimal antiderivative.**

$$\int (a+a \,\text{Sec}[c+d x])\left(A+C \,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 58 leaves, 5 steps):

$$a A x + \frac{a (2 A + C) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{a C \text{Tan}[c + d x]}{d} + \frac{a C \text{Sec}[c + d x] \text{Tan}[c + d x]}{2 d}$$

Result (type 3, 218 leaves) :

$$a A x - \frac{a A \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a A \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} - \frac{a C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]}{2 d} + \frac{a C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]}{2 d} + \frac{a C}{4 d \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} - \frac{a C}{4 d \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} + \frac{a C \text{Tan}[c + d x]}{d}$$

- **Problem 88: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d x] (a + a \text{Sec}[c + d x]) \left(A + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 3, 42 leaves, 5 steps) :

$$a A x + \frac{a C \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{a A \text{Sin}[c + d x]}{d} + \frac{a C \text{Tan}[c + d x]}{d}$$

Result (type 3, 112 leaves) :

$$a A x - \frac{a C \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a C \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a A \text{Cos}[d x] \text{Sin}[c]}{d} + \frac{a A \text{Cos}[c] \text{Sin}[d x]}{d} + \frac{a C \text{Tan}[c + d x]}{d}$$

- **Problem 94: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c + d x] (a + a \text{Sec}[c + d x])^2 \left(A + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 3, 132 leaves, 7 steps) :

$$\frac{a^2 (12 A + 7 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{a^2 (12 A + 7 C) \text{Tan}[c + d x]}{6 d} + \frac{a^2 (12 A + 7 C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{24 d} - \frac{C (a + a \text{Sec}[c + d x])^2 \text{Tan}[c + d x]}{12 d} + \frac{C (a + a \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{4 a d}$$

Result (type 3, 291 leaves) :

$$-\frac{1}{384\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\text{Sec}[c+d\,x]^4$$
$$\left(24\,(12\,A+7\,C)\,\text{Cos}[c+d\,x]^4\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-\right.$$
$$\text{Sec}[c]\,(-48\,(3\,A+2\,C)\,\text{Sin}[c]+3\,(4\,A+15\,C)\,\text{Sin}[d\,x]+12\,A\,\text{Sin}[2\,c+d\,x]+45\,C\,\text{Sin}[2\,c+d\,x]+$$
$$144\,A\,\text{Sin}[c+2\,d\,x]+128\,C\,\text{Sin}[c+2\,d\,x]-48\,A\,\text{Sin}[3\,c+2\,d\,x]+12\,A\,\text{Sin}[2\,c+3\,d\,x]+21\,C\,\text{Sin}[2\,c+3\,d\,x]+$$
$$\left.12\,A\,\text{Sin}[4\,c+3\,d\,x]+21\,C\,\text{Sin}[4\,c+3\,d\,x]+48\,A\,\text{Sin}[3\,c+4\,d\,x]+32\,C\,\text{Sin}[3\,c+4\,d\,x])\right)$$

- **Problem 95: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 96 leaves, 6 steps):

$$a^2\,A\,x+\frac{a^2\,(2\,A+C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a^2\,(A+C)\,\text{Tan}[c+d\,x]}{d}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{C\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1090 leaves):

$$\frac{A\,x\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\left((-2\,A-C)\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\left((2\,A+C)\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+\frac{C\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(7\,C\,\text{Cos}\left[\frac{c}{2}\right]-5\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{6\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$

$$\frac{C\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-7\,C\,\text{Cos}\left[\frac{c}{2}\right]-5\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

$$\frac{\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{6\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

- **Problem 96: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 112 leaves, 6 steps):

$$2\,a^2\,A\,x+\frac{a^2\,(2\,A+3\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{A\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{d}-$$
$$\frac{a^2\,(2\,A-3\,C)\,\text{Tan}[c+d\,x]}{2\,d}-\frac{(2\,A-C)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 330 leaves):

$$\frac{1}{8\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,(1+\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(8\,A\,x-\frac{2\,(2\,A+3\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{2\,(2\,A+3\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{4\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\right.$$
$$\frac{4\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{C}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-$$
$$\left.\frac{C}{d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

Problem 97: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 119 leaves, 5 steps):

$$\frac{1}{2}\,a^2\,(3\,A+2\,C)\,x+\frac{2\,a^2\,C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a^2\,(3\,A-2\,C)\,\text{Sin}[c+d\,x]}{2\,d}+$$
$$\frac{A\,\text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{2\,d}-\frac{(A-2\,C)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 292 leaves):

$$-\left(\left(a^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(4\,\text{Cos}[d\,x]\,\left(3\,A\,d\,x+2\,C\,d\,x-4\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+4\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\right.\right.\right.$$
$$4\,\text{Cos}[2\,c+d\,x]\,\left(3\,A\,d\,x+2\,C\,d\,x-4\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+4\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+$$
$$\left.\left.A\,\text{Sin}[d\,x]+16\,C\,\text{Sin}[d\,x]+A\,\text{Sin}[2\,c+d\,x]+8\,A\,\text{Sin}[c+2\,d\,x]+8\,A\,\text{Sin}[3\,c+2\,d\,x]+A\,\text{Sin}[2\,c+3\,d\,x]+A\,\text{Sin}[4\,c+3\,d\,x]\right)\right)\Big/$$
$$\left.\left(16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)$$

Problem 103: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 157 leaves, 11 steps):

$$\frac{a^3\,(20\,A+13\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a^3\,(20\,A+13\,C)\,\text{Tan}[c+d\,x]}{5\,d}+\frac{3\,a^3\,(20\,A+13\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{40\,d}-$$
$$\frac{C\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Tan}[c+d\,x]}{20\,d}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Tan}[c+d\,x]}{5\,a\,d}+\frac{a^3\,(20\,A+13\,C)\,\text{Tan}[c+d\,x]^3}{60\,d}$$

Result (type 3, 323 leaves):

$$-\frac{1}{7680\,d\,(A+2\,C+A\,Cos[2\,(c+d\,x)])}a^3\,(1+Cos[c+d\,x])^3\,\left(C+A\,Cos[c+d\,x]^2\right)\,Sec\left[\frac{1}{2}\,(c+d\,x)\right]^6\,Sec[c+d\,x]^5$$
$$\left(240\,(20\,A+13\,C)\,Cos[c+d\,x]^5\,\left(Log\left[Cos\left[\frac{1}{2}\,(c+d\,x)\right]-Sin\left[\frac{1}{2}\,(c+d\,x)\right]\right]-Log\left[Cos\left[\frac{1}{2}\,(c+d\,x)\right]+Sin\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-\right.$$
$$Sec[c]\,(80\,(34\,A+29\,C)\,Sin[d\,x]-240\,(7\,A+3\,C)\,Sin[2\,c+d\,x]+360\,A\,Sin[c+2\,d\,x]+750\,C\,Sin[c+2\,d\,x]+360\,A\,Sin[3\,c+2\,d\,x]+$$
$$750\,C\,Sin[3\,c+2\,d\,x]+1840\,A\,Sin[2\,c+3\,d\,x]+1520\,C\,Sin[2\,c+3\,d\,x]-360\,A\,Sin[4\,c+3\,d\,x]+180\,A\,Sin[3\,c+4\,d\,x]+$$
$$\left.195\,C\,Sin[3\,c+4\,d\,x]+180\,A\,Sin[5\,c+4\,d\,x]+195\,C\,Sin[5\,c+4\,d\,x]+440\,A\,Sin[4\,c+5\,d\,x]+304\,C\,Sin[4\,c+5\,d\,x])\right)$$

Problem 104: Result more than twice size of optimal antiderivative.

$$\int (a+a\,Sec[c+d\,x])^3\,\left(A+C\,Sec[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 147 leaves, 7 steps):

$$a^3\,A\,x+\frac{a^3\,(28\,A+15\,C)\,ArcTanh[Sin[c+d\,x]]}{8\,d}+\frac{5\,a^3\,(4\,A+3\,C)\,Tan[c+d\,x]}{8\,d}+$$
$$\frac{C\,(a+a\,Sec[c+d\,x])^3\,Tan[c+d\,x]}{4\,d}+\frac{C\,\left(a^2+a^2\,Sec[c+d\,x]\right)^2\,Tan[c+d\,x]}{4\,a\,d}+\frac{(4\,A+5\,C)\,\left(a^3+a^3\,Sec[c+d\,x]\right)\,Tan[c+d\,x]}{8\,d}$$

Result (type 3, 363 leaves):

$$\frac{1}{256\,d\,(A+2\,C+A\,Cos[2\,(c+d\,x)])}a^3\,(1+Cos[c+d\,x])^3\,\left(C+A\,Cos[c+d\,x]^2\right)\,Sec\left[\frac{1}{2}\,(c+d\,x)\right]^6\,Sec[c+d\,x]^4$$
$$\left(-8\,(28\,A+15\,C)\,Cos[c+d\,x]^4\,\left(Log\left[Cos\left[\frac{1}{2}\,(c+d\,x)\right]-Sin\left[\frac{1}{2}\,(c+d\,x)\right]\right]-Log\left[Cos\left[\frac{1}{2}\,(c+d\,x)\right]+Sin\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\right.$$
$$Sec[c]\,(24\,A\,d\,x\,Cos[c]+16\,A\,d\,x\,Cos[c+2\,d\,x]+16\,A\,d\,x\,Cos[3\,c+2\,d\,x]+4\,A\,d\,x\,Cos[3\,c+4\,d\,x]+$$
$$4\,A\,d\,x\,Cos[5\,c+4\,d\,x]-72\,A\,Sin[c]-72\,C\,Sin[c]+4\,A\,Sin[d\,x]+23\,C\,Sin[d\,x]+4\,A\,Sin[2\,c+d\,x]+23\,C\,Sin[2\,c+d\,x]+$$
$$72\,A\,Sin[c+2\,d\,x]+88\,C\,Sin[c+2\,d\,x]-24\,A\,Sin[3\,c+2\,d\,x]-8\,C\,Sin[3\,c+2\,d\,x]+4\,A\,Sin[2\,c+3\,d\,x]+$$
$$\left.15\,C\,Sin[2\,c+3\,d\,x]+4\,A\,Sin[4\,c+3\,d\,x]+15\,C\,Sin[4\,c+3\,d\,x]+24\,A\,Sin[3\,c+4\,d\,x]+24\,C\,Sin[3\,c+4\,d\,x])\right)$$

Problem 105: Result more than twice size of optimal antiderivative.

$$\int Cos[c+d\,x]\,(a+a\,Sec[c+d\,x])^3\,\left(A+C\,Sec[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 145 leaves, 7 steps):

$$3\,a^3\,A\,x+\frac{a^3\,(6\,A+5\,C)\,ArcTanh[Sin[c+d\,x]]}{2\,d}+\frac{A\,(a+a\,Sec[c+d\,x])^3\,Sin[c+d\,x]}{d}+$$
$$\frac{5\,a^3\,C\,Tan[c+d\,x]}{2\,d}-\frac{(3\,A-C)\,\left(a^2+a^2\,Sec[c+d\,x]\right)^2\,Tan[c+d\,x]}{3\,a\,d}-\frac{(6\,A-5\,C)\,\left(a^3+a^3\,Sec[c+d\,x]\right)\,Tan[c+d\,x]}{6\,d}$$

Result (type 3, 1250 leaves):

$$\frac{3\,A\,x\,\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{4\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$
$$\left((-6\,A-5\,C)\,\text{Cos}[c+d\,x]^5\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(8\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\left((6\,A+5\,C)\,\text{Cos}[c+d\,x]^5\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(8\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+\frac{A\,\text{Cos}[d\,x]\,\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[c]}{4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$
$$\frac{A\,\text{Cos}[c]\,\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[d\,x]}{4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$
$$\frac{C\,\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(5\,C\,\text{Cos}\left[\frac{c}{2}\right]-4\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$
$$\frac{\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+11\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{12\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$
$$\frac{C\,\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-5\,C\,\text{Cos}\left[\frac{c}{2}\right]-4\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$
$$\frac{\text{Cos}[c+d\,x]^5\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+11\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{12\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

Problem 106: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 162 leaves, 6 steps):

$$\frac{1}{2} a^3 (7 A + 2 C) x + \frac{a^3 (2 A + 7 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{5 a^3 (A - C) \text{Sin}[c + d x]}{2 d} + \frac{A \text{Cos}[c + d x] (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{2 d} - \frac{(A - C) \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{2 a d} - \frac{(A - 4 C) \left(a^3 + a^3 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{2 d}$$

Result (type 3, 1074 leaves):

$$\frac{(7 A + 2 C) x \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right)}{8 (A + 2 C + A \text{Cos}[2 c + 2 d x])} +$$

$$\left((-2 A - 7 C) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right)\right) \Big/ (8 d (A + 2 C + A \text{Cos}[2 c + 2 d x])) +$$

$$\left((2 A + 7 C) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right)\right) \Big/ (8 d (A + 2 C + A \text{Cos}[2 c + 2 d x])) + \frac{3 A \text{Cos}[d x] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right) \text{Sin}[c]}{4 d (A + 2 C + A \text{Cos}[2 c + 2 d x])} +$$

$$\frac{A \text{Cos}[2 d x] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right) \text{Sin}[2 c]}{16 d (A + 2 C + A \text{Cos}[2 c + 2 d x])} +$$

$$\frac{3 A \text{Cos}[c] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right) \text{Sin}[d x]}{4 d (A + 2 C + A \text{Cos}[2 c + 2 d x])} +$$

$$\frac{A \text{Cos}[2 c] \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right) \text{Sin}[2 d x]}{16 d (A + 2 C + A \text{Cos}[2 c + 2 d x])} +$$

$$\frac{C \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right)}{16 d (A + 2 C + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} +$$

$$\frac{3 C \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right) \text{Sin}\left[\frac{d x}{2}\right]}{4 d (A + 2 C + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{c}{2}\right] - \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} -$$

$$\frac{C \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right)}{16 d (A + 2 C + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} +$$

$$\frac{3 C \text{Cos}[c + d x]^5 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + C \text{Sec}[c + d x]^2\right) \text{Sin}\left[\frac{d x}{2}\right]}{4 d (A + 2 C + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{c}{2}\right] + \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)}$$

- **Problem 107: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 156 leaves, 6 steps):

$$\frac{1}{2}\,a^3\,(5\,A+6\,C)\,x+\frac{3\,a^3\,C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{5\,a^3\,A\,\text{Sin}[c+d\,x]}{2\,d}+\frac{A\,\text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{3\,d}+\frac{A\,\text{Cos}[c+d\,x]\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{2\,a\,d}-\frac{(5\,A-6\,C)\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{6\,d}$$

Result (type 3, 1014 leaves):

$$a^3 \left(\frac{(5A+6C)\, x \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{8 (A+2C+A \operatorname{Cos}[2c+2d x])} - \right.$$

$$\frac{3 C \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{4 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{3 C \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{4 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{(15A+4C) \operatorname{Cos}[d x] \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[c]}{16 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{3 A \operatorname{Cos}[2 d x] \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2c]}{16 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{A \operatorname{Cos}[3 d x] \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[3c]}{48 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{(15A+4C) \operatorname{Cos}[c] \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[d x]}{16 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{3 A \operatorname{Cos}[2c] \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 d x]}{16 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{A \operatorname{Cos}[3c] \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[3 d x]}{48 d (A+2C+A \operatorname{Cos}[2c+2d x])} +$$

$$\frac{C \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{d x}{2}\right]}{4 d (A+2C+A \operatorname{Cos}[2c+2d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)} +$$

$$\left. \frac{C \operatorname{Cos}[c+d x]^2 (1+\operatorname{Cos}[c+d x])^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{d x}{2}\right]}{4 d (A+2C+A \operatorname{Cos}[2c+2d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)} \right)$$

- **Problem 111: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 228 leaves, 15 steps):

$$\frac{a^4 (14 A+11 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{4 d}+\frac{16 a^4 (14 A+11 C) \text{Tan}[c+d x]}{35 d}+\frac{27 a^4 (14 A+11 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{140 d}+\frac{a^4 (14 A+11 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{70 d}+\frac{(21 A+4 C) (a+a \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{105 d}+\frac{C \text{Sec}[c+d x]^2 (a+a \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{7 d}+\frac{2 C (a+a \text{Sec}[c+d x])^5 \text{Tan}[c+d x]}{21 a d}+\frac{8 a^4 (14 A+11 C) \text{Tan}[c+d x]^3}{105 d}$$

Result (type 3, 574 leaves):

$$\left((-14 A-11 C) \text{Cos}[c+d x]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (32 d (A+2 C+A \text{Cos}[2 c+2 d x]))+\left((14 A+11 C) \text{Cos}[c+d x]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (32 d (A+2 C+A \text{Cos}[2 c+2 d x]))+\frac{1}{215040 d (A+2 C+A \text{Cos}[2 c+2 d x])} \text{Sec}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \text{Sec}[c+d x] (a+a \text{Sec}[c+d x])^4 \left(A+C \text{Sec}[c+d x]^2\right) (50960 A \text{Sin}[d x]+46480 C \text{Sin}[d x]-30380 A \text{Sin}[2 c+d x]-17080 C \text{Sin}[2 c+d x]+10710 A \text{Sin}[c+2 d x]+16415 C \text{Sin}[c+2 d x]+10710 A \text{Sin}[3 c+2 d x]+16415 C \text{Sin}[3 c+2 d x]+41244 A \text{Sin}[2 c+3 d x]+37296 C \text{Sin}[2 c+3 d x]-7560 A \text{Sin}[4 c+3 d x]-840 C \text{Sin}[4 c+3 d x]+7560 A \text{Sin}[3 c+4 d x]+7700 C \text{Sin}[3 c+4 d x]+7560 A \text{Sin}[5 c+4 d x]+7700 C \text{Sin}[5 c+4 d x]+15848 A \text{Sin}[4 c+5 d x]+12712 C \text{Sin}[4 c+5 d x]-420 A \text{Sin}[6 c+5 d x]+1470 A \text{Sin}[5 c+6 d x]+1155 C \text{Sin}[5 c+6 d x]+1470 A \text{Sin}[7 c+6 d x]+1155 C \text{Sin}[7 c+6 d x]+2324 A \text{Sin}[6 c+7 d x]+1816 C \text{Sin}[6 c+7 d x])$$

- **Problem 112: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x] (a+a \text{Sec}[c+d x])^4 \left(A+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 188 leaves, 14 steps):

$$\frac{7 a^4 (10 A+7 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{16 d}+\frac{4 a^4 (10 A+7 C) \text{Tan}[c+d x]}{5 d}+\frac{27 a^4 (10 A+7 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{80 d}+\frac{a^4 (10 A+7 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{40 d}-\frac{C (a+a \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{30 d}+\frac{C (a+a \text{Sec}[c+d x])^5 \text{Tan}[c+d x]}{6 a d}+\frac{2 a^4 (10 A+7 C) \text{Tan}[c+d x]^3}{15 d}$$

Result (type 3, 530 leaves):

$$-\left(7\,(10\,A+7\,C)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(128\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\left(7\,(10\,A+7\,C)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(128\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+\frac{1}{61440\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$(-16000\,A\,\text{Sin}[c]-11520\,C\,\text{Sin}[c]+1860\,A\,\text{Sin}[d\,x]+3750\,C\,\text{Sin}[d\,x]+1860\,A\,\text{Sin}[2\,c+d\,x]+3750\,C\,\text{Sin}[2\,c+d\,x]+17280\,A\,\text{Sin}[c+2\,d\,x]+$$
$$15360\,C\,\text{Sin}[c+2\,d\,x]-6720\,A\,\text{Sin}[3\,c+2\,d\,x]-1920\,C\,\text{Sin}[3\,c+2\,d\,x]+2670\,A\,\text{Sin}[2\,c+3\,d\,x]+3845\,C\,\text{Sin}[2\,c+3\,d\,x]+$$
$$2670\,A\,\text{Sin}[4\,c+3\,d\,x]+3845\,C\,\text{Sin}[4\,c+3\,d\,x]+8640\,A\,\text{Sin}[3\,c+4\,d\,x]+6912\,C\,\text{Sin}[3\,c+4\,d\,x]-960\,A\,\text{Sin}[5\,c+4\,d\,x]+$$
$$810\,A\,\text{Sin}[4\,c+5\,d\,x]+735\,C\,\text{Sin}[4\,c+5\,d\,x]+810\,A\,\text{Sin}[6\,c+5\,d\,x]+735\,C\,\text{Sin}[6\,c+5\,d\,x]+1600\,A\,\text{Sin}[5\,c+6\,d\,x]+1152\,C\,\text{Sin}[5\,c+6\,d\,x])$$

Problem 113: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 177 leaves, 8 steps):

$$a^4\,A\,x+\frac{a^4\,(12\,A+7\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a^4\,(10\,A+7\,C)\,\text{Tan}[c+d\,x]}{2\,d}+\frac{a\,C\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Tan}[c+d\,x]}{5\,d}+$$
$$\frac{C\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Tan}[c+d\,x]}{5\,d}+\frac{(5\,A+7\,C)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Tan}[c+d\,x]}{15\,d}+\frac{(8\,A+7\,C)\,\left(a^4+a^4\,\text{Sec}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{6\,d}$$

Result (type 3, 418 leaves):

$$\frac{1}{3840\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^4\,(1+\text{Cos}[c+d\,x])^4\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^8\,\text{Sec}[c+d\,x]^5$$
$$\left(-240\,(12\,A+7\,C)\,\text{Cos}[c+d\,x]^5\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\right.$$
$$\text{Sec}[c]\,(150\,A\,d\,x\,\text{Cos}[d\,x]+150\,A\,d\,x\,\text{Cos}[2\,c+d\,x]+75\,A\,d\,x\,\text{Cos}[2\,c+3\,d\,x]+75\,A\,d\,x\,\text{Cos}[4\,c+3\,d\,x]+15\,A\,d\,x\,\text{Cos}[4\,c+5\,d\,x]+15\,A\,d\,x$$
$$\text{Cos}[6\,c+5\,d\,x]+1220\,A\,\text{Sin}[d\,x]+1180\,C\,\text{Sin}[d\,x]-780\,A\,\text{Sin}[2\,c+d\,x]-480\,C\,\text{Sin}[2\,c+d\,x]+120\,A\,\text{Sin}[c+2\,d\,x]+330\,C\,\text{Sin}[c+2\,d\,x]+$$
$$120\,A\,\text{Sin}[3\,c+2\,d\,x]+330\,C\,\text{Sin}[3\,c+2\,d\,x]+820\,A\,\text{Sin}[2\,c+3\,d\,x]+800\,C\,\text{Sin}[2\,c+3\,d\,x]-180\,A\,\text{Sin}[4\,c+3\,d\,x]-30\,C\,\text{Sin}[4\,c+3\,d\,x]+$$
$$\left.60\,A\,\text{Sin}[3\,c+4\,d\,x]+105\,C\,\text{Sin}[3\,c+4\,d\,x]+60\,A\,\text{Sin}[5\,c+4\,d\,x]+105\,C\,\text{Sin}[5\,c+4\,d\,x]+200\,A\,\text{Sin}[4\,c+5\,d\,x]+166\,C\,\text{Sin}[4\,c+5\,d\,x])\right)$$

Problem 114: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 181 leaves, 8 steps):

$$4 a^4 A x + \frac{a^4 (52 A + 35 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{A (a + a \text{Sec}[c + d x])^4 \text{Sin}[c + d x]}{d} + \frac{5 a^4 (4 A + 7 C) \text{Tan}[c + d x]}{8 d} - \frac{a (4 A - C) (a + a \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{4 d} - \frac{(12 A - 7 C) \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Tan}[c + d x]}{12 d} - \frac{(12 A - 35 C) \left(a^4 + a^4 \text{Sec}[c + d x]\right) \text{Tan}[c + d x]}{24 d}$$

Result (type 3, 379 leaves) :

$$\frac{1}{1536 d (A + 2 C + A \text{Cos}[2 (c + d x)])} a^4 \left(C + A \text{Cos}[c + d x]^2\right) \text{Sec}\left[\frac{1}{2} (c + d x)\right]^8 (1 + \text{Sec}[c + d x])^4 \left(-24 (52 A + 35 C) \text{Cos}[c + d x]^4 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]\right) + \text{Sec}[c] (288 A d x \text{Cos}[c] + 192 A d x \text{Cos}[c + 2 d x] + 192 A d x \text{Cos}[3 c + 2 d x] + 48 A d x \text{Cos}[3 c + 4 d x] + 48 A d x \text{Cos}[5 c + 4 d x] - 288 A \text{Sin}[c] - 480 C \text{Sin}[c] + 24 A \text{Sin}[d x] + 105 C \text{Sin}[d x] + 24 A \text{Sin}[2 c + d x] + 105 C \text{Sin}[2 c + d x] + 288 A \text{Sin}[c + 2 d x] + 544 C \text{Sin}[c + 2 d x] - 96 A \text{Sin}[3 c + 2 d x] - 96 C \text{Sin}[3 c + 2 d x] + 30 A \text{Sin}[2 c + 3 d x] + 81 C \text{Sin}[2 c + 3 d x] + 30 A \text{Sin}[4 c + 3 d x] + 81 C \text{Sin}[4 c + 3 d x] + 96 A \text{Sin}[3 c + 4 d x] + 160 C \text{Sin}[3 c + 4 d x] + 6 A \text{Sin}[4 c + 5 d x] + 6 A \text{Sin}[6 c + 5 d x])\right)$$

Problem 115: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c + d x]^2 (a + a \text{Sec}[c + d x])^4 \left(A + C \text{Sec}[c + d x]^2\right) \, dx$$

Optimal (type 3, 192 leaves, 7 steps) :

$$\frac{1}{2} a^4 (13 A + 2 C) x + \frac{2 a^4 (2 A + 3 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{5 a^4 (A - 2 C) \text{Sin}[c + d x]}{2 d} - \frac{a (3 A - 2 C) (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{6 d} + \frac{A \text{Cos}[c + d x] (a + a \text{Sec}[c + d x])^4 \text{Sin}[c + d x]}{2 d} - \frac{(A - 2 C) \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{2 d} + \frac{(3 A + 22 C) \left(a^4 + a^4 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{6 d}$$

Result (type 3, 1420 leaves) :

$$\frac{(13\,A+2\,C)\;x\,\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{16\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\left((-2\,A-3\,C)\;\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left((2\,A+3\,C)\;\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+\frac{A\,\text{Cos}[d\,x]\;\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[c]}{2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\frac{A\,\text{Cos}[2\,d\,x]\;\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[2\,c]}{32\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\frac{A\,\text{Cos}[c]\;\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[d\,x]}{2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\frac{A\,\text{Cos}[2\,c]\;\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[2\,d\,x]}{32\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\frac{C\,\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{48\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(13\,C\,\text{Cos}\left[\frac{c}{2}\right]-11\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{96\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

$$\frac{\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+20\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}+$$

$$\frac{C\,\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{48\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-13\,C\,\text{Cos}\left[\frac{c}{2}\right]-11\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{96\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

$$\frac{\text{Cos}[c+d\,x]^6\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+20\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

Problem 116: Result more than twice size of optimal antiderivative.

$$\int \cos[c+d x]^3 \, (a+a \sec[c+d x])^4 \left(A+C \sec[c+d x]^2\right) dx$$

Optimal (type 3, 198 leaves, 7 steps):

$$2 a^4 (3 A+2 C) x+\frac{a^4 (2 A+13 C) \operatorname{ArcTanh}[\sin[c+d x]]}{2 d}+\frac{5 a^4 (2 A-C) \sin[c+d x]}{2 d}+\frac{2 a A \cos[c+d x] (a+a \sec[c+d x])^3 \sin[c+d x]}{3 d}+\frac{A \cos[c+d x]^2 (a+a \sec[c+d x])^4 \sin[c+d x]}{3 d}-\frac{(2 A-C) \left(a^2+a^2 \sec[c+d x]\right)^2 \sin[c+d x]}{2 d}-\frac{(4 A-9 C) \left(a^4+a^4 \sec[c+d x]\right) \sin[c+d x]}{3 d}$$

Result (type 3, 1250 leaves):

$$\frac{(3 A+2 C)\, x \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{4 (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\left((-2 A-13 C) \operatorname{Cos}[c+d x]^6 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ (16 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left((2 A+13 C) \operatorname{Cos}[c+d x]^6 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ (16 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]))+\frac{(27 A+4 C) \operatorname{Cos}[d x] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[c]}{32 d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{A \operatorname{Cos}[2 d x] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 c]}{8 d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{A \operatorname{Cos}[3 d x] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[3 c]}{96 d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{(27 A+4 C) \operatorname{Cos}[c] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[d x]}{32 d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{A \operatorname{Cos}[2 c] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 d x]}{8 d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{A \operatorname{Cos}[3 c] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[3 d x]}{96 d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{C \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{32 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{C \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{d x}{2}\right]}{2 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-$$

$$\frac{C \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{32 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\frac{C \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{d x}{2}\right]}{2 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

Problem 121: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^4 \left(A+C \text{Sec}[c+d x]^2\right)}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 165 leaves, 7 steps):

$$\frac{3 (4 A+5 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 a d}-\frac{(3 A+4 C) \text{Tan}[c+d x]}{a d}+\frac{3 (4 A+5 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 a d}+\frac{(4 A+5 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 a d}-\frac{(A+C) \text{Sec}[c+d x]^4 \text{Tan}[c+d x]}{d (a+a \text{Sec}[c+d x])}-\frac{(3 A+4 C) \text{Tan}[c+d x]^3}{3 a d}$$

Result (type 3, 792 leaves):

$$-\frac{3 (4 A+5 C) \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(A+C \text{Sec}[c+d x]^2\right)}{2 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])}+\frac{3 (4 A+5 C) \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(A+C \text{Sec}[c+d x]^2\right)}{2 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])}+\frac{1}{192 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c] \text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right) \left(-60 A \text{Sin}\left[\frac{d x}{2}\right]-75 C \text{Sin}\left[\frac{d x}{2}\right]-60 A \text{Sin}\left[\frac{3 d x}{2}\right]-91 C \text{Sin}\left[\frac{3 d x}{2}\right]+204 A \text{Sin}\left[c-\frac{d x}{2}\right]+219 C \text{Sin}\left[c-\frac{d x}{2}\right]-60 A \text{Sin}\left[c+\frac{d x}{2}\right]+21 C \text{Sin}\left[c+\frac{d x}{2}\right]+84 A \text{Sin}\left[2 c+\frac{d x}{2}\right]+165 C \text{Sin}\left[2 c+\frac{d x}{2}\right]+36 A \text{Sin}\left[c+\frac{3 d x}{2}\right]+5 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+36 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+69 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+132 A \text{Sin}\left[3 c+\frac{3 d x}{2}\right]+165 C \text{Sin}\left[3 c+\frac{3 d x}{2}\right]-156 A \text{Sin}\left[c+\frac{5 d x}{2}\right]-211 C \text{Sin}\left[c+\frac{5 d x}{2}\right]-60 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-115 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-60 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-51 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+36 A \text{Sin}\left[4 c+\frac{5 d x}{2}\right]+45 C \text{Sin}\left[4 c+\frac{5 d x}{2}\right]-12 A \text{Sin}\left[2 c+\frac{7 d x}{2}\right]-19 C \text{Sin}\left[2 c+\frac{7 d x}{2}\right]+12 A \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+5 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+12 A \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+21 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+36 A \text{Sin}\left[5 c+\frac{7 d x}{2}\right]+45 C \text{Sin}\left[5 c+\frac{7 d x}{2}\right]-48 A \text{Sin}\left[3 c+\frac{9 d x}{2}\right]-64 C \text{Sin}\left[3 c+\frac{9 d x}{2}\right]-24 A \text{Sin}\left[4 c+\frac{9 d x}{2}\right]-40 C \text{Sin}\left[4 c+\frac{9 d x}{2}\right]-24 A \text{Sin}\left[5 c+\frac{9 d x}{2}\right]-24 C \text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

Problem 122: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right)}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 133 leaves, 6 steps):

$$-\frac{(2A+3C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2ad}+\frac{(3A+4C)\,\text{Tan}[c+dx]}{ad}-\frac{(2A+3C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2ad}-\frac{(A+C)\,\text{Sec}[c+dx]^3\,\text{Tan}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}+\frac{(3A+4C)\,\text{Tan}[c+dx]^3}{3ad}$$

Result (type 3, 1090 leaves) :

$$\frac{2\,(2A+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}-$$
$$\frac{2\,(2A+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}+$$
$$\frac{4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Cos}[c+dx]\,\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}+$$
$$\frac{2C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{dx}{2}\right]}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}-$$
$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\left(C\,\text{Cos}\left[\frac{c}{2}\right]-2C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\frac{4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+5C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}+$$
$$\frac{2C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{dx}{2}\right]}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\left(C\,\text{Cos}\left[\frac{c}{2}\right]+2C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\frac{4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+5C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}$$

- **Problem 123: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^2\left(A+C\,\text{Sec}[c+dx]^2\right)}{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 107 leaves, 6 steps) :

$$\frac{(2A+3C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2 a d}-\frac{(A+2C)\,\text{Tan}[c+d x]}{a d}+\frac{(2A+3C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 a d}-\frac{(A+C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{d\,(a+a\,\text{Sec}[c+d x])}$$

Result (type 3, 316 leaves):

$$\frac{1}{a d\,(A+2C+A\,\text{Cos}[2\,(c+d x)])\,(1+\text{Sec}[c+d x])}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Cos}[c+d x]\left(A+C\,\text{Sec}[c+d x]^2\right)\left(-4\,(A+C)\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+\right.$$
$$\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(-2\,(2A+3C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+4A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$6C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{C}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{C}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$
$$\left.\left.(4C\,\text{Sin}[d x])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)$$

Problem 124: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d x]\left(A+C\,\text{Sec}[c+d x]^2\right)}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 57 leaves, 4 steps):

$$-\frac{C\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a d}+\frac{C\,\text{Tan}[c+d x]}{a d}+\frac{(A+C)\,\text{Tan}[c+d x]}{a d\,(1+\text{Sec}[c+d x])}$$

Result (type 3, 227 leaves):

$$\left(4\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Cos}[c+d x]\left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$
$$\left((A+C)\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.\right.$$
$$\left.\left.\left.\text{Sin}[d x]\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\right)\right)\Big/$$
$$(a d\,(A+2C+A\,\text{Cos}[2\,(c+d x)])\,(1+\text{Sec}[c+d x]))$$

Problem 125: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Sec}[c+d x]^2}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 49 leaves, 4 steps):

$$\frac{A x}{a}+\frac{C\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a d}-\frac{(A+C)\,\text{Tan}[c+d x]}{a d\,(1+\text{Sec}[c+d x])}$$

Result (type 3, 143 leaves):

$$-\left(4\cos\left[\frac{1}{2}(c+d x)\right]\left(C+A\cos[c+d x]^2\right)\left(-\cos\left[\frac{1}{2}(c+d x)\right]\left(A d x-C\,\text{Log}\left[\cos\left[\frac{1}{2}(c+d x)\right]-\sin\left[\frac{1}{2}(c+d x)\right]\right]+C\,\text{Log}\left[\cos\left[\frac{1}{2}(c+d x)\right]+\sin\left[\frac{1}{2}(c+d x)\right]\right]\right)+(A+C)\sec\left[\frac{c}{2}\right]\sin\left[\frac{d x}{2}\right]\right)\right)\Big/\left(a d\,(1+\cos[c+d x])\,(A+2 C+A\cos[2(c+d x)])\right)$$

Problem 126: Result more than twice size of optimal antiderivative.

$$\int\frac{\cos[c+d x]\left(A+C\sec[c+d x]^2\right)}{a+a\sec[c+d x]}\,dx$$

Optimal (type 3, 52 leaves, 4 steps):

$$-\frac{A x}{a}+\frac{(2 A+C)\sin[c+d x]}{a d}-\frac{(A+C)\sin[c+d x]}{d\,(a+a\sec[c+d x])}$$

Result (type 3, 108 leaves):

$$\frac{1}{4 a d}\sec\left[\frac{c}{2}\right]\sec\left[\frac{1}{2}(c+d x)\right]\left(-2 A d x\cos\left[\frac{d x}{2}\right]-2 A d x\cos\left[c+\frac{d x}{2}\right]+5 A\sin\left[\frac{d x}{2}\right]+4 C\sin\left[\frac{d x}{2}\right]+A\sin\left[c+\frac{d x}{2}\right]+A\sin\left[c+\frac{3 d x}{2}\right]+A\sin\left[2 c+\frac{3 d x}{2}\right]\right)$$

Problem 130: Result more than twice size of optimal antiderivative.

$$\int\frac{\sec[c+d x]^4\left(A+C\sec[c+d x]^2\right)}{(a+a\sec[c+d x])^2}\,dx$$

Optimal (type 3, 172 leaves, 7 steps):

$$-\frac{(2 A+5 C)\,\text{ArcTanh}[\sin[c+d x]]}{a^2 d}+\frac{(5 A+12 C)\tan[c+d x]}{a^2 d}-\frac{(2 A+5 C)\sec[c+d x]\tan[c+d x]}{a^2 d}-\frac{2(2 A+5 C)\sec[c+d x]^3\tan[c+d x]}{3 a^2 d\,(1+\sec[c+d x])}-\frac{(A+C)\sec[c+d x]^4\tan[c+d x]}{3 d\,(a+a\sec[c+d x])^2}+\frac{(5 A+12 C)\tan[c+d x]^3}{3 a^2 d}$$

Result (type 3, 623 leaves):

$$\frac{1}{24 a^2 d \left(A+2 C+A \operatorname{Cos}[2 (c+d x)]\right) (1+\operatorname{Sec}[c+d x])^2} \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right] \left(A+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(192 (2 A+5 C) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+\right.$$
$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^3 \left(-3 (8 A+C) \operatorname{Sin}\left[\frac{d x}{2}\right]+(66 A+155 C) \operatorname{Sin}\left[\frac{3 d x}{2}\right]-60 A \operatorname{Sin}\left[c-\frac{d x}{2}\right]-153 C \operatorname{Sin}\left[c-\frac{d x}{2}\right]+24 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]+\right.$$
$$21 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]-60 A \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-135 C \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-4 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+25 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+36 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+$$
$$45 C \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-34 A \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]-85 C \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]+42 A \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]+99 C \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]+21 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+$$
$$24 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]+33 C \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-18 A \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]-45 C \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]+24 A \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]+57 C \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]+$$
$$3 A \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+18 C \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+15 A \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]+24 C \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-6 A \operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]-15 C \operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]+$$
$$\left.\left.10 A \operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]+24 C \operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]+3 A \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]+11 C \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]+7 A \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]+13 C \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)\right)$$

Problem 131: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x]^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+a \operatorname{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 150 leaves, 7 steps):

$$\frac{(2 A+7 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 a^2 d}-\frac{4 (A+4 C) \operatorname{Tan}[c+d x]}{3 a^2 d}+$$
$$\frac{(2 A+7 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^2 d}-\frac{2 (A+4 C) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 a^2 d (1+\operatorname{Sec}[c+d x])}-\frac{(A+C) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{3 d (a+a \operatorname{Sec}[c+d x])^2}$$

Result (type 3, 513 leaves):

$$-\frac{1}{24\,a^2\,d\,\left(A+2\,C+A\,\text{Cos}\left[2\,(c+d\,x)\right]\right)\,\left(1+\text{Sec}[c+d\,x]\right)^2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(96\,(2\,A+7\,C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(-2\,(10\,A+7\,C)\,\text{Sin}\left[\frac{d\,x}{2}\right]+(22\,A+97\,C)\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-36\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-126\,C\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+\right.$$
$$36\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+42\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-20\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-98\,C\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-18\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-3\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$22\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+37\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-18\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-63\,C\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+18\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+75\,C\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$
$$6\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+15\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+18\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+39\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-6\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-21\,C\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+$$
$$\left.\left.8\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+32\,C\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+8\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+20\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)\right)$$

- **Problem 132: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\left(a+a\,\text{Sec}[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 99 leaves, 6 steps):

$$-\frac{2\,C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^2\,d}+\frac{(A+4\,C)\,\text{Tan}[c+d\,x]}{3\,a^2\,d}+\frac{2\,C\,\text{Tan}[c+d\,x]}{a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A+C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 280 leaves):

$$\frac{1}{3\,a^2\,d\,\left(A+2\,C+A\,\text{Cos}\left[2\,(c+d\,x)\right]\right)\,\left(1+\text{Sec}[c+d\,x]\right)^2}$$
$$4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left((A+C)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,(A+7\,C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\right.$$
$$\left(2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\text{Sin}[d\,x]\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\right.\right.$$
$$\left.\left.\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)+(A+C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Tan}\left[\frac{c}{2}\right]\right)$$

- **Problem 133: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\left(a+a\,\text{Sec}[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 75 leaves, 4 steps):

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^2\,d}+\frac{(A-5\,C)\,\text{Tan}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}+\frac{(A+C)\,\text{Tan}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 377 leaves):

$$-\frac{1}{6\,a^2\,d\,(1+\text{Sec}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2$$
$$\left(3\,C\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+3\,C\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$9\,C\,\text{Cos}\left[\frac{d\,x}{2}\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$
$$9\,C\,\text{Cos}\left[c+\frac{d\,x}{2}\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$
$$3\,C\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-3\,C\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\left.6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+18\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-6\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-4\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+8\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]\right)$$

- **Problem 134: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 68 leaves, 3 steps):

$$\frac{A\,x}{a^2}-\frac{2\,(2\,A-C)\,\text{Tan}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A+C)\,\text{Tan}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 141 leaves):

$$\frac{1}{24\,a^2\,d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\left(9\,A\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+9\,A\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+3\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+\right.$$
$$\left.3\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-18\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+12\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-10\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+2\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]\right)$$

- **Problem 135: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 82 leaves, 5 steps):

$$-\frac{2\,A\,x}{a^2}+\frac{(10\,A+C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{2\,A\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 195 leaves):

$$\frac{1}{48 a^2 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\left(-36 A d x \text{Cos}\left[\frac{d x}{2}\right]-36 A d x \text{Cos}\left[c+\frac{d x}{2}\right]-12 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]-12 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+66 A \text{Sin}\left[\frac{d x}{2}\right]+12 C \text{Sin}\left[\frac{d x}{2}\right]-30 A \text{Sin}\left[c+\frac{d x}{2}\right]-12 C \text{Sin}\left[c+\frac{d x}{2}\right]+41 A \text{Sin}\left[c+\frac{3 d x}{2}\right]+8 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+9 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+3 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+3 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]\right)$$

- **Problem 136: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^2\left(A+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 137 leaves, 6 steps):

$$\frac{(7 A+2 C) x}{2 a^2}-\frac{4 (4 A+C) \text{Sin}[c+d x]}{3 a^2 d}+\frac{(7 A+2 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a^2 d}-\frac{2 (4 A+C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A+C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 281 leaves):

$$\frac{1}{48 a^2 d (1+\text{Sec}[c+d x])^2}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(36 (7 A+2 C) d x \text{Cos}\left[\frac{d x}{2}\right]+36 (7 A+2 C) d x \text{Cos}\left[c+\frac{d x}{2}\right]+84 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+24 C d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+84 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+24 C d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]-381 A \text{Sin}\left[\frac{d x}{2}\right]-144 C \text{Sin}\left[\frac{d x}{2}\right]+147 A \text{Sin}\left[c+\frac{d x}{2}\right]+96 C \text{Sin}\left[c+\frac{d x}{2}\right]-239 A \text{Sin}\left[c+\frac{3 d x}{2}\right]-80 C \text{Sin}\left[c+\frac{3 d x}{2}\right]-63 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-15 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-15 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+3 A \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+3 A \text{Sin}\left[4 c+\frac{7 d x}{2}\right]\right)$$

- **Problem 137: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^3\left(A+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 163 leaves, 7 steps):

$$-\frac{(5 A+2 C) x}{a^2}+\frac{(12 A+5 C) \text{Sin}[c+d x]}{a^2 d}-\frac{(5 A+2 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{a^2 d}-\frac{2 (5 A+2 C) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A+C) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}-\frac{(12 A+5 C) \text{Sin}[c+d x]^3}{3 a^2 d}$$

Result (type 3, 349 leaves):

$$\frac{1}{48\,a^2\,d\,(1+\text{Sec}[c+d\,x])^2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\left(-72\,(5\,A+2\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-72\,(5\,A+2\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-120\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-120\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-48\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+516\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+264\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-156\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-120\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+342\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+164\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+118\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+36\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+30\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-3\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-3\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 138: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^4\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 198 leaves, 8 steps):

$$\frac{(2\,A+13\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}-\frac{2\,(11\,A+76\,C)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}+\frac{(2\,A+13\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^3\,d}-\frac{(A+C)\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{(A+11\,C)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(11\,A+76\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 3, 632 leaves):

$$-\frac{1}{240 a^3 d (A+2 C+A \operatorname{Cos}[2 (c+d x)]) (1+\operatorname{Sec}[c+d x])^3} \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right] \operatorname{Sec}[c+d x] \left(A+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(1920 (2 A+13 C) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+\right.$$
$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^2 \left(-5 (98 A+247 C) \operatorname{Sin}\left[\frac{d x}{2}\right]+5 (106 A+761 C) \operatorname{Sin}\left[\frac{3 d x}{2}\right]-654 A \operatorname{Sin}\left[c-\frac{d x}{2}\right]-4329 C \operatorname{Sin}\left[c-\frac{d x}{2}\right]+\right.$$
$$654 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]+1989 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]-490 A \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-3575 C \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-350 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-475 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+$$
$$530 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+2005 C \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-350 A \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]-2275 C \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]+378 A \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]+$$
$$2673 C \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]-150 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+105 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+378 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]+1593 C \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-$$
$$150 A \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]-975 C \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]+190 A \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]+1325 C \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]-30 A \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+$$
$$255 C \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+190 A \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]+875 C \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-30 A \operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]-195 C \operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]+$$
$$\left.\left.44 A \operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]+304 C \operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]+90 C \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]+44 A \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]+214 C \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)\right)$$

- **Problem 139: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c+d x]^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+a \operatorname{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 145 leaves, 7 steps):

$$-\frac{3 C \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^3 d}+\frac{(2 A+27 C) \operatorname{Tan}[c+d x]}{15 a^3 d}-$$
$$\frac{(A+C) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{5 d (a+a \operatorname{Sec}[c+d x])^3}+\frac{(A-9 C) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{15 a d (a+a \operatorname{Sec}[c+d x])^2}+\frac{3 C \operatorname{Tan}[c+d x]}{d \left(a^3+a^3 \operatorname{Sec}[c+d x]\right)}$$

Result (type 3, 457 leaves):

$$\frac{1}{60 a^3 d (A+2 C+A \operatorname{Cos}[2 (c+d x)]) (1+\operatorname{Sec}[c+d x])^3} \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right] \operatorname{Sec}[c+d x] \left(A+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(2880 C \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+\right.$$
$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c] \operatorname{Sec}[c+d x] \left(-5 (4 A+51 C) \operatorname{Sin}\left[\frac{d x}{2}\right]+(22 A+567 C) \operatorname{Sin}\left[\frac{3 d x}{2}\right]-10 A \operatorname{Sin}\left[c-\frac{d x}{2}\right]-600 C \operatorname{Sin}\left[c-\frac{d x}{2}\right]+10 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]+\right.$$
$$375 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]-20 A \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-480 C \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]-60 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+22 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+402 C \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-$$
$$225 C \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]+10 A \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]+315 C \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]+30 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+10 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]+240 C \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-$$
$$\left.\left.45 C \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]+2 A \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]+72 C \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]+15 C \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+2 A \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]+57 C \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]\right)\right)$$

Problem 142: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C \operatorname{Sec}[c+d x]^2}{(a+a \operatorname{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 106 leaves, 4 steps):

$$\frac{A x}{a^3}-\frac{(A+C) \operatorname{Tan}[c+d x]}{5 d (a+a \operatorname{Sec}[c+d x])^3}-\frac{(7 A-3 C) \operatorname{Tan}[c+d x]}{15 a d (a+a \operatorname{Sec}[c+d x])^2}-\frac{(22 A-3 C) \operatorname{Tan}[c+d x]}{15 d \left(a^3+a^3 \operatorname{Sec}[c+d x]\right)}$$

Result (type 3, 227 leaves):

$$\frac{1}{480 a^3 d}$$
$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^5 \left(150 A d x \operatorname{Cos}\left[\frac{d x}{2}\right]+150 A d x \operatorname{Cos}\left[c+\frac{d x}{2}\right]+75 A d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+75 A d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+15 A d x \operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+\right.$$
$$15 A d x \operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]-370 A \operatorname{Sin}\left[\frac{d x}{2}\right]+30 C \operatorname{Sin}\left[\frac{d x}{2}\right]+270 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]-30 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]-$$
$$\left.230 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+30 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+90 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-64 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+6 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]\right)$$

Problem 143: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x] \left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+a \operatorname{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 120 leaves, 6 steps):

$$-\frac{3 A x}{a^3}+\frac{2 (36 A+C) \operatorname{Sin}[c+d x]}{15 a^3 d}-\frac{(A+C) \operatorname{Sin}[c+d x]}{5 d (a+a \operatorname{Sec}[c+d x])^3}-\frac{(9 A-C) \operatorname{Sin}[c+d x]}{15 a d (a+a \operatorname{Sec}[c+d x])^2}-\frac{3 A \operatorname{Sin}[c+d x]}{d \left(a^3+a^3 \operatorname{Sec}[c+d x]\right)}$$

Result (type 3, 283 leaves):

$$-\frac{1}{960\,a^3\,d}\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(900\,A\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+900\,A\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+450\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+450\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+90\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+90\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-1755\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-160\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+1125\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+120\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1215\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-80\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+225\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+60\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-363\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-28\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-75\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 144: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 183 leaves, 7 steps):

$$\frac{(13\,A+2\,C)\,x}{2\,a^3}-\frac{2\,(76\,A+11\,C)\,\text{Sin}[c+d\,x]}{15\,a^3\,d}+\frac{(13\,A+2\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,d}-\frac{(A+C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{(11\,A+C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(76\,A+11\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 3, 385 leaves):

$$\frac{1}{3840\,a^3\,d}\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(600\,(13\,A+2\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+600\,(13\,A+2\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+3900\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+600\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3900\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+600\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+780\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+120\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+780\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+120\,C\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-12760\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2960\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+7560\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+2160\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-9230\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-1840\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+930\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+720\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2782\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-512\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-750\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-105\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-105\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 145: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 216 leaves, 8 steps):

$$-\frac{(23 A+6 C) x}{2 a^3}+\frac{4 (34 A+9 C) \operatorname{Sin}[c+d x]}{5 a^3 d}-\frac{(23 A+6 C) \operatorname{Cos}[c+d x] \operatorname{Sin}[c+d x]}{2 a^3 d}-\frac{(A+C) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{5 d (a+a \operatorname{Sec}[c+d x])^3}-\frac{(13 A+3 C) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{15 a d (a+a \operatorname{Sec}[c+d x])^2}-\frac{(23 A+6 C) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{3 d \left(a^3+a^3 \operatorname{Sec}[c+d x]\right)}-\frac{4 (34 A+9 C) \operatorname{Sin}[c+d x]^3}{15 a^3 d}$$

Result (type 3, 455 leaves) :

$$-\frac{1}{3840 a^3 d} \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^5 \left(600 (23 A+6 C) d x \operatorname{Cos}\left[\frac{d x}{2}\right]+600 (23 A+6 C) d x \operatorname{Cos}\left[c+\frac{d x}{2}\right]+6900 A d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+1800 C d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+6900 A d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+1800 C d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+1380 A d x \operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+360 C d x \operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+1380 A d x \operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]+360 C d x \operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]-20410 A \operatorname{Sin}\left[\frac{d x}{2}\right]-7020 C \operatorname{Sin}\left[\frac{d x}{2}\right]+11110 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]+4500 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]-15380 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-4860 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+380 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+900 C \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-4777 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]-1452 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]-1625 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-300 C \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-230 A \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]-60 C \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]-230 A \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-60 C \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]+20 A \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]+20 A \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]-5 A \operatorname{Sin}\left[5 c+\frac{11 d x}{2}\right]-5 A \operatorname{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

- **Problem 146: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c+d x]^5 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+a \operatorname{Sec}[c+d x])^4} \, dx$$

Optimal (type 3, 232 leaves, 9 steps) :

$$\frac{(2 A+21 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 a^4 d}-\frac{32 (5 A+54 C) \operatorname{Tan}[c+d x]}{105 a^4 d}+\frac{(2 A+21 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^4 d}-\frac{(10 A+129 C) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{105 a^4 d (1+\operatorname{Sec}[c+d x])^2}-\frac{16 (5 A+54 C) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{105 a^4 d (1+\operatorname{Sec}[c+d x])}-\frac{(A+C) \operatorname{Sec}[c+d x]^5 \operatorname{Tan}[c+d x]}{7 d (a+a \operatorname{Sec}[c+d x])^4}-\frac{2 C \operatorname{Sec}[c+d x]^4 \operatorname{Tan}[c+d x]}{5 a d (a+a \operatorname{Sec}[c+d x])^3}$$

Result (type 3, 890 leaves) :

$$-\frac{16\,(2A+21C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}[c+dx]^2\,\left(A+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^4}+$$

$$\frac{16\,(2A+21C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^8\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}[c+dx]^2\,\left(A+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^4}+$$

$$\frac{1}{3360\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^4}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+dx]^4\,\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(14140\,A\,\text{Sin}\left[\frac{dx}{2}\right]+73206\,C\,\text{Sin}\left[\frac{dx}{2}\right]-15160\,A\,\text{Sin}\left[\frac{3dx}{2}\right]-166668\,C\,\text{Sin}\left[\frac{3dx}{2}\right]+17220\,A\,\text{Sin}\left[c-\frac{dx}{2}\right]+\right.$$

$$183162\,C\,\text{Sin}\left[c-\frac{dx}{2}\right]-17220\,A\,\text{Sin}\left[c+\frac{dx}{2}\right]-100842\,C\,\text{Sin}\left[c+\frac{dx}{2}\right]+14140\,A\,\text{Sin}\left[2c+\frac{dx}{2}\right]+155526\,C\,\text{Sin}\left[2c+\frac{dx}{2}\right]+$$

$$9800\,A\,\text{Sin}\left[c+\frac{3dx}{2}\right]+37380\,C\,\text{Sin}\left[c+\frac{3dx}{2}\right]-15160\,A\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-101148\,C\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+9800\,A\,\text{Sin}\left[3c+\frac{3dx}{2}\right]+$$

$$102900\,C\,\text{Sin}\left[3c+\frac{3dx}{2}\right]-10920\,A\,\text{Sin}\left[c+\frac{5dx}{2}\right]-119364\,C\,\text{Sin}\left[c+\frac{5dx}{2}\right]+4760\,A\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+8820\,C\,\text{Sin}\left[2c+\frac{5dx}{2}\right]-$$

$$10920\,A\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-78204\,C\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+4760\,A\,\text{Sin}\left[4c+\frac{5dx}{2}\right]+49980\,C\,\text{Sin}\left[4c+\frac{5dx}{2}\right]-5890\,A\,\text{Sin}\left[2c+\frac{7dx}{2}\right]-$$

$$64053\,C\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+1470\,A\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-3885\,C\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-5890\,A\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-44733\,C\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+$$

$$1470\,A\,\text{Sin}\left[5c+\frac{7dx}{2}\right]+15435\,C\,\text{Sin}\left[5c+\frac{7dx}{2}\right]-2030\,A\,\text{Sin}\left[3c+\frac{9dx}{2}\right]-21987\,C\,\text{Sin}\left[3c+\frac{9dx}{2}\right]+210\,A\,\text{Sin}\left[4c+\frac{9dx}{2}\right]-$$

$$3675\,C\,\text{Sin}\left[4c+\frac{9dx}{2}\right]-2030\,A\,\text{Sin}\left[5c+\frac{9dx}{2}\right]-16107\,C\,\text{Sin}\left[5c+\frac{9dx}{2}\right]+210\,A\,\text{Sin}\left[6c+\frac{9dx}{2}\right]+2205\,C\,\text{Sin}\left[6c+\frac{9dx}{2}\right]-$$

$$\left.320\,A\,\text{Sin}\left[4c+\frac{11dx}{2}\right]-3456\,C\,\text{Sin}\left[4c+\frac{11dx}{2}\right]-840\,C\,\text{Sin}\left[5c+\frac{11dx}{2}\right]-320\,A\,\text{Sin}\left[6c+\frac{11dx}{2}\right]-2616\,C\,\text{Sin}\left[6c+\frac{11dx}{2}\right]\right)$$

- **Problem 147: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+dx]^4\,\left(A+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^4}\,dx$$

Optimal (type 3, 183 leaves, 8 steps):

$$-\frac{4\,C\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a^4\,d}+\frac{2\,(3A+122C)\,\text{Tan}[c+dx]}{105\,a^4\,d}+\frac{(3A-88C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{105\,a^4\,d\,(1+\text{Sec}[c+dx])^2}+$$

$$\frac{4\,C\,\text{Tan}[c+dx]}{a^4\,d\,(1+\text{Sec}[c+dx])}-\frac{(A+C)\,\text{Sec}[c+dx]^4\,\text{Tan}[c+dx]}{7\,d\,(a+a\,\text{Sec}[c+dx])^4}+\frac{2\,(A-6C)\,\text{Sec}[c+dx]^3\,\text{Tan}[c+dx]}{35\,a\,d\,(a+a\,\text{Sec}[c+dx])^3}$$

Result (type 3, 544 leaves):

$$\frac{1}{840 a^4 d (A + 2 C + A \operatorname{Cos}[2 (c + d x)]) (1 + \operatorname{Sec}[c + d x])^4} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] \operatorname{Sec}[c + d x]^2 \left(A + C \operatorname{Sec}[c + d x]^2\right)$$

$$\left(107520 C \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^7 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right]\right) + \right.$$

$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c] \operatorname{Sec}[c + d x] \left(-70 (3 A + 154 C) \operatorname{Sin}\left[\frac{d x}{2}\right] + 28 (9 A + 671 C) \operatorname{Sin}\left[\frac{3 d x}{2}\right] - 126 A \operatorname{Sin}\left[c - \frac{d x}{2}\right] - 20524 C \operatorname{Sin}\left[c - \frac{d x}{2}\right] + \right.$$

$$126 A \operatorname{Sin}\left[c + \frac{d x}{2}\right] + 14644 C \operatorname{Sin}\left[c + \frac{d x}{2}\right] - 210 A \operatorname{Sin}\left[2 c + \frac{d x}{2}\right] - 16660 C \operatorname{Sin}\left[2 c + \frac{d x}{2}\right] - 4690 C \operatorname{Sin}\left[c + \frac{3 d x}{2}\right] +$$

$$252 A \operatorname{Sin}\left[2 c + \frac{3 d x}{2}\right] + 14378 C \operatorname{Sin}\left[2 c + \frac{3 d x}{2}\right] - 9100 C \operatorname{Sin}\left[3 c + \frac{3 d x}{2}\right] + 132 A \operatorname{Sin}\left[c + \frac{5 d x}{2}\right] + 11668 C \operatorname{Sin}\left[c + \frac{5 d x}{2}\right] -$$

$$630 C \operatorname{Sin}\left[2 c + \frac{5 d x}{2}\right] + 132 A \operatorname{Sin}\left[3 c + \frac{5 d x}{2}\right] + 9358 C \operatorname{Sin}\left[3 c + \frac{5 d x}{2}\right] - 2940 C \operatorname{Sin}\left[4 c + \frac{5 d x}{2}\right] + 42 A \operatorname{Sin}\left[2 c + \frac{7 d x}{2}\right] +$$

$$4228 C \operatorname{Sin}\left[2 c + \frac{7 d x}{2}\right] + 315 C \operatorname{Sin}\left[3 c + \frac{7 d x}{2}\right] + 42 A \operatorname{Sin}\left[4 c + \frac{7 d x}{2}\right] + 3493 C \operatorname{Sin}\left[4 c + \frac{7 d x}{2}\right] - 420 C \operatorname{Sin}\left[5 c + \frac{7 d x}{2}\right] +$$

$$\left.\left. 6 A \operatorname{Sin}\left[3 c + \frac{9 d x}{2}\right] + 664 C \operatorname{Sin}\left[3 c + \frac{9 d x}{2}\right] + 105 C \operatorname{Sin}\left[4 c + \frac{9 d x}{2}\right] + 6 A \operatorname{Sin}\left[5 c + \frac{9 d x}{2}\right] + 559 C \operatorname{Sin}\left[5 c + \frac{9 d x}{2}\right]\right)\right)$$

- **Problem 151: Result more than twice size of optimal antiderivative.**

$$\int \frac{A + C \operatorname{Sec}[c + d x]^2}{(a + a \operatorname{Sec}[c + d x])^4} \, dx$$

Optimal (type 3, 136 leaves, 5 steps):

$$\frac{A x}{a^4} - \frac{(55 A - 8 C) \operatorname{Tan}[c + d x]}{105 a^4 d (1 + \operatorname{Sec}[c + d x])^2} - \frac{8 (20 A - C) \operatorname{Tan}[c + d x]}{105 a^4 d (1 + \operatorname{Sec}[c + d x])} - \frac{(A + C) \operatorname{Tan}[c + d x]}{7 d (a + a \operatorname{Sec}[c + d x])^4} - \frac{2 (5 A - 2 C) \operatorname{Tan}[c + d x]}{35 a d (a + a \operatorname{Sec}[c + d x])^3}$$

Result (type 3, 315 leaves):

$$\frac{1}{13440 a^4 d} \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^7$$

$$\left(3675 A d x \operatorname{Cos}\left[\frac{d x}{2}\right] + 3675 A d x \operatorname{Cos}\left[c + \frac{d x}{2}\right] + 2205 A d x \operatorname{Cos}\left[c + \frac{3 d x}{2}\right] + 2205 A d x \operatorname{Cos}\left[2 c + \frac{3 d x}{2}\right] + 735 A d x \operatorname{Cos}\left[2 c + \frac{5 d x}{2}\right] + \right.$$

$$735 A d x \operatorname{Cos}\left[3 c + \frac{5 d x}{2}\right] + 105 A d x \operatorname{Cos}\left[3 c + \frac{7 d x}{2}\right] + 105 A d x \operatorname{Cos}\left[4 c + \frac{7 d x}{2}\right] - 9940 A \operatorname{Sin}\left[\frac{d x}{2}\right] + 560 C \operatorname{Sin}\left[\frac{d x}{2}\right] +$$

$$8260 A \operatorname{Sin}\left[c + \frac{d x}{2}\right] - 350 C \operatorname{Sin}\left[c + \frac{d x}{2}\right] - 7140 A \operatorname{Sin}\left[c + \frac{3 d x}{2}\right] + 336 C \operatorname{Sin}\left[c + \frac{3 d x}{2}\right] + 3780 A \operatorname{Sin}\left[2 c + \frac{3 d x}{2}\right] - 210 C \operatorname{Sin}\left[2 c + \frac{3 d x}{2}\right] -$$

$$\left. 2800 A \operatorname{Sin}\left[2 c + \frac{5 d x}{2}\right] + 182 C \operatorname{Sin}\left[2 c + \frac{5 d x}{2}\right] + 840 A \operatorname{Sin}\left[3 c + \frac{5 d x}{2}\right] - 520 A \operatorname{Sin}\left[3 c + \frac{7 d x}{2}\right] + 26 C \operatorname{Sin}\left[3 c + \frac{7 d x}{2}\right]\right)$$

Problem 152: Result more than twice size of optimal antiderivative.

$$\int \frac{\cos[c+d x] \left(A+C \sec[c+d x]^2\right)}{(a+a \sec[c+d x])^4} \, dx$$

Optimal (type 3, 152 leaves, 7 steps):

$$-\frac{4 A x}{a^4}+\frac{2 (332 A+3 C) \sin[c+d x]}{105 a^4 d}-\frac{(88 A-3 C) \sin[c+d x]}{105 a^4 d (1+\sec[c+d x])^2}-\frac{4 A \sin[c+d x]}{a^4 d (1+\sec[c+d x])}-\frac{(A+C) \sin[c+d x]}{7 d (a+a \sec[c+d x])^4}-\frac{2 (6 A-C) \sin[c+d x]}{35 a d (a+a \sec[c+d x])^3}$$

Result (type 3, 371 leaves):

$$-\frac{1}{26880 a^4 d} \sec\left[\frac{c}{2}\right] \sec\left[\frac{1}{2} (c+d x)\right]^7 \left(29400 A d x \cos\left[\frac{d x}{2}\right]+29400 A d x \cos\left[c+\frac{d x}{2}\right]+17640 A d x \cos\left[c+\frac{3 d x}{2}\right]+17640 A d x \cos\left[2 c+\frac{3 d x}{2}\right]+5880 A d x \cos\left[2 c+\frac{5 d x}{2}\right]+5880 A d x \cos\left[3 c+\frac{5 d x}{2}\right]+840 A d x \cos\left[3 c+\frac{7 d x}{2}\right]+840 A d x \cos\left[4 c+\frac{7 d x}{2}\right]-60830 A \sin\left[\frac{d x}{2}\right]-2520 C \sin\left[\frac{d x}{2}\right]+46130 A \sin\left[c+\frac{d x}{2}\right]+2520 C \sin\left[c+\frac{d x}{2}\right]-46116 A \sin\left[c+\frac{3 d x}{2}\right]-1764 C \sin\left[c+\frac{3 d x}{2}\right]+18060 A \sin\left[2 c+\frac{3 d x}{2}\right]+1260 C \sin\left[2 c+\frac{3 d x}{2}\right]-19292 A \sin\left[2 c+\frac{5 d x}{2}\right]-588 C \sin\left[2 c+\frac{5 d x}{2}\right]+2100 A \sin\left[3 c+\frac{5 d x}{2}\right]+420 C \sin\left[3 c+\frac{5 d x}{2}\right]-3791 A \sin\left[3 c+\frac{7 d x}{2}\right]-144 C \sin\left[3 c+\frac{7 d x}{2}\right]-735 A \sin\left[4 c+\frac{7 d x}{2}\right]-105 A \sin\left[4 c+\frac{9 d x}{2}\right]-105 A \sin\left[5 c+\frac{9 d x}{2}\right]\right)$$

Problem 153: Result more than twice size of optimal antiderivative.

$$\int \frac{\cos[c+d x]^2 \left(A+C \sec[c+d x]^2\right)}{(a+a \sec[c+d x])^4} \, dx$$

Optimal (type 3, 215 leaves, 8 steps):

$$\frac{(21 A+2 C) x}{2 a^4}-\frac{32 (54 A+5 C) \sin[c+d x]}{105 a^4 d}+\frac{(21 A+2 C) \cos[c+d x] \sin[c+d x]}{2 a^4 d}-\frac{(129 A+10 C) \cos[c+d x] \sin[c+d x]}{105 a^4 d (1+\sec[c+d x])^2}-\frac{16 (54 A+5 C) \cos[c+d x] \sin[c+d x]}{105 a^4 d (1+\sec[c+d x])}-\frac{(A+C) \cos[c+d x] \sin[c+d x]}{7 d (a+a \sec[c+d x])^4}-\frac{2 A \cos[c+d x] \sin[c+d x]}{5 a d (a+a \sec[c+d x])^3}$$

Result (type 3, 505 leaves):

$$\frac{1}{107520\, a^4\, d} \mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^7$$

$$\left(14700\,(21 A+2 C)\, d x \mathrm{Cos}\left[\frac{d x}{2}\right]+14700\,(21 A+2 C)\, d x \mathrm{Cos}\left[c+\frac{d x}{2}\right]+185220\, A\, d x \mathrm{Cos}\left[c+\frac{3 d x}{2}\right]+17640\, C\, d x \mathrm{Cos}\left[c+\frac{3 d x}{2}\right]+\right.$$

$$185220\, A\, d x \mathrm{Cos}\left[2 c+\frac{3 d x}{2}\right]+17640\, C\, d x \mathrm{Cos}\left[2 c+\frac{3 d x}{2}\right]+61740\, A\, d x \mathrm{Cos}\left[2 c+\frac{5 d x}{2}\right]+5880\, C\, d x \mathrm{Cos}\left[2 c+\frac{5 d x}{2}\right]+$$

$$61740\, A\, d x \mathrm{Cos}\left[3 c+\frac{5 d x}{2}\right]+5880\, C\, d x \mathrm{Cos}\left[3 c+\frac{5 d x}{2}\right]+8820\, A\, d x \mathrm{Cos}\left[3 c+\frac{7 d x}{2}\right]+840\, C\, d x \mathrm{Cos}\left[3 c+\frac{7 d x}{2}\right]+8820\, A\, d x \mathrm{Cos}\left[4 c+\frac{7 d x}{2}\right]+$$

$$840\, C\, d x \mathrm{Cos}\left[4 c+\frac{7 d x}{2}\right]-539490\, A \mathrm{Sin}\left[\frac{d x}{2}\right]-79520\, C \mathrm{Sin}\left[\frac{d x}{2}\right]+386190\, A \mathrm{Sin}\left[c+\frac{d x}{2}\right]+66080\, C \mathrm{Sin}\left[c+\frac{d x}{2}\right]-$$

$$422478\, A \mathrm{Sin}\left[c+\frac{3 d x}{2}\right]-57120\, C \mathrm{Sin}\left[c+\frac{3 d x}{2}\right]+132930\, A \mathrm{Sin}\left[2 c+\frac{3 d x}{2}\right]+30240\, C \mathrm{Sin}\left[2 c+\frac{3 d x}{2}\right]-181461\, A \mathrm{Sin}\left[2 c+\frac{5 d x}{2}\right]-$$

$$22400\, C \mathrm{Sin}\left[2 c+\frac{5 d x}{2}\right]+3675\, A \mathrm{Sin}\left[3 c+\frac{5 d x}{2}\right]+6720\, C \mathrm{Sin}\left[3 c+\frac{5 d x}{2}\right]-36003\, A \mathrm{Sin}\left[3 c+\frac{7 d x}{2}\right]-4160\, C \mathrm{Sin}\left[3 c+\frac{7 d x}{2}\right]-$$

$$\left.9555\, A \mathrm{Sin}\left[4 c+\frac{7 d x}{2}\right]-945\, A \mathrm{Sin}\left[4 c+\frac{9 d x}{2}\right]-945\, A \mathrm{Sin}\left[5 c+\frac{9 d x}{2}\right]+105\, A \mathrm{Sin}\left[5 c+\frac{11 d x}{2}\right]+105\, A \mathrm{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

- **Problem 154: Result more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Cos}[c+d x]^3\left(A+C \mathrm{Sec}[c+d x]^2\right)}{(a+a \mathrm{Sec}[c+d x])^4}\, dx$$

Optimal (type 3, 248 leaves, 9 steps):

$$-\frac{2\,(11 A+2 C)\, x}{a^4}+\frac{4\,(454 A+83 C) \mathrm{Sin}[c+d x]}{35\, a^4\, d}-\frac{2\,(11 A+2 C) \mathrm{Cos}[c+d x] \mathrm{Sin}[c+d x]}{a^4\, d}-\frac{(178 A+31 C) \mathrm{Cos}[c+d x]^2 \mathrm{Sin}[c+d x]}{105\, a^4\, d\,(1+\mathrm{Sec}[c+d x])^2}-$$

$$\frac{4\,(11 A+2 C) \mathrm{Cos}[c+d x]^2 \mathrm{Sin}[c+d x]}{3\, a^4\, d\,(1+\mathrm{Sec}[c+d x])}-\frac{(A+C) \mathrm{Cos}[c+d x]^2 \mathrm{Sin}[c+d x]}{7\, d\,(a+a \mathrm{Sec}[c+d x])^4}-\frac{2\,(8 A+C) \mathrm{Cos}[c+d x]^2 \mathrm{Sin}[c+d x]}{35\, a\, d\,(a+a \mathrm{Sec}[c+d x])^3}-\frac{4\,(454 A+83 C) \mathrm{Sin}[c+d x]^3}{105\, a^4\, d}$$

Result (type 3, 575 leaves):

$$-\frac{1}{107\,520\,a^4\,d}\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^7$$
$$\left(58\,800\,(11\,A+2\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+58\,800\,(11\,A+2\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+388\,080\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+70\,560\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+\right.$$
$$388\,080\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+70\,560\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+129\,360\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+23\,520\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$129\,360\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+23\,520\,C\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+18\,480\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+3360\,C\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$
$$18\,480\,A\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+3360\,C\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-1\,010\,660\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-243\,320\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$687\,260\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+184\,520\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-814\,107\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-184\,464\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$204\,645\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+72\,240\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-357\,609\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-77\,168\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$18\,025\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+8400\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-72\,522\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-15\,164\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$
$$24\,010\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-2940\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-2310\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-420\,C\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-2310\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-$$
$$\left.420\,C\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+175\,A\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+175\,A\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]-35\,A\,\text{Sin}\left[6\,c+\frac{13\,d\,x}{2}\right]-35\,A\,\text{Sin}\left[7\,c+\frac{13\,d\,x}{2}\right]\right)$$

- **Problem 160: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 94 leaves, 5 steps):

$$\frac{\sqrt{a}\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{A\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}-\frac{a\,(A-2\,C)\,\text{Tan}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 398 leaves):

$$\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\left(\frac{1}{2}(-A+4C)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{1}{2}A\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]\right)}{d}-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)A\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\sqrt{a(1+\text{Sec}[c+dx])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 161: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^2\sqrt{a+a\,\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 110 leaves, 4 steps):

$$\frac{\sqrt{a}\,(3A+8C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{4d}+\frac{a\,A\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{A\,\text{Cos}[c+dx]\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2d}$$

Result (type 4, 410 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(-\frac{1}{8}\text{A Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}\text{A Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{8}\text{A Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(3A+8C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 162: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 153 leaves, 5 steps):

$$\frac{\sqrt{a}\,(5A+8C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8 d}+\frac{a(5A+8C)\,\text{Sin}[c+d x]}{8 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a A\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{12 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{A\,\text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 4, 439 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}$$
$$\left(-\frac{1}{48}(11 A+24 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{6}(2 A+3 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{16}A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{24}A\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]\right)+$$
$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(5 A+8 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 163: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\text{Cos}[c+d x]^4\sqrt{a+a\,\text{Sec}[c+d x]}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 196 leaves, 6 steps):

$$\frac{\sqrt{a}\,(35 A+48 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a(35 A+48 C)\,\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a(35 A+48 C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{96 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a A\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{24 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{A\,\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 460 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(-\frac{1}{384}(41 A+48 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{48}(11 A+12 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{128}(15 A+16 C)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{48}A\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{64}A\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]\right)+$$

$$\frac{1}{\left(-64+48\sqrt{2}\right)d}(35 A+48 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 169: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2\,(a+a\,\text{Sec}[c+d x])^{3/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 151 leaves, 5 steps):

$$\frac{a^{3/2}(7 A+8 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4 d}+\frac{a^2(5 A-8 C)\,\text{Sin}[c+d x]}{4 d\sqrt{a+a\,\text{Sec}[c+d x]}}-$$

$$\frac{a(A-4 C)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{2 d}+\frac{A\,\text{Cos}[c+d x]\,(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{2 d}$$

Result (type 4, 424 leaves):

$$\frac{1}{2}\left(\frac{1}{d}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(-\frac{1}{8}(5A-16C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{3}{4}A\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{8}A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+\right.$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(7A+8C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)$$

- **Problem 171: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{3/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{3/2}(75A+112C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^2(75A+112C)\,\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2(13A+16C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{32 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a A\,\text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{8 d}+\frac{A\,\text{Cos}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 534 leaves):

$$\left(\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{1}{128}\,(43\,A+80\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{3}{16}\,(3\,A+4\,C)\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+\frac{1}{128}\,(23\,A+16\,C)\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]+\frac{1}{16}\,A\,\text{Sin}\left[\frac{7}{2}\,(c+d\,x)\right]+\frac{1}{64}\,A\,\text{Sin}\left[\frac{9}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\frac{1}{\left(-64+48\,\sqrt{2}\right)\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])}\,(75\,A+112\,C)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\,\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$

$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Cos}[c+d\,x]^2$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 172: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^5\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 245 leaves, 7 steps):

$$\frac{a^{3/2}\,(133\,A+176\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{128\,d}+\frac{a^2\,(133\,A+176\,C)\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(133\,A+176\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^2\,(67\,A+80\,C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{3\,a\,A\,\text{Cos}[c+d\,x]^3\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d}+\frac{A\,\text{Cos}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 4, 556 leaves):

$$\left(\text{Cos}[c+d x]^3 \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2} \left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$
$$\left(-\frac{(1019 A+1360 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{3840}+\frac{1}{480}(239 A+280 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{256}(49 A+48 C)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\right.$$
$$\left.\left.\frac{1}{240}(17 A+10 C)\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{3}{128} A\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]+\frac{1}{160} A\,\text{Sin}\left[\frac{11}{2}(c+d x)\right]\right)\right)\Big/ (d (A+2 C+A\,\text{Cos}[2 c+2 d x]))+$$
$$\frac{1}{64 d (A+2 C+A\,\text{Cos}[2 c+2 d x])}\left(4+3\sqrt{2}\right)(133 A+176 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4 \sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$
$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]^2$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\text{Sec}[c+d x]))^{3/2}\left(A+C\,\text{Sec}[c+d x]^2\right)\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 178: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2 (a+a\,\text{Sec}[c+d x])^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 188 leaves, 6 steps):

$$\frac{a^{5/2}(19 A+8 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4 d}+\frac{a^3 (27 A-56 C)\,\text{Sin}[c+d x]}{12 d\sqrt{a+a\,\text{Sec}[c+d x]}}-\frac{a^2 (A-8 C)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{2 d}-$$
$$\frac{a (3 A-4 C)(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{6 d}+\frac{A\,\text{Cos}[c+d x](a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{2 d}$$

Result (type 4, 455 leaves):

$$\frac{1}{2}\left(\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\right.$$

$$\left(-\frac{1}{48}(27 A-128 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{3} C\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{5}{8} A\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{16} A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(19 A+8 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\text{Cos}[c+d x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)$$

- **Problem 180: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 200 leaves, 6 steps) :

$$\frac{a^{5/2}(163 A+304 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^3(299 A+432 C)\,\text{Sin}[c+d x]}{192 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2(17 A+16 C)\,\text{Cos}[c+d x]\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{32 d}+$$

$$\frac{5 a A\,\text{Cos}[c+d x]^2(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{24 d}+\frac{A\,\text{Cos}[c+d x]^3(a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 535 leaves) :

$$\left(\mathrm{Cos}[c+d x]^4\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\left(-\frac{1}{768}(265 A+432 C)\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{5}{96}(11 A+12 C)\,\mathrm{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{256}(47 A+16 C)\,\mathrm{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{5}{96} A\,\mathrm{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{128} A\,\mathrm{Sin}\left[\frac{9}{2}(c+d x)\right]\right)\right)\Big/$$
$$(d(A+2 C+A\,\mathrm{Cos}[2 c+2 d x]))+\frac{1}{64 d(A+2 C+A\,\mathrm{Cos}[2 c+2 d x])}\left(4+3\sqrt{2}\right)(163 A+304 C)\,\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]^4$$
$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\mathrm{Cos}[c+d x]^3$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 181: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d x]^5 (a+a\,\mathrm{Sec}[c+d x])^{5/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 245 leaves, 7 steps):

$$\frac{a^{5/2}(283 A+400 C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d x]}{\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\right]}{128 d}+\frac{a^3(283 A+400 C)\,\mathrm{Sin}[c+d x]}{128 d\sqrt{a+a\,\mathrm{Sec}[c+d x]}}+$$
$$\frac{a^3(787 A+1040 C)\,\mathrm{Cos}[c+d x]\,\mathrm{Sin}[c+d x]}{960 d\sqrt{a+a\,\mathrm{Sec}[c+d x]}}+\frac{a^2(79 A+80 C)\,\mathrm{Cos}[c+d x]^2\sqrt{a+a\,\mathrm{Sec}[c+d x]}\,\mathrm{Sin}[c+d x]}{240 d}+$$
$$\frac{a A\,\mathrm{Cos}[c+d x]^3(a+a\,\mathrm{Sec}[c+d x])^{3/2}\mathrm{Sin}[c+d x]}{8 d}+\frac{A\,\mathrm{Cos}[c+d x]^4(a+a\,\mathrm{Sec}[c+d x])^{5/2}\mathrm{Sin}[c+d x]}{5 d}$$

Result (type 4, 556 leaves):

$$\left(\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left(-\frac{(2309 A+3760 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{7680}+\frac{1}{960}(509 A+640 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{5}{512}(19 A+16 C)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\right.$$

$$\left.\left.\frac{1}{240}(16 A+5 C)\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{5}{256}A\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]+\frac{1}{320}A\,\text{Sin}\left[\frac{11}{2}(c+d x)\right]\right)\right)\Big/ (d (A+2 C+A\,\text{Cos}[2 c+2 d x]))+$$

$$\frac{1}{64 d (A+2 C+A\,\text{Cos}[2 c+2 d x])}\left(2+\frac{3}{\sqrt{2}}\right)(283 A+400 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4 \sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]^3$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\ \sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right)\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 182: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d x]^6 (a+a\,\text{Sec}[c+d x])^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 290 leaves, 8 steps):

$$\frac{a^{5/2}(1015 A+1304 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{512 d}+\frac{a^3 (1015 A+1304 C)\,\text{Sin}[c+d x]}{512 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^3 (1015 A+1304 C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{768 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a^3 (109 A+136 C)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{192 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2 (23 A+24 C)\,\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{96 d}+$$

$$\frac{a A\,\text{Cos}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{12 d}+\frac{A\,\text{Cos}[c+d x]^5 (a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{6 d}$$

Result (type 4, 577 leaves):

$$\left(\text{Cos}[c+d x]^4\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{(1589 A+2120 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{6144}+\frac{11}{384}(17 A+20 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{(1145 A+1128 C)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]}{6144}+\frac{1}{384}(29 A+20 C)\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{(83 A+24 C)\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]}{3072}+\frac{1}{128}A\,\text{Sin}\left[\frac{11}{2}(c+d x)\right]+\frac{1}{768}A\,\text{Sin}\left[\frac{13}{2}(c+d x)\right]\right)\right)\Big/$$

$$(d(A+2C+A\,\text{Cos}[2c+2dx]))+\frac{1}{512\,d\,(A+2C+A\,\text{Cos}[2c+2dx])}\left(4+3\sqrt{2}\right)(1015 A+1304 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]^3$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right)\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 183: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^4\left(A+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 236 leaves, 7 steps):

$$-\frac{\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{4(147 A+143 C)\,\text{Tan}[c+d x]}{315\,d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{2(21 A+19 C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{105\,d\sqrt{a+a\,\text{Sec}[c+d x]}}-$$

$$\frac{2C\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{63\,d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{2C\,\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{9\,d\sqrt{a+a\,\text{Sec}[c+d x]}}-\frac{2(21 A+29 C)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{315\,a\,d}$$

Result (type 3, 474 leaves):

$$\frac{1}{(A+2C+A\cos[2c+2dx])\sqrt{a(1+\sec[c+dx])}}\cos[c+dx]^2\sqrt{(1+\cos[c+dx])\sec[c+dx]}\sqrt{1+\sec[c+dx]}\left(A+C\sec[c+dx]^2\right)$$

$$\left(\frac{8(-84A-126C+273A\cos[c]+257C\cos[c])\sin\left[\frac{c}{2}\right]}{315d\left(\cos\left[\frac{c}{2}\right]+\cos\left[\frac{3c}{2}\right]\right)}+\frac{4\sec\left[\frac{c}{2}\right]\sec\left[\frac{c}{2}+\frac{dx}{2}\right]\left(357A\sin\left[\frac{dx}{2}\right]+383C\sin\left[\frac{dx}{2}\right]\right)}{315d}+\right.$$

$$\frac{4C\sec[c]\sec[c+dx]^4\sin[dx]}{9d}+\frac{4\sec[c]\sec[c+dx](63A\sin[c]+97C\sin[c]-84A\sin[dx]-126C\sin[dx])}{315d}-$$

$$\left.\frac{4\sec[c]\sec[c+dx]^2(40C\sin[c]-63A\sin[dx]-97C\sin[dx])}{315d}+\frac{4\sec[c]\sec[c+dx]^3(7C\sin[c]-8C\sin[dx])}{63d}\right)+$$

$$\left(2\sqrt{2}(A+C)\operatorname{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\sec[c+dx]}}\right]\cos[c+dx]^4\sqrt{-1+\sec[c+dx]}(1+\sec[c+dx])^2\left(A+C\sec[c+dx]^2\right)\sin[c+dx]\right)\Big/$$

$$\left(d(1+\cos[c+dx])\sqrt{1-\cos[c+dx]^2}(A+2C+A\cos[2c+2dx])\sqrt{a(1+\sec[c+dx])}\sqrt{\cos[c+dx]^2(-1+\sec[c+dx])(1+\sec[c+dx])}\right)$$

- **Problem 184: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sec[c+dx]^3\left(A+C\sec[c+dx]^2\right)}{\sqrt{a+a\sec[c+dx]}}\,dx$$

Optimal (type 3, 193 leaves, 6 steps):

$$\frac{\sqrt{2}(A+C)\operatorname{ArcTan}\left[\frac{\sqrt{a}\tan[c+dx]}{\sqrt{2}\sqrt{a+a\sec[c+dx]}}\right]}{\sqrt{a}\,d}-\frac{4(35A+37C)\tan[c+dx]}{105d\sqrt{a+a\sec[c+dx]}}-$$

$$\frac{2C\sec[c+dx]^2\tan[c+dx]}{35d\sqrt{a+a\sec[c+dx]}}+\frac{2C\sec[c+dx]^3\tan[c+dx]}{7d\sqrt{a+a\sec[c+dx]}}+\frac{2(35A+31C)\sqrt{a+a\sec[c+dx]}\tan[c+dx]}{105ad}$$

Result (type 3, 432 leaves):

$$\left(\text{Cos}[c+d x]^2 \sqrt{(1+\text{Cos}[c+d x])\,\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\left(A+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{8\,(-35 A-49 C+35 A\,\text{Cos}[c]+43 C\,\text{Cos}[c])\,\text{Sin}\left[\frac{c}{2}\right]}{105 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Cos}\left[\frac{3c}{2}\right]\right)}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(35 A\,\text{Sin}\left[\frac{d x}{2}\right]+46 C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{105 d}+\frac{4 C\,\text{Sec}[c]\,\text{Sec}[c+d x]^3\,\text{Sin}[d x]}{7 d}-\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,(18 C\,\text{Sin}[c]-35 A\,\text{Sin}[d x]-49 C\,\text{Sin}[d x])}{105 d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(5 C\,\text{Sin}[c]-6 C\,\text{Sin}[d x])}{35 d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2d x])\sqrt{a\,(1+\text{Sec}[c+d x])}\right)-$$

$$\left(2\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d x]}}\right]\text{Cos}[c+d x]^4\sqrt{-1+\text{Sec}[c+d x]}\,(1+\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c+d x]\right)\Big/$$
$$\left(d\,(1+\text{Cos}[c+d x])\sqrt{1-\text{Cos}[c+d x]^2}\,(A+2C+A\,\text{Cos}[2c+2d x])\sqrt{a\,(1+\text{Sec}[c+d x])}\sqrt{\text{Cos}[c+d x]^2\,(-1+\text{Sec}[c+d x])\,(1+\text{Sec}[c+d x])}\right)$$

- **Problem 185: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^2\left(A+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 152 leaves, 5 steps):

$$-\frac{\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{2\,(15 A+14 C)\,\text{Tan}[c+d x]}{15 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{2 C\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{5 d\sqrt{a+a\,\text{Sec}[c+d x]}}-\frac{2 C\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{15 a d}$$

Result (type 3, 392 leaves):

$$\left(\text{Cos}[c+d x]^2 \sqrt{(1+\text{Cos}[c+d x])\,\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\left(A+C\,\text{Sec}[c+d x]^2\right)\left(\frac{8\,(-4 C+15 A\,\text{Cos}[c]+13 C\,\text{Cos}[c])\,\text{Sin}\left[\frac{c}{2}\right]}{15 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Cos}\left[\frac{3c}{2}\right]\right)}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(15 A\,\text{Sin}\left[\frac{d x}{2}\right]+17 C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+\frac{4 C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5 d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,(3 C\,\text{Sin}[c]-4 C\,\text{Sin}[d x])}{15 d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2d x])\sqrt{a\,(1+\text{Sec}[c+d x])}\right)+$$

$$\left(2\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d x]}}\right]\text{Cos}[c+d x]^4\sqrt{-1+\text{Sec}[c+d x]}\,(1+\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c+d x]\right)\Big/$$
$$\left(d\,(1+\text{Cos}[c+d x])\sqrt{1-\text{Cos}[c+d x]^2}\,(A+2C+A\,\text{Cos}[2c+2d x])\sqrt{a\,(1+\text{Sec}[c+d x])}\sqrt{\text{Cos}[c+d x]^2\,(-1+\text{Sec}[c+d x])\,(1+\text{Sec}[c+d x])}\right)$$

Problem 192: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^4 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 259 leaves, 7 steps):

$$\frac{(11 A+19 C) \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{2} \sqrt{a+a \text{Sec}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}-\frac{(A+C) \text{Sec}[c+d x]^4 \text{Tan}[c+d x]}{2 d (a+a \text{Sec}[c+d x])^{3/2}}-\frac{(455 A+799 C) \text{Tan}[c+d x]}{105 a d \sqrt{a+a \text{Sec}[c+d x]}}-\frac{(35 A+67 C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{70 a d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{(7 A+11 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{14 a d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{(245 A+397 C) \sqrt{a+a \text{Sec}[c+d x]} \text{Tan}[c+d x]}{210 a^2 d}$$

Result (type 3, 528 leaves):

$$\frac{1}{(A+2 C+A \text{Cos}[2 c+2 d x]) (a (1+\text{Sec}[c+d x]))^{3/2}} \text{Cos}[c+d x]^2 \sqrt{(1+\text{Cos}[c+d x]) \text{Sec}[c+d x]} (1+\text{Sec}[c+d x])^{3/2} \left(A+C \text{Sec}[c+d x]^2\right) \left(-\frac{2 (-140 A-448 C+665 A \text{Cos}[c]+1201 C \text{Cos}[c]) \text{Sin}\left[\frac{c}{2}\right]}{105 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Cos}\left[\frac{3 c}{2}\right]\right)}+\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(A \text{Sin}\left[\frac{c}{2}\right]+C \text{Sin}\left[\frac{c}{2}\right]\right)}{2 d}+\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(-805 A \text{Sin}\left[\frac{d x}{2}\right]-1649 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{105 d}+\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(A \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{2 d}+\frac{4 C \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{7 d}-\frac{4 \text{Sec}[c] \text{Sec}[c+d x] (39 C \text{Sin}[c]-35 A \text{Sin}[d x]-112 C \text{Sin}[d x])}{105 d}+\frac{4 \text{Sec}[c] \text{Sec}[c+d x]^2 (5 C \text{Sin}[c]-13 C \text{Sin}[d x])}{35 d}\right)-\left((11 A+19 C) \text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d x]}}\right] \text{Cos}[c+d x]^4 \sqrt{-1+\text{Sec}[c+d x]} (1+\text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}[c+d x]\right) \Big/ \left(\sqrt{2} d (1+\text{Cos}[c+d x]) \sqrt{1-\text{Cos}[c+d x]^2} (A+2 C+A \text{Cos}[2 c+2 d x]) (a (1+\text{Sec}[c+d x]))^{3/2} \sqrt{\text{Cos}[c+d x]^2 (-1+\text{Sec}[c+d x]) (1+\text{Sec}[c+d x])}\right)$$

Problem 193: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 214 leaves, 6 steps):

$$-\frac{(7A+15C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{(A+C)\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{2\,d\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{(15A+31C)\,\text{Tan}[c+d x]}{5\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{(5A+9C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{10\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d x]}}-\frac{(5A+13C)\,\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{10\,a^2\,d}$$

Result (type 3, 490 leaves):

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{3/2}}\text{Cos}[c+d x]^2\sqrt{(1+\text{Cos}[c+d x])\,\text{Sec}[c+d x]}\,(1+\text{Sec}[c+d x])^{3/2}\left(A+C\,\text{Sec}[c+d x]^2\right)\left(\frac{2\,(-12C+25A\,\text{Cos}[c]+49C\,\text{Cos}[c])\,\text{Sin}\left[\frac{c}{2}\right]}{5\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Cos}\left[\frac{3c}{2}\right]\right)}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(-A\,\text{Sin}\left[\frac{c}{2}\right]-C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-A\,\text{Sin}\left[\frac{d x}{2}\right]-C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(25A\,\text{Sin}\left[\frac{d x}{2}\right]+61C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{5\,d}+\frac{4C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,(C\,\text{Sin}[c]-3C\,\text{Sin}[d x])}{5\,d}\right)+$$

$$\left((7A+15C)\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d x]}}\right]\text{Cos}[c+d x]^4\sqrt{-1+\text{Sec}[c+d x]}\,(1+\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c+d x]\right)\Big/$$
$$\left(\sqrt{2}\,d\,(1+\text{Cos}[c+d x])\sqrt{1-\text{Cos}[c+d x]^2}\,(A+2C+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\sqrt{\text{Cos}[c+d x]^2\,(-1+\text{Sec}[c+d x])\,(1+\text{Sec}[c+d x])}\right)$$

- **Problem 194: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^2\left(A+C\,\text{Sec}[c+d x]^2\right)}{(a+a\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 3, 169 leaves, 5 steps):

$$\frac{(3A+11C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{(A+C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{2\,d\,(a+a\,\text{Sec}[c+d x])^{3/2}}-\frac{(3A+13C)\,\text{Tan}[c+d x]}{3\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{(3A+7C)\,\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{6\,a^2\,d}$$

Result (type 3, 458 leaves):

$$\left(\cos[c+d x]^2 \sqrt{(1+\cos[c+d x]) \operatorname{Sec}[c+d x]}\, (1+\operatorname{Sec}[c+d x])^{3/2} \left(A+C \operatorname{Sec}[c+d x]^2\right) \left(-\frac{2 (-4 C+3 A \cos[c]+19 C \cos[c]) \sin\left[\frac{c}{2}\right]}{3 d \left(\cos\left[\frac{c}{2}\right]+\cos\left[\frac{3 c}{2}\right]\right)}+\frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(A \sin\left[\frac{c}{2}\right]+C \sin\left[\frac{c}{2}\right]\right)}{2 d}+\frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(-3 A \sin\left[\frac{d x}{2}\right]-23 C \sin\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(A \sin\left[\frac{d x}{2}\right]+C \sin\left[\frac{d x}{2}\right]\right)}{2 d}+\frac{4 C \operatorname{Sec}[c] \operatorname{Sec}[c+d x] \sin[d x]}{3 d}\right)\right) \Big/ \left((A+2 C+A \cos[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) - \left((3 A+11 C) \operatorname{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\operatorname{Sec}[c+d x]}}\right] \cos[c+d x]^4 \sqrt{-1+\operatorname{Sec}[c+d x]}\, (1+\operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right) \sin[c+d x]\right) \Big/ \left(\sqrt{2}\, d\, (1+\cos[c+d x]) \sqrt{1-\cos[c+d x]^2}\, (A+2 C+A \cos[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{3/2} \sqrt{\cos[c+d x]^2 (-1+\operatorname{Sec}[c+d x]) (1+\operatorname{Sec}[c+d x])}\right)$$

- **Problem 204: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+C \operatorname{Sec}[c+d x]^2}{(a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 162 leaves, 7 steps):

$$\frac{2 A \operatorname{ArcTan}\left[\frac{\sqrt{a} \tan[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{a^{5/2} d}-\frac{(43 A-5 C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \tan[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2}\, a^{5/2} d}-\frac{(A+C) \tan[c+d x]}{4 d (a+a \operatorname{Sec}[c+d x])^{5/2}}-\frac{(11 A-5 C) \tan[c+d x]}{16 a d (a+a \operatorname{Sec}[c+d x])^{3/2}}$$

Result (type 3, 725 leaves):

$$\left(\text{Cos}[c+d\,x]^2\,(1+\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(-\left(\sqrt{2}\,(-11\,A+5\,C)\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]\,\text{Cos}[c+d\,x]^2\,\sqrt{-1+\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\right)\right/$$

$$\left(d\,(1+\text{Cos}[c+d\,x])\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\text{Cos}[c+d\,x]^2\,(-1+\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])}\right)+$$

$$\left(32\,A\left(\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]+\text{ArcTan}\left[\frac{-2+\sqrt{1+\text{Sec}[c+d\,x]}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]-\text{ArcTan}\left[\frac{2+\sqrt{1+\text{Sec}[c+d\,x]}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]\right)\right.$$

$$\left.\text{Cos}[c+d\,x]^2\,\sqrt{-1+\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(d\,(1+\text{Cos}[c+d\,x])\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\text{Cos}[c+d\,x]^2\,(-1+\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])}\right)\right)\right)\Big/$$

$$\left(16\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$

$$\text{Cos}[c+d\,x]^2$$
$$\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}$$
$$(1+\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\left(-A\,\text{Sin}\left[\frac{c}{2}\right]-C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{8\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(19\,A\,\text{Sin}\left[\frac{c}{2}\right]+3\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{16\,d}+\right.$$

$$\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(-15\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+$$

$$\left.\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d}-\frac{(15\,A-C)\,\text{Tan}\left[\frac{c}{2}\right]}{8\,d}\right)$$

- **Problem 205: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 199 leaves, 8 steps) :

$$-\frac{5\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(115\,A+3\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{(15\,A-C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{(35\,A+3\,C)\,\text{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 739 leaves):

$$\Bigg(\text{Cos}[c+d\,x]^2\,(1+\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(\sqrt{2}\,(-35\,A-3\,C)\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]\text{Cos}[c+d\,x]^2\,\sqrt{-1+\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\Bigg)\Big/$$
$$\left(d\,(1+\text{Cos}[c+d\,x])\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\text{Cos}[c+d\,x]^2\,(-1+\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])}\right)-$$
$$\Bigg(80\,A\left(\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]+\text{ArcTan}\left[\frac{-2+\sqrt{1+\text{Sec}[c+d\,x]}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]-\text{ArcTan}\left[\frac{2+\sqrt{1+\text{Sec}[c+d\,x]}}{\sqrt{-1+\text{Sec}[c+d\,x]}}\right]\right)$$
$$\text{Cos}[c+d\,x]^2\,\sqrt{-1+\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\Bigg)\Big/$$
$$\left(d\,(1+\text{Cos}[c+d\,x])\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\text{Cos}[c+d\,x]^2\,(-1+\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])}\right)\Bigg)\Bigg)\Big/$$
$$\left(16\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$
$$\text{Cos}[c+d\,x]^2\,\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}$$
$$(1+\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-27\,A\,\text{Sin}\left[\frac{c}{2}\right]-11\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{16\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(A\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{8\,d}+\frac{2\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+$$
$$\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-27\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-11\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d}+\frac{7\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+$$
$$\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+\frac{2\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{7\,(A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{8\,d}\Bigg)$$

- **Problem 207: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 205 leaves, 9 steps):

$$-\frac{2 a (5 A+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{2 a (7 A+5 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+\frac{2 a (5 A+3 C) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 d}+\frac{2 a (7 A+5 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{21 d}+\frac{2 a C \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{5 d}+\frac{2 a C \text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{7 d}$$

Result (type 5, 624 leaves):

$$a \left(-\left(2 \sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^2 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (d (A+2 C+A \text{Cos}[2 c+2 d x]))-\left(6 \sqrt{2} C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^2 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (5 d (A+2 C+A \text{Cos}[2 c+2 d x]))+\frac{4 A \text{Cos}[c+d x]^{5/2} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}\ \left(A+C \text{Sec}[c+d x]^2\right)}{3 d (A+2 C+A \text{Cos}[2 c+2 d x])}+\frac{20 C \text{Cos}[c+d x]^{5/2} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}\ \left(A+C \text{Sec}[c+d x]^2\right)}{21 d (A+2 C+A \text{Cos}[2 c+2 d x])}+\left(\left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{4 (5 A+3 C) \text{Cos}[d x] \text{Csc}[c]}{5 d}+\frac{4 C \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{7 d}+\frac{4 \text{Sec}[c] \text{Sec}[c+d x]^2 (5 C \text{Sin}[c]+7 C \text{Sin}[d x])}{35 d}+\frac{4 \text{Sec}[c] \text{Sec}[c+d x] (21 C \text{Sin}[c]+35 A \text{Sin}[d x]+25 C \text{Sin}[d x])}{105 d}+\frac{4 (7 A+5 C) \text{Tan}[c]}{21 d}\right)\right) \Big/ \left((A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{3/2}\right)\right)$$

Problem 208: Result unnecessarily involves higher level functions.

$$\int \sqrt{\text{Sec}[c+d x]}\, (a+a \text{Sec}[c+d x]) \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 172 leaves, 8 steps):

$$-\frac{2 a (5 A+3 C) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{2 a (3 A+C) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}+\frac{2 a (5 A+3 C) \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{5 d}+\frac{2 a C \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 d}+\frac{2 a C \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 5, 282 leaves):

$$\frac{1}{15 d \left(1+e^{2 i (c+d x)}\right)^2 (A+2 C+A \text{Cos}[2 (c+d x)]) \text{Sec}[c+d x]^{3/2}} 2 a e^{-i (2 c+d x)} \left(-1+e^{2 i c}\right) \text{Csc}[c] \Big(15 A+9 C+5 C e^{i (c+d x)}+30 A e^{2 i (c+d x)}+24 C e^{2 i (c+d x)}+15 A e^{4 i (c+d x)}+ 3 C e^{4 i (c+d x)}-5 C e^{5 i (c+d x)}-5 i (3 A+C) e^{i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^2 \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]- 3 (5 A+3 C) \left(1+e^{2 i (c+d x)}\right)^{5/2} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\Big) \left(A+C \text{Sec}[c+d x]^2\right)$$

Problem 209: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \text{Sec}[c+d x]) \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{\text{Sec}[c+d x]}} dx$$

Optimal (type 4, 135 leaves, 7 steps):

$$\frac{2 a (A-C) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\frac{2 a (3 A+C) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}+\frac{2 a C \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{d}+\frac{2 a C \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 d}$$

Result (type 5, 197 leaves):

$$\frac{1}{3 d} a e^{-i (2 c+d x)} \text{Sec}[c+d x]^{3/2} \Big(-3 i A+3 i C-3 i A \text{Cos}[2 (c+d x)]+3 i C \text{Cos}[2 (c+d x)]+2 (3 A+C) \text{Cos}[c+d x]^{3/2} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]+3 i (A-C) e^{-2 i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{3/2} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+2 C \text{Sin}[c+d x]+3 C \text{Sin}[2 (c+d x)]\Big) (\text{Cos}[2 c+d x]+i \text{Sin}[2 c+d x])$$

Problem 210: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \operatorname{Sec}[c + d x]) \left(A + C \operatorname{Sec}[c + d x]^2\right)}{\operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 135 leaves, 7 steps):

$$\frac{2 a (A - C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{2 a (A + 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{3 d} + \frac{2 a A \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Sec}[c + d x]}} + \frac{2 a C \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d}$$

Result (type 5, 182 leaves):

$$\frac{1}{3 d} a e^{-i (2 c + d x)} \sqrt{\operatorname{Sec}[c + d x]} \left(-6 i A \operatorname{Cos}[c + d x] + 6 i C \operatorname{Cos}[c + d x] + 2 (A + 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] + 6 i (A - C) e^{-i (c + d x)} \sqrt{1 + e^{2 i (c + d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right] + 6 C \operatorname{Sin}[c + d x] + A \operatorname{Sin}[2 (c + d x)]\right) (\operatorname{Cos}[2 c + d x] + i \operatorname{Sin}[2 c + d x])$$

Problem 211: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \operatorname{Sec}[c + d x]) \left(A + C \operatorname{Sec}[c + d x]^2\right)}{\operatorname{Sec}[c + d x]^{5/2}} \, dx$$

Optimal (type 4, 141 leaves, 7 steps):

$$\frac{2 a (3 A + 5 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{5 d} + \frac{2 a (A + 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{3 d} + \frac{2 a A \operatorname{Sin}[c + d x]}{5 d \operatorname{Sec}[c + d x]^{3/2}} + \frac{2 a A \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 5, 183 leaves):

$$\frac{1}{30 d} a e^{-i (2 c + d x)} \sqrt{\operatorname{Sec}[c + d x]} \left(20 (A + 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] + 12 i (3 A + 5 C) e^{-i (c + d x)} \sqrt{1 + e^{2 i (c + d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right] + 2 \operatorname{Cos}[c + d x] (-6 i (3 A + 5 C) + 10 A \operatorname{Sin}[c + d x] + 3 A \operatorname{Sin}[2 (c + d x)])\right) (\operatorname{Cos}[2 c + d x] + i \operatorname{Sin}[2 c + d x])$$

Problem 212: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 174 leaves, 8 steps):

$$\frac{2\,a\,(3\,A+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{2\,a\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+7\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 202 leaves):

$$\frac{1}{420\,d}a\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(40\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+168\,i\,(3\,A+5\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-84\,i\,(3\,A+5\,C)+5\,(23\,A+28\,C)\,\text{Sin}[c+d\,x]+42\,A\,\text{Sin}[2\,(c+d\,x)]+15\,A\,\text{Sin}[3\,(c+d\,x)])\right)\,(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x])$$

Problem 213: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 205 leaves, 9 steps):

$$\frac{2\,a\,(7\,A+9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+\frac{2\,a\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,a\,(7\,A+9\,C)\,\text{Sin}[c+d\,x]}{45\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+7\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 218 leaves):

$$\frac{1}{2520\,d}a\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(240\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+336\,i\,(7\,A+9\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-1176\,i\,A-1512\,i\,C+30\,(23\,A+28\,C)\,\text{Sin}[c+d\,x]+14\,(19\,A+18\,C)\,\text{Sin}[2\,(c+d\,x)]+90\,A\,\text{Sin}[3\,(c+d\,x)]+35\,A\,\text{Sin}[4\,(c+d\,x)])\right)\,(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x])$$

- **Problem 214: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 270 leaves, 10 steps):

$$-\frac{16 a^2 (3 A+2 C) \sqrt{\text{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+$$
$$\frac{4 a^2 (7 A+5 C) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+\frac{16 a^2 (3 A+2 C) \sqrt{\text{Sec}[c+d x]} \text{ Sin}[c+d x]}{15 d}+$$
$$\frac{4 a^2 (7 A+5 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{21 d}+\frac{2 a^2 (21 A+19 C) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{105 d}+$$
$$\frac{2 C \text{Sec}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{9 d}+\frac{8 C \text{Sec}[c+d x]^{5/2} \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{63 d}$$

Result (type 5, 801 leaves):

$$-\left(4\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}[c+dx]^4\,\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\right)-$$

$$\left(8\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}[c+dx]^4\,\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(15d\,(A+2C+A\,\text{Cos}[2c+2dx])\right)+$$

$$\frac{2A\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}+$$

$$\frac{10C\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)}{21d\,(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}+$$

$$\left(\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{8(3A+2C)\,\text{Cos}[dx]\,\text{Csc}[c]}{15d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+dx]^4\,\text{Sin}[dx]}{9d}+\right.\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+dx]^3(7C\,\text{Sin}[c]+18C\,\text{Sin}[dx])}{63d}+\frac{\text{Sec}[c]\,\text{Sec}[c+dx]^2(90C\,\text{Sin}[c]+63A\,\text{Sin}[dx]+112C\,\text{Sin}[dx])}{315d}+$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+dx]\,(63A\,\text{Sin}[c]+112C\,\text{Sin}[c]+210A\,\text{Sin}[dx]+150C\,\text{Sin}[dx])}{315d}+$$

$$\left.\left.\frac{2(7A+5C)\,\text{Tan}[c]}{21d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)$$

- **Problem 215: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 4, 237 leaves, 9 steps) :

$$-\frac{4 a^2 (5 A+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{8 a^2 (7 A+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+$$
$$\frac{4 a^2 (5 A+3 C) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 d}+\frac{2 a^2 (35 A+33 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{105 d}+$$
$$\frac{2 C \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{7 d}+\frac{8 C \text{Sec}[c+d x]^{3/2} \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{35 d}$$

Result (type 5, 757 leaves):

$$-\left(\sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (d (A+2 C+A \text{Cos}[2 c+2 d x]))-$$
$$\left(3 \sqrt{2} C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (5 d (A+2 C+A \text{Cos}[2 c+2 d x]))+$$
$$\frac{4 A \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{3 d (A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}}+$$
$$\frac{4 C \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{7 d (A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}}+$$
$$\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right.$$
$$\left(\frac{2 (5 A+3 C) \text{Cos}[d x] \text{Csc}[c]}{5 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{7 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (5 C \text{Sin}[c]+14 C \text{Sin}[d x])}{35 d}+\right.$$
$$\left.\left.\frac{\text{Sec}[c] \text{Sec}[c+d x] (42 C \text{Sin}[c]+35 A \text{Sin}[d x]+60 C \text{Sin}[d x])}{105 d}+\frac{(7 A+12 C) \text{Tan}[c]}{21 d}\right)\right) \Big/ \left((A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}\right)$$

- **Problem 216: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{\text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 196 leaves, 8 steps) :

$$-\frac{16 a^2 C \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{4 a^2 (3 A+C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 d}+\frac{2 a^2 (15 A+17 C)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 d}+\frac{2 C\sqrt{\text{Sec}[c+d x]}\ (a+a\,\text{Sec}[c+d x])^2\,\text{Sin}[c+d x]}{5 d}+\frac{8 C\sqrt{\text{Sec}[c+d x]}\ \left(a^2+a^2\,\text{Sec}[c+d x]\right)\text{Sin}[c+d x]}{15 d}$$

Result (type 5, 436 leaves) :

$$-\frac{1}{15 d\left(-1+e^{2 i c}\right)(A+2 C+A\,\text{Cos}[2 c+2 d x])}2 i\sqrt{2}\,e^{-i(c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2 i(c+d x)}}}\ \text{Cos}[c+d x]^4\left(12 C\left(1+e^{2 i(c+d x)}\right)+12 C\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i(c+d x)}\right]+5(3 A+C)\,e^{i(c+d x)}\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i(c+d x)}}\ \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)+\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{(-5 A-16 C+5 A\,\text{Cos}[2 c])\,\text{Cos}[d x]\,\text{Csc}[c]}{10 d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(3 C\,\text{Sin}[c]+10 C\,\text{Sin}[d x])}{15 d}+\frac{2 C\,\text{Tan}[c]}{3 d}\right)\right)\Big/\left((A+2 C+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\right)$$

- **Problem 217: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 198 leaves, 8 steps) :

$$\frac{4 a^2 (A-C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{d}+\frac{8 a^2 (A+C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 d}-\frac{2 a^2 (A-5 C)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3 d}+\frac{2 A (a+a\,\text{Sec}[c+d x])^2\,\text{Sin}[c+d x]}{3 d\sqrt{\text{Sec}[c+d x]}}-\frac{2 (A-C)\sqrt{\text{Sec}[c+d x]}\ \left(a^2+a^2\,\text{Sec}[c+d x]\right)\text{Sin}[c+d x]}{3 d}$$

Result (type 5, 215 leaves) :

$$\frac{1}{6\,d}\,a^2\,e^{-i\,(2\,c+d\,x)}\,\text{Sec}[c+d\,x]^{3/2}\,\Big(-12\,i\,A+12\,i\,C-12\,i\,A\,\text{Cos}[2\,(c+d\,x)]+12\,i\,C\,\text{Cos}[2\,(c+d\,x)]+16\,(A+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]+12\,i\,(A-C)\,e^{-2\,i\,(c+d\,x)}\,\big(1+e^{2\,i\,(c+d\,x)}\big)^{3/2}\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\Big]+A\,\text{Sin}[c+d\,x]+4\,C\,\text{Sin}[c+d\,x]+12\,C\,\text{Sin}[2\,(c+d\,x)]+A\,\text{Sin}[3\,(c+d\,x)]\Big)\,(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x])$$

Problem 218: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 196 leaves, 8 steps):

$$\frac{16\,a^2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{4\,a^2\,(A+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}-\frac{2\,a^2\,(7\,A-15\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{8\,A\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 209 leaves):

$$\frac{1}{30\,d\,\sqrt{\text{Sec}[c+d\,x]}}\,a^2\,\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(-96\,i\,A+\frac{192\,i\,A\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}-\frac{80\,i\,(A+3\,C)\,e^{i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,\frac{1}{2},\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}+40\,A\,\text{Sin}[c+d\,x]+3\,A\,\text{Sec}[c+d\,x]\,\text{Sin}[3\,(c+d\,x)]+3\,A\,\text{Tan}[c+d\,x]+60\,C\,\text{Tan}[c+d\,x]\right)$$

Problem 219: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 204 leaves, 8 steps):

$$\frac{4\,a^2\,(3\,A+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{8\,a^2\,(3\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a^2\,(33\,A+35\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{8\,A\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d\,\text{Sec}[c+d\,x]^{3/2}}$$

Result (type 5, 203 leaves) :

$$\frac{1}{420\,d} a^2 e^{-i\,(2\,c+d\,x)} \sqrt{\mathrm{Sec}[c+d\,x]} \left(160\,(3\,A+7\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+\right.$$
$$336\,i\,(3\,A+5\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.2\,\mathrm{Cos}[c+d\,x]\,(-504\,i\,A-840\,i\,C+5\,(51\,A+28\,C)\,\mathrm{Sin}[c+d\,x]+84\,A\,\mathrm{Sin}[2\,(c+d\,x)]+15\,A\,\mathrm{Sin}[3\,(c+d\,x)])\right)\,(\mathrm{Cos}[2\,c+d\,x]+i\,\mathrm{Sin}[2\,c+d\,x])$$

- **Problem 220: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 237 leaves, 9 steps) :

$$\frac{16\,a^2\,(2\,A+3\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{15\,d}+\frac{4\,a^2\,(5\,A+7\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{21\,d}+$$
$$\frac{2\,a^2\,(19\,A+21\,C)\,\mathrm{Sin}[c+d\,x]}{105\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(5\,A+7\,C)\,\mathrm{Sin}[c+d\,x]}{21\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{9\,d\,\mathrm{Sec}[c+d\,x]^{7/2}}+\frac{8\,A\,\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{63\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}$$

Result (type 5, 850 leaves) :

$$\left(8\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}[c+dx]^4\,\text{Csc}[c]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/(15\,d\,(A+2C+A\,\text{Cos}[2c+2dx]))+$$
$$\left(4\sqrt{2}\,C\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}[c+dx]^4\,\text{Csc}[c]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/(5\,d\,(A+2C+A\,\text{Cos}[2c+2dx]))+$$
$$\frac{10\,A\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)}{21\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}+$$
$$\frac{2\,C\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)}{3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}+$$
$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(-\frac{(347A+558C+421A\,\text{Cos}[2c]+594C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}[c]}{720\,d}+\frac{(13A+14C)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{42\,d}+\right.$$
$$\frac{(79A+36C)\,\text{Cos}[3dx]\,\text{Sin}[3c]}{720\,d}+\frac{A\,\text{Cos}[4dx]\,\text{Sin}[4c]}{28\,d}+\frac{A\,\text{Cos}[5dx]\,\text{Sin}[5c]}{144\,d}+\frac{(421A+594C)\,\text{Cos}[c]\,\text{Sin}[dx]}{360\,d}+$$
$$\left.\frac{(13A+14C)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{42\,d}+\frac{(79A+36C)\,\text{Cos}[3c]\,\text{Sin}[3dx]}{720\,d}+\frac{A\,\text{Cos}[4c]\,\text{Sin}[4dx]}{28\,d}+\frac{A\,\text{Cos}[5c]\,\text{Sin}[5dx]}{144\,d}\right)$$

- **Problem 221: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+dx])^2\left(A+C\,\text{Sec}[c+dx]^2\right)}{\text{Sec}[c+dx]^{11/2}}\,dx$$

Optimal (type 4, 270 leaves, 10 steps) :

$$\frac{4 a^2 (7 A+9 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+$$

$$\frac{8 a^2 (25 A+33 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{231 d}+\frac{2 a^2 (89 A+99 C) \text{Sin}[c+d x]}{693 d\, \text{Sec}[c+d x]^{5/2}}+\frac{4 a^2 (7 A+9 C) \text{Sin}[c+d x]}{45 d\, \text{Sec}[c+d x]^{3/2}}+$$

$$\frac{8 a^2 (25 A+33 C) \text{Sin}[c+d x]}{231 d \sqrt{\text{Sec}[c+d x]}}+\frac{2 A (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{11 d\, \text{Sec}[c+d x]^{9/2}}+\frac{8 A \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{99 d\, \text{Sec}[c+d x]^{7/2}}$$

Result (type 5, 896 leaves) :

$$\left(7 \sqrt{2}\, A\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (15 d (A+2 C+A \text{Cos}[2 c+2 d x]))+$$

$$\left(3 \sqrt{2}\, C\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^4 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (5 d (A+2 C+A \text{Cos}[2 c+2 d x]))+$$

$$\frac{100 A \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{231 d (A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}}+$$

$$\frac{4 C \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{7 d (A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}}+$$

$$\frac{1}{(A+2 C+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{7/2}}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(-\frac{(149 A+198 C+187 A \text{Cos}[2 c]+234 C \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}[c]}{360 d}+\right.$$

$$\frac{(2185 A+2376 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{7392 d}+\frac{(43 A+36 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{360 d}+\frac{(27 A+11 C) \text{Cos}[4 d x] \text{Sin}[4 c]}{616 d}+$$

$$\frac{A \text{Cos}[5 d x] \text{Sin}[5 c]}{72 d}+\frac{A \text{Cos}[6 d x] \text{Sin}[6 c]}{352 d}+\frac{(187 A+234 C) \text{Cos}[c] \text{Sin}[d x]}{180 d}+\frac{(2185 A+2376 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{7392 d}+$$

$$\left.\frac{(43 A+36 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{360 d}+\frac{(27 A+11 C) \text{Cos}[4 c] \text{Sin}[4 d x]}{616 d}+\frac{A \text{Cos}[5 c] \text{Sin}[5 d x]}{72 d}+\frac{A \text{Cos}[6 c] \text{Sin}[6 d x]}{352 d}\right)$$

Problem 222: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 319 leaves, 11 steps):

$$-\frac{4 a^3 (7 A+5 C) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{4 a^3 (143 A+105 C) \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{231 d}+\frac{4 a^3 (7 A+5 C) \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{5 d}+\frac{4 a^3 (143 A+105 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{231 d}+\frac{8 a^3 (44 A+35 C) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{385 d}+\frac{2 C \text{Sec}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])^3 \text{Sin}[c+d x]}{11 d}+\frac{4 C \text{Sec}[c+d x]^{5/2} \left(a^2+a^2 \text{Sec}[c+d x]\right)^2 \text{Sin}[c+d x]}{33 a d}+\frac{2 (33 A+35 C) \text{Sec}[c+d x]^{5/2} \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{231 d}$$

Result (type 5, 841 leaves):

$$-\left(7\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(5\,\sqrt{2}\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\frac{13\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{21\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}+$$

$$\frac{5\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{11\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}+$$

$$\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(\frac{(7\,A+5\,C)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{5\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{22\,d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(3\,C\,\text{Sin}[c]+11\,C\,\text{Sin}[d\,x])}{66\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(77\,C\,\text{Sin}[c]+33\,A\,\text{Sin}[d\,x]+126\,C\,\text{Sin}[d\,x])}{462\,d}+$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(165\,A\,\text{Sin}[c]+630\,C\,\text{Sin}[c]+693\,A\,\text{Sin}[d\,x]+770\,C\,\text{Sin}[d\,x])}{2310\,d}+$$

$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(693\,A\,\text{Sin}[c]+770\,C\,\text{Sin}[c]+1430\,A\,\text{Sin}[d\,x]+1050\,C\,\text{Sin}[d\,x])}{2310\,d}+\frac{(143\,A+105\,C)\,\text{Tan}[c]}{231\,d}\right)$$

- **Problem 223: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 286 leaves, 10 steps):

$$-\frac{4 a^3 (27 A+17 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+\frac{4 a^3 (21 A+11 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{21 d}+\frac{4 a^3 (27 A+17 C) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 d}+\frac{8 a^3 (21 A+16 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{105 d}+\frac{2 C \text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^3 \text{Sin}[c+d x]}{9 d}+\frac{4 C \text{Sec}[c+d x]^{3/2} \left(a^2+a^2 \text{Sec}[c+d x]\right)^2 \text{Sin}[c+d x]}{21 a d}+\frac{2 (63 A+73 C) \text{Sec}[c+d x]^{3/2} \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{315 d}$$

Result (type 5, 798 leaves) :

$$-\left(9 A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^5 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(5 \sqrt{2}\ d\ (A+2 C+A \text{Cos}[2 c+2 d x])\right)-$$

$$\left(17 C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}[c+d x]^5 \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(15 \sqrt{2}\ d\ (A+2 C+A \text{Cos}[2 c+2 d x])\right)+$$

$$\frac{A \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)}{d\ (A+2 C+A \text{Cos}[2 c+2 d x])\ \text{Sec}[c+d x]^{9/2}}+\frac{11 C \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)}{21 d\ (A+2 C+A \text{Cos}[2 c+2 d x])\ \text{Sec}[c+d x]^{9/2}}+$$

$$\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{(27 A+17 C) \text{Cos}[d x] \text{Csc}[c]}{15 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^4 \text{Sin}[d x]}{18 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (7 C \text{Sin}[c]+27 C \text{Sin}[d x])}{126 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (135 C \text{Sin}[c]+63 A \text{Sin}[d x]+238 C \text{Sin}[d x])}{630 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (63 A \text{Sin}[c]+238 C \text{Sin}[c]+315 A \text{Sin}[d x]+330 C \text{Sin}[d x])}{630 d}+\frac{(21 A+22 C) \text{Tan}[c]}{42 d}\right)\right) \Big/ \left((A+2 C+A \text{Cos}[2 c+2 d x])\ \text{Sec}[c+d x]^{9/2}\right)$$

- **Problem 224: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^3 \left(A + C \operatorname{Sec}[c + d x]^2\right)}{\sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 253 leaves, 9 steps):

$$-\frac{4 a^3 (5 A + 7 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{5 d} +$$
$$\frac{4 a^3 (35 A + 13 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{21 d} +$$
$$\frac{8 a^3 (70 A + 53 C) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{105 d} + \frac{2 C \sqrt{\operatorname{Sec}[c + d x]} (a + a \operatorname{Sec}[c + d x])^3 \operatorname{Sin}[c + d x]}{7 d} +$$
$$\frac{12 C \sqrt{\operatorname{Sec}[c + d x]} \left(a^2 + a^2 \operatorname{Sec}[c + d x]\right)^2 \operatorname{Sin}[c + d x]}{35 a d} + \frac{2 (5 A + 7 C) \sqrt{\operatorname{Sec}[c + d x]} \left(a^3 + a^3 \operatorname{Sec}[c + d x]\right) \operatorname{Sin}[c + d x]}{15 d}$$

Result (type 5, 778 leaves):

$$-\left(A\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}[c+d x]^5\, \text{Csc}[c] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+C\,\text{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2}\, d\, (A+2C+A\,\text{Cos}[2c+2 d x])\right) -$$

$$\left(7 C\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}[c+d x]^5\, \text{Csc}[c] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+C\,\text{Sec}[c+d x]^2\right)\right) \Big/ \left(5\sqrt{2}\, d\, (A+2C+A\,\text{Cos}[2c+2 d x])\right) +$$

$$\frac{5 A \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+C\,\text{Sec}[c+d x]^2\right)}{3 d\, (A+2C+A\,\text{Cos}[2c+2 d x])\, \text{Sec}[c+d x]^{9/2}} +$$

$$\frac{13 C \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+C\,\text{Sec}[c+d x]^2\right)}{21 d\, (A+2C+A\,\text{Cos}[2c+2 d x])\, \text{Sec}[c+d x]^{9/2}} +$$

$$\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+C\,\text{Sec}[c+d x]^2\right) \left(-\frac{(-25 A-28 C+5 A\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}[c]}{20 d} + \frac{A\,\text{Cos}[c]\,\text{Sin}[d x]}{2 d} + \frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]^3\,\text{Sin}[d x]}{14 d} + \frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(5 C\,\text{Sin}[c]+21 C\,\text{Sin}[d x])}{70 d} + \frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(63 C\,\text{Sin}[c]+35 A\,\text{Sin}[d x]+130 C\,\text{Sin}[d x])}{210 d} + \frac{(7 A+26 C)\,\text{Tan}[c]}{42 d}\right)\right) \Big/ \left((A+2C+A\,\text{Cos}[2c+2 d x])\,\text{Sec}[c+d x]^{9/2}\right)$$

- **Problem 225: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^3 \left(A+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\, dx$$

Optimal (type 4, 259 leaves, 9 steps):

$$\frac{4 a^3 (5 A-9 C) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{5 d} + \frac{4 a^3 (5 A+3 C) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 d} +$$

$$\frac{4 a^3 (5 A+21 C) \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{15 d} + \frac{2 A\, (a+a\,\text{Sec}[c+d x])^3\, \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}} -$$

$$\frac{2 (5 A-3 C) \sqrt{\text{Sec}[c+d x]}\, \left(a^2+a^2\,\text{Sec}[c+d x]\right)^2 \text{Sin}[c+d x]}{15 a d} - \frac{2 (5 A-9 C) \sqrt{\text{Sec}[c+d x]}\, \left(a^3+a^3\,\text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{15 d}$$

Result (type 5, 764 leaves) :

$$\left(A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2} d (A+2 C+A \operatorname{Cos}[2 c+2 d x])\right) -$$

$$\left(9 C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(5 \sqrt{2} d (A+2 C+A \operatorname{Cos}[2 c+2 d x])\right) +$$

$$\frac{5 A \sqrt{\operatorname{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{3 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}} +$$

$$\frac{C \sqrt{\operatorname{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}} +$$

$$\left(\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right) \left(-\frac{(5 A-36 C+15 A \operatorname{Cos}[2 c]) \operatorname{Cos}[d x] \operatorname{Csc}[c]}{20 d}+\frac{A \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{12 d}+\frac{3 A \operatorname{Cos}[c] \operatorname{Sin}[d x]}{2 d}+\frac{C \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^2 \operatorname{Sin}[d x]}{10 d}+\frac{\operatorname{Sec}[c] \operatorname{Sec}[c+d x] (C \operatorname{Sin}[c]+5 C \operatorname{Sin}[d x])}{10 d}+\frac{A \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{12 d}+\frac{C \operatorname{Tan}[c]}{2 d}\right)\right) \Big/ \left((A+2 C+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}\right)$$

- **Problem 226: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a \operatorname{Sec}[c+d x])^3 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{5/2}} \, dx$$

Optimal (type 4, 253 leaves, 9 steps) :

$$\frac{4 a^3 (9 A - 5 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticE}\left[\frac{1}{2}(c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{5 d} + \frac{4 a^3 (3 A + 5 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{3 d} - \frac{8 a^3 (3 A - 10 C) \sqrt{\text{Sec}[c + d x]}\ \text{Sin}[c + d x]}{15 d} + \frac{2 A (a + a\,\text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{5 d\,\text{Sec}[c + d x]^{3/2}} + \frac{4 A \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{5 a d \sqrt{\text{Sec}[c + d x]}} - \frac{2 (9 A - 5 C) \sqrt{\text{Sec}[c + d x]} \left(a^3 + a^3 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{15 d}$$

Result (type 5, 245 leaves):

$$\frac{1}{60 d} a^3 e^{-i (2 c + d x)} \text{Sec}[c + d x]^{3/2} \Big(-216 i A + 120 i C - 216 i A \text{Cos}[2 (c + d x)] + 120 i C \text{Cos}[2 (c + d x)] + 80 (3 A + 5 C) \text{Cos}[c + d x]^{3/2} \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] + 24 i (9 A - 5 C) e^{-2 i (c + d x)} \left(1 + e^{2 i (c + d x)}\right)^{3/2} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right] + 30 A \text{Sin}[c + d x] + 40 C \text{Sin}[c + d x] + 6 A \text{Sin}[2 (c + d x)] + 180 C \text{Sin}[2 (c + d x)] + 30 A \text{Sin}[3 (c + d x)] + 3 A \text{Sin}[4 (c + d x)]\Big) (\text{Cos}[2 c + d x] + i \text{Sin}[2 c + d x])$$

- **Problem 227: Result unnecessarily involves higher level functions.**

$$\int \frac{(a + a\,\text{Sec}[c + d x])^3 \left(A + C\,\text{Sec}[c + d x]^2\right)}{\text{Sec}[c + d x]^{7/2}} \, dx$$

Optimal (type 4, 253 leaves, 9 steps):

$$\frac{4 a^3 (7 A + 5 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticE}\left[\frac{1}{2}(c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{5 d} + \frac{4 a^3 (13 A + 35 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{21 d} - \frac{4 a^3 (41 A - 35 C) \sqrt{\text{Sec}[c + d x]}\ \text{Sin}[c + d x]}{105 d} + \frac{2 A (a + a\,\text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{7 d\,\text{Sec}[c + d x]^{5/2}} + \frac{12 A \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{35 a d\,\text{Sec}[c + d x]^{3/2}} + \frac{2 (7 A + 5 C) \left(a^3 + a^3 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{15 d \sqrt{\text{Sec}[c + d x]}}$$

Result (type 5, 231 leaves):

$$\frac{1}{420 d} a^3 e^{-i (2 c + d x)} \sqrt{\text{Sec}[c + d x]} \Big(-2352 i A \text{Cos}[c + d x] - 1680 i C \text{Cos}[c + d x] + 80 (13 A + 35 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] + 336 i (7 A + 5 C) e^{-i (c + d x)} \sqrt{1 + e^{2 i (c + d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right] + 126 A \text{Sin}[c + d x] + 840 C \text{Sin}[c + d x] + 550 A \text{Sin}[2 (c + d x)] + 140 C \text{Sin}[2 (c + d x)] + 126 A \text{Sin}[3 (c + d x)] + 15 A \text{Sin}[4 (c + d x)]\Big) (\text{Cos}[2 c + d x] + i \text{Sin}[2 c + d x])$$

- **Problem 228: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^3 \left(A + C \operatorname{Sec}[c + d x]^2\right)}{\operatorname{Sec}[c + d x]^{9/2}} \, dx$$

Optimal (type 4, 253 leaves, 9 steps):

$$\frac{4 a^3 (17 A + 27 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{15 d} +$$

$$\frac{4 a^3 (11 A + 21 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{21 d} + \frac{8 a^3 (16 A + 21 C) \operatorname{Sin}[c + d x]}{105 d \sqrt{\operatorname{Sec}[c + d x]}} +$$

$$\frac{2 A (a + a \operatorname{Sec}[c + d x])^3 \operatorname{Sin}[c + d x]}{9 d \operatorname{Sec}[c + d x]^{7/2}} + \frac{4 A \left(a^2 + a^2 \operatorname{Sec}[c + d x]\right)^2 \operatorname{Sin}[c + d x]}{21 a d \operatorname{Sec}[c + d x]^{5/2}} + \frac{2 (73 A + 63 C) \left(a^3 + a^3 \operatorname{Sec}[c + d x]\right) \operatorname{Sin}[c + d x]}{315 d \operatorname{Sec}[c + d x]^{3/2}}$$

Result (type 5, 847 leaves):

$$\left(17\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^5\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(15\sqrt{2}\,d\,(A+2C+A\,\text{Cos}[2c+2d x])\right)+$$

$$\left(9\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^5\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(5\sqrt{2}\,d\,(A+2C+A\,\text{Cos}[2c+2d x])\right)+$$

$$\frac{11\,A\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)}{21\,d\,(A+2C+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}}+$$

$$\frac{C\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)}{d\,(A+2C+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}}+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)$$

$$\left(-\frac{(743A+1278C+889A\,\text{Cos}[2c]+1314C\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}[c]}{1440\,d}+\frac{(53A+42C)\,\text{Cos}[2d x]\,\text{Sin}[2c]}{168\,d}+\right.$$

$$\frac{(151A+36C)\,\text{Cos}[3d x]\,\text{Sin}[3c]}{1440\,d}+\frac{3A\,\text{Cos}[4d x]\,\text{Sin}[4c]}{112\,d}+\frac{A\,\text{Cos}[5d x]\,\text{Sin}[5c]}{288\,d}+\frac{(889A+1314C)\,\text{Cos}[c]\,\text{Sin}[d x]}{720\,d}+$$

$$\left.\frac{(53A+42C)\,\text{Cos}[2c]\,\text{Sin}[2d x]}{168\,d}+\frac{(151A+36C)\,\text{Cos}[3c]\,\text{Sin}[3d x]}{1440\,d}+\frac{3A\,\text{Cos}[4c]\,\text{Sin}[4d x]}{112\,d}+\frac{A\,\text{Cos}[5c]\,\text{Sin}[5d x]}{288\,d}\right)$$

- **Problem 229: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d x])^3\left(A+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{11/2}}\,dx$$

Optimal (type 4, 286 leaves, 10 steps) :

$$\frac{4 a^3 (5 A + 7 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{5 d} +$$

$$\frac{4 a^3 (105 A + 143 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{231 d} + \frac{8 a^3 (35 A + 44 C) \text{Sin}[c + d x]}{385 d \text{Sec}[c + d x]^{3/2}} + \frac{4 a^3 (105 A + 143 C) \text{Sin}[c + d x]}{231 d \sqrt{\text{Sec}[c + d x]}} +$$

$$\frac{2 A (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{11 d \text{Sec}[c + d x]^{9/2}} + \frac{4 A \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{33 a d \text{Sec}[c + d x]^{7/2}} + \frac{2 (35 A + 33 C) \left(a^3 + a^3 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{231 d \text{Sec}[c + d x]^{5/2}}$$

Result (type 5, 893 leaves) :

$$\left(A\, e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\, \text{Cos}[c+dx]^5\, \text{Csc}[c]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 (a+a\,\text{Sec}[c+dx])^3\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(\sqrt{2}\, d\,(A+2C+A\,\text{Cos}[2c+2dx])\right)+$$

$$\left(7C\, e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\, \text{Cos}[c+dx]^5\, \text{Csc}[c]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 (a+a\,\text{Sec}[c+dx])^3\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5\sqrt{2}\, d\,(A+2C+A\,\text{Cos}[2c+2dx])\right)+$$

$$\frac{5A\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6(a+a\,\text{Sec}[c+dx])^3\left(A+C\,\text{Sec}[c+dx]^2\right)}{11\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}}+$$

$$\frac{13C\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6(a+a\,\text{Sec}[c+dx])^3\left(A+C\,\text{Sec}[c+dx]^2\right)}{21\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}}+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6(a+a\,\text{Sec}[c+dx])^3\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{(215A+318C+265A\,\text{Cos}[2c]+354C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}[c]}{480\,d}+\right.$$

$$\frac{(4473A+4840C)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{14784\,d}+\frac{(55A+36C)\,\text{Cos}[3dx]\,\text{Sin}[3c]}{480\,d}+\frac{(49A+11C)\,\text{Cos}[4dx]\,\text{Sin}[4c]}{1232\,d}+$$

$$\frac{A\,\text{Cos}[5dx]\,\text{Sin}[5c]}{96\,d}+\frac{A\,\text{Cos}[6dx]\,\text{Sin}[6c]}{704\,d}+\frac{(265A+354C)\,\text{Cos}[c]\,\text{Sin}[dx]}{240\,d}+\frac{(4473A+4840C)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{14784\,d}+$$

$$\left.\frac{(55A+36C)\,\text{Cos}[3c]\,\text{Sin}[3dx]}{480\,d}+\frac{(49A+11C)\,\text{Cos}[4c]\,\text{Sin}[4dx]}{1232\,d}+\frac{A\,\text{Cos}[5c]\,\text{Sin}[5dx]}{96\,d}+\frac{A\,\text{Cos}[6c]\,\text{Sin}[6dx]}{704\,d}\right)$$

- **Problem 230: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+dx])^3\left(A+C\,\text{Sec}[c+dx]^2\right)}{\text{Sec}[c+dx]^{13/2}}\,dx$$

Optimal (type 4, 319 leaves, 11 steps):

$$\frac{4 a^3 (175 A + 221 C) \sqrt{\text{Cos}[c + d x]} \ \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{195 d} +$$

$$\frac{4 a^3 (95 A + 121 C) \sqrt{\text{Cos}[c + d x]} \ \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{231 d} + \frac{40 a^3 (118 A + 143 C) \ \text{Sin}[c + d x]}{9009 d \ \text{Sec}[c + d x]^{5/2}} +$$

$$\frac{4 a^3 (175 A + 221 C) \ \text{Sin}[c + d x]}{585 d \ \text{Sec}[c + d x]^{3/2}} + \frac{4 a^3 (95 A + 121 C) \ \text{Sin}[c + d x]}{231 d \sqrt{\text{Sec}[c + d x]}} + \frac{2 A (a + a \ \text{Sec}[c + d x])^3 \ \text{Sin}[c + d x]}{13 d \ \text{Sec}[c + d x]^{11/2}} +$$

$$\frac{12 A \left(a^2 + a^2 \ \text{Sec}[c + d x]\right)^2 \ \text{Sin}[c + d x]}{143 a d \ \text{Sec}[c + d x]^{9/2}} + \frac{2 (145 A + 143 C) \left(a^3 + a^3 \ \text{Sec}[c + d x]\right) \ \text{Sin}[c + d x]}{1287 d \ \text{Sec}[c + d x]^{7/2}}$$

Result (type 5, 942 leaves) :

$$\left(35\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2\,i\,(c+dx)}}}\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+dx)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(39\sqrt{2}\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(17\,C\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2\,i\,(c+dx)}}}\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+dx)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(15\sqrt{2}\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\frac{95\,A\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6(a+a\,\text{Sec}[c+d\,x])^3\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{231\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}+$$

$$\frac{11\,C\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6(a+a\,\text{Sec}[c+d\,x])^3\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{21\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}+$$

$$\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6(a+a\,\text{Sec}[c+d\,x])^3\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{(59375\,A+77272\,C+75025\,A\,\text{Cos}[2\,c]+92456\,C\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]}{149760\,d}+\frac{(4267\,A+4664\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{14784\,d}+\right.$$

$$\frac{(9005\,A+7852\,C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{74880\,d}+\frac{(59\,A+33\,C)\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{1232\,d}+\frac{(245\,A+52\,C)\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{14976\,d}+\frac{3\,A\,\text{Cos}[6\,d\,x]\,\text{Sin}[6\,c]}{704\,d}+$$

$$\frac{A\,\text{Cos}[7\,d\,x]\,\text{Sin}[7\,c]}{1664\,d}+\frac{(75025\,A+92456\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{74880\,d}+\frac{(4267\,A+4664\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{14784\,d}+\frac{(9005\,A+7852\,C)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{74880\,d}+$$

$$\left.\frac{(59\,A+33\,C)\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{1232\,d}+\frac{(245\,A+52\,C)\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{14976\,d}+\frac{3\,A\,\text{Cos}[6\,c]\,\text{Sin}[6\,d\,x]}{704\,d}+\frac{A\,\text{Cos}[7\,c]\,\text{Sin}[7\,d\,x]}{1664\,d}\right)$$

- **Problem 231: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 232 leaves, 9 steps):

$$-\frac{3 (5 A+7 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 a d}-\frac{(3 A+5 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a d}+\frac{3 (5 A+7 C) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{5 a d}-\frac{(3 A+5 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a d}+\frac{(5 A+7 C) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{5 a d}-\frac{(A+C) \text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{d (a+a \text{Sec}[c+d x])}$$

Result (type 5, 828 leaves):

$$-\left(3 \sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x]))-\left(21 \sqrt{2} C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ (5 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x]))-\frac{2 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]}{d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]}\ (a+a \text{Sec}[c+d x])}-\frac{10 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]}{3 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]}\ (a+a \text{Sec}[c+d x])}+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{6 (5 A+7 C) \text{Cos}[d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{5 d}-\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{8 C \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{5 d}+\frac{8 \text{Sec}[c] \text{Sec}[c+d x] (3 C \text{Sin}[c]-5 C \text{Sin}[d x])}{15 d}-\frac{4 (2 C+3 A \text{Cos}[c]+5 C \text{Cos}[c]) \text{Sec}[c] \text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right) \Big/ \left((A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]}\ (a+a \text{Sec}[c+d x])\right)$$

- **Problem 232: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{3/2} \left(A+C \text{Sec}[c+d x]^2\right)}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 190 leaves, 8 steps):

$$\frac{(A+3 C) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}+\frac{(3 A+5 C) \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a d}-\frac{(A+3 C) \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{a d}+\frac{(3 A+5 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a d}-\frac{(A+C) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{d (a+a \text{Sec}[c+d x])}$$

Result (type 5, 791 leaves):

$$\left(\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Cos}[c+d x]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x]))+\left(3\sqrt{2}\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Cos}[c+d x]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x]))+$$
$$\frac{2A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])}+$$
$$\frac{10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c]}{3d\,(A+2C+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])}+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$
$$\left(-\frac{2\,(A+3C)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{8\,C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{3d}+\right.$$
$$\left.\left.\frac{4\,(2C+3A\,\text{Cos}[c]+5C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])\right)$$

- **Problem 233: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d x]}\,\left(A+C\,\text{Sec}[c+d x]^2\right)}{a+a\,\text{Sec}[c+d x]}\,dx$$

Optimal (type 4, 152 leaves, 7 steps) :

$$-\frac{(A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+$$
$$\frac{(A-C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+\frac{(A+3C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{a\,d}-\frac{(A+C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 5, 755 leaves) :

$$-\left(\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-\left(3\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+$$
$$\frac{2A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}-$$
$$\frac{2C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{2(A+3C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}-\frac{4(A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$
$$\left((A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])\right)$$

- **Problem 234: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+dx]^2}{\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}\,dx$$

Optimal (type 4, 124 leaves, 6 steps) :

$$\frac{(3A+C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}-$$

$$\frac{(A-C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}-\frac{(A+C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 5, 772 leaves) :

$$\left(3\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+\left(\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-$$
$$\frac{2A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}+$$
$$\frac{2C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{2\,(2A+C+A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}+\right.\right.$$
$$\left.\left.\frac{8A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{4\,(A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])\right)$$

- **Problem 235: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+dx]^2}{\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])}\,dx$$

Optimal (type 4, 162 leaves, 7 steps) :

$$-\frac{(3A+C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+\frac{(5A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3\,a\,d}+\frac{(5A+3C)\,\text{Sin}[c+dx]}{3\,a\,d\sqrt{\text{Sec}[c+dx]}}-\frac{(A+C)\,\text{Sin}[c+dx]}{d\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 5, 809 leaves):

$$-\left(3\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-\left(\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+$$
$$\frac{10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])}+$$
$$\frac{2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])}+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{2\,(2A+C+A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}-\frac{8\,A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{4\,A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3\,d}-\frac{4\,(A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$
$$\left((A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])\right)$$

- **Problem 236: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+dx]^2}{\text{Sec}[c+dx]^{5/2}\,(a+a\,\text{Sec}[c+dx])}\,dx$$

Optimal (type 4, 199 leaves, 8 steps):

$$\frac{3\,(7A+5C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{5ad}-\frac{(5A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3ad}+\frac{(7A+5C)\,\text{Sin}[c+dx]}{5ad\,\text{Sec}[c+dx]^{3/2}}-\frac{(5A+3C)\,\text{Sin}[c+dx]}{3ad\sqrt{\text{Sec}[c+dx]}}-\frac{(A+C)\,\text{Sin}[c+dx]}{d\,\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 5, 865 leaves):

$$\left(21\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+\left(3\sqrt{2}\,C\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-$$
$$\frac{10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{3d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}-$$
$$\frac{2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])}+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{(51A+40C+33A\,\text{Cos}[2c]+20C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{10d}-\frac{4A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}+\frac{2A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}+\frac{2\,(33A+20C)\,\text{Cos}[c]\,\text{Sin}[dx]}{5d}-\frac{4A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}+\frac{2A\,\text{Cos}[3c]\,\text{Sin}[3dx]}{5d}+\frac{4\,(A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])\right)$$

Problem 237: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\left(a+a\,\text{Sec}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 229 leaves, 9 steps):

$$\frac{(A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{2\,(A+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{(A+7\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a^2\,d}+\frac{2\,(A+5\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(A+7\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A+C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 860 leaves):

$$\left(2\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+\left(14\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(8\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(40\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{4\,(A+7C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+\right.\right.$$

$$\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+4\,C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+\frac{16\,C\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{3\,d}+$$

$$\left.\left.\frac{16\,(C+A\,\text{Cos}[c]+5\,C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 238: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 191 leaves, 8 steps):

$$-\frac{4\,C\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{(A-5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}+\frac{4\,C\,\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{a^2\,d}+\frac{(A-5\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A+C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 643 leaves) :

$$-\left(8\,\sqrt{2}\,C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(4\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)-$$
$$\left(20\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Sec}[c+d\,x]}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(\frac{16\,C\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\right.$$
$$\left.\left.\frac{8\,(-A+5\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 239: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 165 leaves, 7 steps) :

$$-\frac{(A-C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}+\frac{2(A+C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 a^2 d}+\frac{(A-C)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{a^2 d(1+\text{Sec}[c+d x])}-\frac{(A+C)\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{3 d(a+a\,\text{Sec}[c+d x])^2}$$

Result (type 5, 835 leaves) :

$$-\left(2\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+\left(2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$
$$\left(8A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$
$$\left(8C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\right.$$
$$\left(\frac{4(A-C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(2A\,\text{Sin}\left[\frac{dx}{2}\right]-C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\right.$$
$$\left.\left.\frac{16(2A-C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

Problem 240: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a + a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 170 leaves, 7 steps):

$$\frac{4\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d} - \frac{(5\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d} - \frac{(5\,A-C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])} - \frac{(A+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 659 leaves):

$$\left(8\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right) \Big/ \left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right) -$$

$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right) \Big/ \left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right) +$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right) \Big/ \left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Sec}[c+d\,x]}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{4\,A\,(3+\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d} - \frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d} + \frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(7\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d} + \frac{16\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d} + \frac{8\,(7\,A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d} - \frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right) \Big/ \left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

Problem 241: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{3/2}\,(a + a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 201 leaves, 8 steps):

$$-\frac{(7A+C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a^2 d}+\frac{2(5A+C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3a^2 d}+$$

$$\frac{2(5A+C)\,\text{Sin}[c+dx]}{3a^2 d\sqrt{\text{Sec}[c+dx]}}-\frac{(7A+C)\,\text{Sin}[c+dx]}{3a^2 d\sqrt{\text{Sec}[c+dx]}\,(1+\text{Sec}[c+dx])}-\frac{(A+C)\,\text{Sin}[c+dx]}{3d\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 5, 888 leaves):

$$-\left(14\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-\left(2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(40\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\ \left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(8\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\ \left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\ \left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{4\,(5A+C+2A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{8A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}+\right.\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(5A\,\text{Sin}\left[\frac{dx}{2}\right]+2C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{32A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+$$

$$\left.\left.\frac{8A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}-\frac{16\,(5A+2C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 242: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{\text{Sec}[c + d\,x]^{5/2}\,(a + a\,\text{Sec}[c + d\,x])^2}\,dx$$

Optimal (type 4, 236 leaves, 9 steps):

$$\frac{4\,(14\,A + 5\,C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{5\,a^2\,d} - \frac{5\,(3\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,a^2\,d} +$$
$$\frac{4\,(14\,A + 5\,C)\,\text{Sin}[c + d\,x]}{15\,a^2\,d\,\text{Sec}[c + d\,x]^{3/2}} - \frac{5\,(3\,A + C)\,\text{Sin}[c + d\,x]}{3\,a^2\,d\,\sqrt{\text{Sec}[c + d\,x]}} - \frac{(3\,A + C)\,\text{Sin}[c + d\,x]}{a^2\,d\,\text{Sec}[c + d\,x]^{3/2}\,(1 + \text{Sec}[c + d\,x])} - \frac{(A + C)\,\text{Sin}[c + d\,x]}{3\,d\,\text{Sec}[c + d\,x]^{3/2}\,(a + a\,\text{Sec}[c + d\,x])^2}$$

Result (type 5, 941 leaves):

$$\left(112\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+\left(8\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(20\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(-\frac{(151A+60C+73A\,\text{Cos}[2c]+20C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{16A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}+\frac{4A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5d}-\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(13A\,\text{Sin}\left[\frac{dx}{2}\right]+7C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,(73A+20C)\,\text{Cos}[c]\,\text{Sin}[dx]}{5d}-$$

$$\left.\frac{16A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}+\frac{4A\,\text{Cos}[3c]\,\text{Sin}[3dx]}{5d}+\frac{8\,(13A+7C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)$$

- **Problem 243: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{7/2}\left(A+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 282 leaves, 10 steps):

$$\frac{(9\,A+119\,C)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(A+11\,C)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a^3\,d}-$$
$$\frac{(9\,A+119\,C)\,\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{10\,a^3\,d}+\frac{(A+11\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,a^3\,d}-$$
$$\frac{(A+C)\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{2\,C\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(9\,A+119\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{30\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 964 leaves) :

$$\left(18\sqrt{2}\, A\, e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(238\sqrt{2}\, C\, e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(4\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(44\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{4\,(9A+119C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}+\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(3\,A\,\text{Sin}\left[\frac{dx}{2}\right]+13\,C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15\,d}+$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(3\,A\,\text{Sin}\left[\frac{dx}{2}\right]+29\,C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+\frac{32\,C\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{3\,d}+$$

$$\left.\frac{8\,(4C+3A\,\text{Cos}[c]+33C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{8\,(3A+13C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 244: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{5/2}\left(A+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 249 leaves, 9 steps):

$$\frac{(A-49C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(A-13C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(A-49C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{10a^3d}-\frac{(A+C)\text{Sec}[c+dx]^{7/2}\text{Sin}[c+dx]}{5d(a+a\,\text{Sec}[c+dx])^3}+\frac{2(A-4C)\text{Sec}[c+dx]^{5/2}\text{Sin}[c+dx]}{15ad(a+a\,\text{Sec}[c+dx])^2}+\frac{(A-13C)\text{Sec}[c+dx]^{3/2}\text{Sin}[c+dx]}{6d\left(a^3+a^3\text{Sec}[c+dx]\right)}$$

Result (type 5, 933 leaves):

$$\left(2\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(98\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$
$$\left(52C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{4(A-49C)\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-13C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\right.\right.$$
$$\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-4C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}-\frac{8(-A+13C)\text{Tan}\left[\frac{c}{2}\right]}{3d}+$$
$$\left.\left.\frac{16(A-4C)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{4(A+C)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)$$

- **Problem 245: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d\,x]^{3/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 220 leaves, 8 steps):

$$-\frac{(A-9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(A+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-$$
$$\frac{(A+C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{2\,(2\,A-3\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{(A-9\,C)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 932 leaves):

$$-\left(2\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d x]\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(5\,d\,(A+2\,C+A\,\mathrm{Cos}[2c+2 d x])\,(a+a\,\mathrm{Sec}[c+d x])^3\right)+\left(18\sqrt{2}\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d x]\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(5\,d\,(A+2\,C+A\,\mathrm{Cos}[2c+2 d x])\,(a+a\,\mathrm{Sec}[c+d x])^3\right)+$$

$$\left(4\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\mathrm{Cos}[2c+2 d x])\,(a+a\,\mathrm{Sec}[c+d x])^3\right)+$$

$$\left(4\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2\,C+A\,\mathrm{Cos}[2c+2 d x])\,(a+a\,\mathrm{Sec}[c+d x])^3\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\mathrm{Sec}[c+d x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\left(\frac{4\,(A-9\,C)\,\mathrm{Cos}[d x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5\,d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(7\,A\,\mathrm{Sin}\left[\frac{d x}{2}\right]-3\,C\,\mathrm{Sin}\left[\frac{d x}{2}\right]\right)}{15\,d}+\right.\right.$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d x}{2}\right]\right)}{5\,d}+\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d x}{2}\right]+3\,C\,\mathrm{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}+\frac{8\,(A+3\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}-$$

$$\left.\left.\frac{8\,(7\,A-3\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left((A+2\,C+A\,\mathrm{Cos}[2c+2 d x])\,(a+a\,\mathrm{Sec}[c+d x])^3\right)$$

- **Problem 246: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Sec}[c+d x]}\left(A+C\,\mathrm{Sec}[c+d x]^2\right)}{(a+a\,\mathrm{Sec}[c+d x])^3}\,dx$$

Optimal (type 4, 222 leaves, 8 steps):

$$-\frac{(9A-C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(3A+C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(A+C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Sec}[c+dx])^3}+\frac{2(3A-2C)\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Sec}[c+dx])^2}+\frac{(3A+C)\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{6d\left(a^3+a^3\,\text{Sec}[c+dx]\right)}$$

Result (type 5, 934 leaves) :

$$-\left(18\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{4(9A-C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(9A\,\text{Sin}\left[\frac{dx}{2}\right]-C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(6A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-\frac{8(9A-C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{16(6A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{4(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)$$

- **Problem 247: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{\sqrt{\text{Sec}[c + d\,x]}\,\left(a + a\,\text{Sec}[c + d\,x]\right)^3}\,dx$$

Optimal (type 4, 226 leaves, 8 steps):

$$\frac{(49\,A - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{10\,a^3\,d} - \frac{(13\,A - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{6\,a^3\,d} - \frac{(A + C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{5\,d\,\left(a + a\,\text{Sec}[c + d\,x]\right)^3} - \frac{2\,(4\,A - C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{15\,a\,d\,\left(a + a\,\text{Sec}[c + d\,x]\right)^2} - \frac{(13\,A - C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{6\,d\,\left(a^3 + a^3\,\text{Sec}[c + d\,x]\right)}$$

Result (type 5, 955 leaves):

$$\left(98\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(52\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(-\frac{4\,(39A-C+10\,A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(23\,A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(17\,A\,\text{Sin}\left[\frac{dx}{2}\right]+7\,C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+$$

$$\left.\frac{32\,A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{8\,(23A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{8\,(17A+7C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 248: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+dx]^2}{\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 249 leaves, 9 steps):

$$-\frac{(119\,A+9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(11\,A+C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,a^3\,d}+\frac{(11\,A+C)\,\text{Sin}[c+d\,x]}{2\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{2\,A\,\text{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(119\,A+9\,C)\,\text{Sin}[c+d\,x]}{30\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 988 leaves) :

$$-\left(238\sqrt{2}\,A\,e^{-i\,(2c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(5\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)-\left(18\sqrt{2}\,C\,e^{-i\,(2c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(5\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\left(44\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\left(4\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\frac{1}{(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Sec}[c+d\,x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{4\,(89\,A+9\,C+30\,A\,\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5\,d}+\frac{16\,A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{3\,d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.$$

$$\frac{16\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(11\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(43\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+9\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{96\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}+$$

$$\left.\frac{16\,A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{3\,d}-\frac{8\,(43\,A+9\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{16\,(11\,A+6\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 249: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{\mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 290 leaves, 10 steps) :

$$\frac{7\,(33\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}-$$

$$\frac{(63\,A+13\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}+\frac{7\,(33\,A+7\,C)\,\text{Sin}[c+d\,x]}{30\,a^3\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{(63\,A+13\,C)\,\text{Sin}[c+d\,x]}{6\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{(A+C)\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{2\,(6\,A+C)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(63\,A+13\,C)\,\text{Sin}[c+d\,x]}{10\,d\,\text{Sec}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 1032 leaves) :

$$\left(462\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(98\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(84\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(52\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(-\frac{2\,(329A+78C+133A\,\text{Cos}[2c]+20C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{16A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{d}+\frac{8A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5d}+\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{184\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(27A\,\text{Sin}\left[\frac{dx}{2}\right]+17C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+\frac{8\,(133A+20C)\,\text{Cos}[c]\,\text{Sin}[dx]}{5d}-\frac{16A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{d}+$$

$$\left.\frac{8A\,\text{Cos}[3c]\,\text{Sin}[3dx]}{5d}+\frac{184\,(3A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{8\,(27A+17C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 261: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+dx])^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)}{\sqrt{\text{Sec}[c+dx]}}\,dx$$

Optimal (type 3, 171 leaves, 5 steps):

$$\frac{a^{3/2}\,(8A+7C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{4d}+\frac{a^2\,(8A-5C)\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{4d\,\sqrt{a+a\,\text{Sec}[c+dx]}}+$$
$$\frac{3aC\,\sqrt{\text{Sec}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{4d}+\frac{C\,\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{2d}$$

Result (type 3, 378 leaves):

$$\Big((8A+7C)\,\text{Cos}[c+dx]^3\,\Big(-\text{Log}[1+\text{Sec}[c+dx]]+\text{Log}\Big[\sqrt{\text{Sec}[c+dx]}+\text{Sec}[c+dx]^{3/2}+\sqrt{1+\text{Sec}[c+dx]}\,\sqrt{-1+\text{Sec}[c+dx]^2}\Big]\Big)$$
$$(a\,(1+\text{Sec}[c+dx]))^{3/2}\,\sqrt{-1+\text{Sec}[c+dx]^2}\,\left(A+C\,\text{Sec}[c+dx]^2\right)\,\text{Sin}[c+dx]\Big)\Big/$$
$$\left(2d\,\left(1-\text{Cos}[c+dx]^2\right)\,(A+2C+A\,\text{Cos}[2c+2dx])\,(1+\text{Sec}[c+dx])^{3/2}\right)+$$
$$\Bigg(\sqrt{(1+\text{Cos}[c+dx])\,\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\,\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\Bigg(\frac{4A\,\text{Cos}[dx]\,\text{Sin}[c]}{d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\left(-8A\,\text{Sin}\left[\frac{dx}{2}\right]+5C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{2d}+\frac{4A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{d}-$$
$$\frac{(-2C+8A\,\text{Cos}[c]-7C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{2d}\Bigg)\Bigg)\Bigg/\left((A+2C+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\,(1+\text{Sec}[c+dx])^{3/2}\right)$$

- **Problem 262: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+dx])^{3/2}\,\left(A+C\,\text{Sec}[c+dx]^2\right)}{\text{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 3, 169 leaves, 5 steps):

$$\frac{3a^{3/2}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{d}+\frac{a^2\,(8A-3C)\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{3d\,\sqrt{a+a\,\text{Sec}[c+dx]}}-$$
$$\frac{a\,(2A-3C)\,\sqrt{\text{Sec}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{3d}+\frac{2A\,(a+a\,\text{Sec}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{3d\,\sqrt{\text{Sec}[c+dx]}}$$

Result (type 3, 382 leaves):

$$\left(6\,C\,\mathrm{Cos}[c+d\,x]^3\left(-\mathrm{Log}[1+\mathrm{Sec}[c+d\,x]]+\mathrm{Log}\left[\sqrt{\mathrm{Sec}[c+d\,x]}+\mathrm{Sec}[c+d\,x]^{3/2}+\sqrt{1+\mathrm{Sec}[c+d\,x]}\,\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\right]\right)(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(d\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{3/2}\right)+$$

$$\left(\sqrt{(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{16\,A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{3\,d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(8\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-3\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{16\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{3\,d}-\frac{2\,(8\,A-3\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{3/2}\,(1+\mathrm{Sec}[c+d\,x])^{3/2}\right)$$

- **Problem 263: Result more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 163 leaves, 5 steps):

$$\frac{2\,a^{3/2}\,C\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,(4\,A+5\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}$$

Result (type 3, 428 leaves):

$$\left(4\,C\,\mathrm{Cos}[c+d\,x]^3\left(-\mathrm{Log}[1+\mathrm{Sec}[c+d\,x]]+\mathrm{Log}\left[\sqrt{\mathrm{Sec}[c+d\,x]}+\mathrm{Sec}[c+d\,x]^{3/2}+\sqrt{1+\mathrm{Sec}[c+d\,x]}\,\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\right]\right)(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(d\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{3/2}\right)+$$

$$\left(\sqrt{(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{(17\,A+20\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{5\,d}+\frac{4\,A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}+\frac{A\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{5\,d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(4\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{(17\,A+20\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{5\,d}+\frac{4\,A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}+\frac{A\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{5\,d}-\frac{4\,(4\,A+5\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left((A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{3/2}\,(1+\mathrm{Sec}[c+d\,x])^{3/2}\right)$$

Problem 272: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 210 leaves, 6 steps):

$$\frac{5\,a^{5/2}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^3\,(64\,A+15\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{a^2\,(16\,A-15\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,a\,A\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}$$

Result (type 3, 428 leaves):

$$\left(10\,C\,\text{Cos}[c+d\,x]^3\left(-\text{Log}[1+\text{Sec}[c+d\,x]]+\text{Log}\left[\sqrt{\text{Sec}[c+d\,x]}+\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]\right)(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\right)\Big/\left(d\left(1-\text{Cos}[c+d\,x]^2\right)(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(1+\text{Sec}[c+d\,x])^{5/2}\right)+\left(\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{(131\,A+60\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{15\,d}+\frac{22\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{15\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{5\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(64\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+15\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\frac{(131\,A+60\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{15\,d}+\frac{22\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{15\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{5\,d}-\frac{2\,(64\,A+15\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}\right)\right)\Big/\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,(1+\text{Sec}[c+d\,x])^{5/2}\right)$$

Problem 273: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 3, 210 leaves, 6 steps):

$$\frac{2\,a^{5/2}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^3\,(32\,A+49\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a^2\,(8\,A+7\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a\,A\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}$$

Result (type 3, 474 leaves):

$$\left(4\,C\,\mathrm{Cos}[c+d\,x]^3\left(-\mathrm{Log}[1+\mathrm{Sec}[c+d\,x]]+\mathrm{Log}\left[\sqrt{\mathrm{Sec}[c+d\,x]}+\mathrm{Sec}[c+d\,x]^{3/2}+\sqrt{1+\mathrm{Sec}[c+d\,x]}\,\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\right]\right)(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(d\left(1-\mathrm{Cos}[c+d\,x]^2\right)(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{5/2}\right)+$$

$$\frac{1}{(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{3/2}\,(1+\mathrm{Sec}[c+d\,x])^{5/2}}\sqrt{(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}$$

$$\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{(137\,A+196\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{21\,d}+\frac{(31\,A+14\,C)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{21\,d}+\frac{3\,A\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{7\,d}+\right.$$

$$\frac{A\,\mathrm{Cos}[4\,d\,x]\,\mathrm{Sin}[4\,c]}{14\,d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(32\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+49\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{21\,d}+\frac{(137\,A+196\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{21\,d}+$$

$$\left.\frac{(31\,A+14\,C)\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{21\,d}+\frac{3\,A\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{7\,d}+\frac{A\,\mathrm{Cos}[4\,c]\,\mathrm{Sin}[4\,d\,x]}{14\,d}-\frac{4\,(32\,A+49\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{21\,d}\right)$$

- **Problem 277: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{5/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 226 leaves, 8 steps):

$$-\frac{(8\,A+9\,C)\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{8\,\sqrt{a}\,d}+\frac{\sqrt{2}\,(A+C)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+$$

$$\frac{(8\,A+7\,C)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}-\frac{C\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{C\,\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 793 leaves):

$$\left(\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{(-10\,C+24\,A\,\text{Cos}[c]+21\,C\,\text{Cos}[c])\,\text{Sin}\left[\frac{c}{2}\right]}{6\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Cos}\left[\frac{3\,c}{2}\right]\right)}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(24\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+31\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{12\,d}+\frac{2\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(4\,C\,\text{Sin}[c]-5\,C\,\text{Sin}[d\,x])}{6\,d}\right)\right)\Big/$$

$$\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)+\frac{1}{8\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{a\,(1+\text{Sec}[c+d\,x])}}$$

$$\text{Cos}[c+d\,x]^2\sqrt{1+\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{1}{2\,d\,(1+\text{Cos}[c+d\,x])\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\sqrt{1-\text{Cos}[c+d\,x]^2}}\right.$$

$$(8\,A+7\,C)\,\text{Cos}[c+d\,x]^2\left(\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\sqrt{2}\sqrt{\text{Sec}[c+d\,x]}\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]-\right.$$

$$\left.\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\sqrt{2}\sqrt{\text{Sec}[c+d\,x]}\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]\right)$$

$$(1+\text{Sec}[c+d\,x])\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]+\frac{1}{4\,d\,(1+\text{Cos}[c+d\,x])\left(1-\text{Cos}[c+d\,x]^2\right)}$$

$$(-8\,A-9\,C)\,\text{Cos}[c+d\,x]^2\left(-8\,\text{Log}[1+\text{Sec}[c+d\,x]]+8\,\text{Log}\left[\sqrt{\text{Sec}[c+d\,x]}+\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]+\sqrt{2}\right.$$

$$\left(-\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\sqrt{2}\sqrt{\text{Sec}[c+d\,x]}\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]+\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[\right.\right.$$

$$\left.\left.\left.c+d\,x]^2+2\sqrt{2}\sqrt{\text{Sec}[c+d\,x]}\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]\right)\right)(1+\text{Sec}[c+d\,x])\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)$$

- **Problem 278: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 183 leaves, 7 steps):

$$\frac{(8\,A+7\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\sqrt{a}\,d}-\frac{\sqrt{2}\,(A+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{C\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 730 leaves):

$$\left(\sqrt{(1+\text{Cos}[c+d x])\,\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(-\frac{C\,(-2+\text{Cos}[c])\,\text{Sin}\left[\frac{c}{2}\right]}{d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Cos}\left[\frac{3c}{2}\right]\right)}-\frac{3\,C\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\,\text{Sin}\left[\frac{d x}{2}\right]}{2 d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{d}\right)\right)\Big/$$
$$\left((A+2 C+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{3/2}\,\sqrt{a\,(1+\text{Sec}[c+d x])}\right)+$$
$$\frac{1}{4\,(A+2 C+A\,\text{Cos}[2 c+2 d x])\,\sqrt{a\,(1+\text{Sec}[c+d x])}}\,\text{Cos}[c+d x]^2\,\sqrt{1+\text{Sec}[c+d x]}\,\left(A+C\,\text{Sec}[c+d x]^2\right)$$
$$\left(-\left(C\,\text{Cos}[c+d x]^2\,\left(\text{Log}\left[1-2\,\text{Sec}[c+d x]-3\,\text{Sec}[c+d x]^2-2\sqrt{2}\,\sqrt{\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\sqrt{-1+\text{Sec}[c+d x]^2}\right]-\text{Log}\left[1-2\,\text{Sec}[c+\right.\right.\right.\right.$$
$$\left.\left.d x]-3\,\text{Sec}[c+d x]^2+2\sqrt{2}\,\sqrt{\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\sqrt{-1+\text{Sec}[c+d x]^2}\right]\right)\,(1+\text{Sec}[c+d x])\,\sqrt{-1+\text{Sec}[c+d x]^2}$$
$$\left.\text{Sin}[c+d x]\right)\Big/\left(2 d\,(1+\text{Cos}[c+d x])\,\sqrt{2-2\,\text{Cos}[c+d x]^2}\,\sqrt{1-\text{Cos}[c+d x]^2}\right)-\frac{1}{4 d\,(1+\text{Cos}[c+d x])\,\left(1-\text{Cos}[c+d x]^2\right)}$$
$$(-8 A-7 C)\,\text{Cos}[c+d x]^2\,\left(-8\,\text{Log}[1+\text{Sec}[c+d x]]+8\,\text{Log}\left[\sqrt{\text{Sec}[c+d x]}+\text{Sec}[c+d x]^{3/2}+\sqrt{1+\text{Sec}[c+d x]}\,\sqrt{-1+\text{Sec}[c+d x]^2}\right]+\sqrt{2}\right.$$
$$\left(-\text{Log}\left[1-2\,\text{Sec}[c+d x]-3\,\text{Sec}[c+d x]^2-2\sqrt{2}\,\sqrt{\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\sqrt{-1+\text{Sec}[c+d x]^2}\right]+\text{Log}\left[1-2\,\text{Sec}[c+d x]-3\,\text{Sec}[\right.\right.$$
$$\left.\left.\left.c+d x]^2+2\sqrt{2}\,\sqrt{\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\,\sqrt{-1+\text{Sec}[c+d x]^2}\right]\right)\right)\,(1+\text{Sec}[c+d x])\,\sqrt{-1+\text{Sec}[c+d x]^2}\,\text{Sin}[c+d x]\right)$$

- **Problem 279: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d x]}\,\left(A+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 133 leaves, 6 steps):

$$-\frac{C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{\sqrt{2}\,(A+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{C\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{d\,\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 717 leaves):

$$\Big((2A+C)\,\mathrm{Cos}[c+d x]^4\,\Big(\mathrm{Log}\Big[1-2\,\mathrm{Sec}[c+d x]-3\,\mathrm{Sec}[c+d x]^2-2\sqrt{2}\,\sqrt{\mathrm{Sec}[c+d x]}\,\sqrt{1+\mathrm{Sec}[c+d x]}\,\sqrt{-1+\mathrm{Sec}[c+d x]^2}\Big]-\mathrm{Log}\Big[1-2\,\mathrm{Sec}[c+d x]-3\,\mathrm{Sec}[c+d x]^2+2\sqrt{2}\,\sqrt{\mathrm{Sec}[c+d x]}\,\sqrt{1+\mathrm{Sec}[c+d x]}\,\sqrt{-1+\mathrm{Sec}[c+d x]^2}\Big]\Big)\,(1+\mathrm{Sec}[c+d x])^{3/2}\sqrt{-1+\mathrm{Sec}[c+d x]^2}\,\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sin}[c+d x]\Big)\Big/\Big(2d\,(1+\mathrm{Cos}[c+d x])\sqrt{2-2\,\mathrm{Cos}[c+d x]^2}\,\sqrt{1-\mathrm{Cos}[c+d x]^2}\,(A+2C+A\,\mathrm{Cos}[2c+2d x])\sqrt{a\,(1+\mathrm{Sec}[c+d x])}\Big)-\Big(C\,\mathrm{Cos}[c+d x]^4\,\Big(-8\,\mathrm{Log}[1+\mathrm{Sec}[c+d x]]+8\,\mathrm{Log}\Big[\sqrt{\mathrm{Sec}[c+d x]}+\mathrm{Sec}[c+d x]^{3/2}+\sqrt{1+\mathrm{Sec}[c+d x]}\,\sqrt{-1+\mathrm{Sec}[c+d x]^2}\Big]+\sqrt{2}\,\Big(-\mathrm{Log}\Big[1-2\,\mathrm{Sec}[c+d x]-3\,\mathrm{Sec}[c+d x]^2-2\sqrt{2}\,\sqrt{\mathrm{Sec}[c+d x]}\,\sqrt{1+\mathrm{Sec}[c+d x]}\,\sqrt{-1+\mathrm{Sec}[c+d x]^2}\Big]+\mathrm{Log}\Big[1-2\,\mathrm{Sec}[c+d x]-3\,\mathrm{Sec}[c+d x]^2+2\sqrt{2}\,\sqrt{\mathrm{Sec}[c+d x]}\,\sqrt{1+\mathrm{Sec}[c+d x]}\,\sqrt{-1+\mathrm{Sec}[c+d x]^2}\Big]\Big)\Big)\,(1+\mathrm{Sec}[c+d x])^{3/2}\sqrt{-1+\mathrm{Sec}[c+d x]^2}\,\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sin}[c+d x]\Big)\Big/\Big(4d\,(1+\mathrm{Cos}[c+d x])\left(1-\mathrm{Cos}[c+d x]^2\right)(A+2C+A\,\mathrm{Cos}[2c+2d x])\sqrt{a\,(1+\mathrm{Sec}[c+d x])}\Big)+\Big(\sqrt{(1+\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}\,\sqrt{1+\mathrm{Sec}[c+d x]}\,\left(A+C\,\mathrm{Sec}[c+d x]^2\right)\Big(\frac{2C\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\mathrm{Sin}\left[\frac{d x}{2}\right]}{d}+\frac{2C\,\mathrm{Tan}\left[\frac{c}{2}\right]}{d}\Big)\Big)\Big/\Big((A+2C+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{3/2}\sqrt{a\,(1+\mathrm{Sec}[c+d x])}\Big)$$

Problem 280: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\mathrm{Sec}[c+d x]^2}{\sqrt{\mathrm{Sec}[c+d x]}\,\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 135 leaves, 6 steps):

$$\frac{2C\,\mathrm{ArcSinh}\Big[\frac{\sqrt{a}\,\mathrm{Tan}[c+d x]}{\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\Big]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A+C)\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\sqrt{\mathrm{Sec}[c+d x]}\,\mathrm{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\Big]}{\sqrt{a}\,d}+\frac{2A\sqrt{\mathrm{Sec}[c+d x]}\,\mathrm{Sin}[c+d x]}{d\sqrt{a+a\,\mathrm{Sec}[c+d x]}}$$

Result (type 3, 504 leaves):

$$-\frac{1}{4\,d\,(-1+\text{Sec}[c+d\,x])\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}}$$

$$\text{Tan}[c+d\,x]\left(\frac{8\,A}{\sqrt{\frac{1}{1+\text{Cos}[c+d\,x]}}}-8\,A\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}+8\,C\,\text{Log}[1+\text{Sec}[c+d\,x]]\,\sqrt{\text{Tan}[c+d\,x]^2}-\right.$$

$$8\,C\,\text{Log}\left[\sqrt{\text{Sec}[c+d\,x]}+\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]^2}\right]\sqrt{\text{Tan}[c+d\,x]^2}+$$

$$\sqrt{2}\,A\,\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]^2}\right]\sqrt{\text{Tan}[c+d\,x]^2}+$$

$$\sqrt{2}\,C\,\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]^2}\right]\sqrt{\text{Tan}[c+d\,x]^2}-$$

$$\sqrt{2}\,A\,\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]^2}\right]\sqrt{\text{Tan}[c+d\,x]^2}-$$

$$\left.\sqrt{2}\,C\,\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{\text{Tan}[c+d\,x]^2}\right]\sqrt{\text{Tan}[c+d\,x]^2}\right)$$

- **Problem 281: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 136 leaves, 4 steps):

$$\frac{\sqrt{2}\,(A+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{2\,A\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 462 leaves):

$$\left((A+C)\,\text{Cos}[c+d\,x]^4\left(\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]-\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]\right)(1+\text{Sec}[c+d\,x])^{3/2}\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1+\text{Cos}[c+d\,x])\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)+\left(\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{8\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{2\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{3\,d}+\frac{8\,A\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{3\,d}-\frac{8\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{2\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{3\,d}+\frac{8\,A\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)$$

- **Problem 282: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 181 leaves, 5 steps):

$$-\frac{\sqrt{2}\,(A+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{2\,A\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,(13\,A+15\,C)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 528 leaves):

$$-\Bigg(\Bigg((A+C)\operatorname{Cos}[c+d x]^4\Big(\operatorname{Log}\Big[1-2\operatorname{Sec}[c+d x]-3\operatorname{Sec}[c+d x]^2-2\sqrt{2}\sqrt{\operatorname{Sec}[c+d x]}\sqrt{1+\operatorname{Sec}[c+d x]}\sqrt{-1+\operatorname{Sec}[c+d x]^2}\Big]-$$

$$\operatorname{Log}\Big[1-2\operatorname{Sec}[c+d x]-3\operatorname{Sec}[c+d x]^2+2\sqrt{2}\sqrt{\operatorname{Sec}[c+d x]}\sqrt{1+\operatorname{Sec}[c+d x]}\sqrt{-1+\operatorname{Sec}[c+d x]^2}\Big]\Big)$$

$$(1+\operatorname{Sec}[c+d x])^{3/2}\sqrt{-1+\operatorname{Sec}[c+d x]^2}\left(A+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sin}[c+d x]\Bigg)\Big/$$

$$\left(d\,(1+\operatorname{Cos}[c+d x])\sqrt{2-2\operatorname{Cos}[c+d x]^2}\sqrt{1-\operatorname{Cos}[c+d x]^2}\,(A+2 C+A\operatorname{Cos}[2 c+2 d x])\sqrt{a\,(1+\operatorname{Sec}[c+d x])}\right)\Bigg)+$$

$$\Bigg(\sqrt{(1+\operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}\sqrt{1+\operatorname{Sec}[c+d x]}\left(A+C\operatorname{Sec}[c+d x]^2\right)$$

$$\left(\frac{(71 A+60 C)\operatorname{Cos}[d x]\operatorname{Sin}[c]}{15 d}-\frac{8 A\operatorname{Cos}[2 d x]\operatorname{Sin}[2 c]}{15 d}+\frac{A\operatorname{Cos}[3 d x]\operatorname{Sin}[3 c]}{5 d}-\frac{4\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(17 A\operatorname{Sin}\left[\frac{d x}{2}\right]+15 C\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+\right.$$

$$\left.\frac{(71 A+60 C)\operatorname{Cos}[c]\operatorname{Sin}[d x]}{15 d}-\frac{8 A\operatorname{Cos}[2 c]\operatorname{Sin}[2 d x]}{15 d}+\frac{A\operatorname{Cos}[3 c]\operatorname{Sin}[3 d x]}{5 d}-\frac{4\,(17 A+15 C)\operatorname{Tan}\left[\frac{c}{2}\right]}{15 d}\right)\Bigg)\Big/$$

$$\left((A+2 C+A\operatorname{Cos}[2 c+2 d x])\operatorname{Sec}[c+d x]^{3/2}\sqrt{a\,(1+\operatorname{Sec}[c+d x])}\right)$$

- **Problem 283: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\operatorname{Sec}[c+d x]^2}{\operatorname{Sec}[c+d x]^{7/2}\sqrt{a+a\operatorname{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 224 leaves, 6 steps):

$$\frac{\sqrt{2}\,(A+C)\operatorname{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\operatorname{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{2 A\operatorname{Sin}[c+d x]}{7 d\operatorname{Sec}[c+d x]^{5/2}\sqrt{a+a\operatorname{Sec}[c+d x]}}-$$

$$\frac{2 A\operatorname{Sin}[c+d x]}{35 d\operatorname{Sec}[c+d x]^{3/2}\sqrt{a+a\operatorname{Sec}[c+d x]}}+\frac{2\,(31 A+35 C)\operatorname{Sin}[c+d x]}{105 d\sqrt{\operatorname{Sec}[c+d x]}\sqrt{a+a\operatorname{Sec}[c+d x]}}-\frac{2\,(43 A+35 C)\sqrt{\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{105 d\sqrt{a+a\operatorname{Sec}[c+d x]}}$$

Result (type 3, 573 leaves):

$$\left((A+C)\operatorname{Cos}[c+d x]^4\left(\operatorname{Log}\left[1-2\operatorname{Sec}[c+d x]-3\operatorname{Sec}[c+d x]^2-2\sqrt{2}\sqrt{\operatorname{Sec}[c+d x]}\sqrt{1+\operatorname{Sec}[c+d x]}\sqrt{-1+\operatorname{Sec}[c+d x]^2}\right]-\operatorname{Log}\left[1-2\operatorname{Sec}[c+d x]-3\operatorname{Sec}[c+d x]^2+2\sqrt{2}\sqrt{\operatorname{Sec}[c+d x]}\sqrt{1+\operatorname{Sec}[c+d x]}\sqrt{-1+\operatorname{Sec}[c+d x]^2}\right]\right)(1+\operatorname{Sec}[c+d x])^{3/2}\sqrt{-1+\operatorname{Sec}[c+d x]^2}\left(A+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sin}[c+d x]\right)\Big/\left(d(1+\operatorname{Cos}[c+d x])\sqrt{2-2\operatorname{Cos}[c+d x]^2}\sqrt{1-\operatorname{Cos}[c+d x]^2}(A+2C+A\operatorname{Cos}[2c+2d x])\sqrt{a(1+\operatorname{Sec}[c+d x])}\right)+$$

$$\frac{1}{(A+2C+A\operatorname{Cos}[2c+2d x])\operatorname{Sec}[c+d x]^{3/2}\sqrt{a(1+\operatorname{Sec}[c+d x])}}\sqrt{(1+\operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}\sqrt{1+\operatorname{Sec}[c+d x]}\left(A+C\operatorname{Sec}[c+d x]^2\right)\left(-\frac{2(193A+140C)\operatorname{Cos}[d x]\operatorname{Sin}[c]}{105d}+\frac{(113A+70C)\operatorname{Cos}[2d x]\operatorname{Sin}[2c]}{105d}-\frac{6A\operatorname{Cos}[3d x]\operatorname{Sin}[3c]}{35d}+\frac{A\operatorname{Cos}[4d x]\operatorname{Sin}[4c]}{14d}+\frac{8\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(46A\operatorname{Sin}\left[\frac{d x}{2}\right]+35C\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{105d}-\frac{2(193A+140C)\operatorname{Cos}[c]\operatorname{Sin}[d x]}{105d}+\frac{(113A+70C)\operatorname{Cos}[2c]\operatorname{Sin}[2d x]}{105d}-\frac{6A\operatorname{Cos}[3c]\operatorname{Sin}[3d x]}{35d}+\frac{A\operatorname{Cos}[4c]\operatorname{Sin}[4d x]}{14d}+\frac{8(46A+35C)\operatorname{Tan}\left[\frac{c}{2}\right]}{105d}\right)$$

Problem 284: Result more than twice size of optimal antiderivative.

$$\int\frac{\operatorname{Sec}[c+d x]^{3/2}\left(A+C\operatorname{Sec}[c+d x]^2\right)}{(a+a\operatorname{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 3, 188 leaves, 7 steps):

$$-\frac{3C\operatorname{ArcSinh}\left[\frac{\sqrt{a}\operatorname{Tan}[c+d x]}{\sqrt{a+a\operatorname{Sec}[c+d x]}}\right]}{a^{3/2}d}+\frac{(A+9C)\operatorname{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\operatorname{Sec}[c+d x]}}\right]}{2\sqrt{2}a^{3/2}d}-\frac{(A+C)\operatorname{Sec}[c+d x]^{5/2}\operatorname{Sin}[c+d x]}{2d(a+a\operatorname{Sec}[c+d x])^{3/2}}+\frac{(A+3C)\operatorname{Sec}[c+d x]^{3/2}\operatorname{Sin}[c+d x]}{2ad\sqrt{a+a\operatorname{Sec}[c+d x]}}$$

Result (type 3, 800 leaves):

$$\frac{1}{2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}\,\text{Cos}[c+d\,x]^2\,(1+\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\Big((A+3\,C)\,\text{Cos}[c+d\,x]^2\,\Big(\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]-\text{Log}\Big[1-$$

$$2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]\Big)\,(1+\text{Sec}[c+d\,x])\,\sqrt{-1+\text{Sec}[c+d\,x]^2}$$

$$\text{Sin}[c+d\,x]\Big)\Big/\left(2\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right)-\frac{1}{2\,d\,(1+\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)}$$

$$3\,C\,\text{Cos}[c+d\,x]^2\,\Big(-8\,\text{Log}[1+\text{Sec}[c+d\,x]]+8\,\text{Log}\Big[\sqrt{\text{Sec}[c+d\,x]}+\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]+$$

$$\sqrt{2}\,\Big(-\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]+$$

$$\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]\Big)\Big)$$

$$(1+\text{Sec}[c+d\,x])\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)+\Bigg(\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{3/2}$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(-A\,\text{Sin}\left[\frac{c}{2}\right]-C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{2\,d}+\right.$$

$$\left.\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{(A+3\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\Bigg)\Bigg)\Bigg/$$

$$\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)$$

- **Problem 285: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 145 leaves, 6 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{3/2}\,d}+\frac{(3\,A-5\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A+C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 795 leaves):

$$\frac{1}{2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}\,\text{Cos}[c+d\,x]^2\,(1+\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg((3\,A-C)\,\text{Cos}[c+d\,x]^2\,\Big(\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]-\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]\Big)\,(1+\text{Sec}[c+d\,x])\,\sqrt{-1+\text{Sec}[c+d\,x]^2}$$

$$\text{Sin}[c+d\,x]\Bigg)\Big/\left(2\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right)+\frac{1}{d\,(1+\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)}$$

$$C\,\text{Cos}[c+d\,x]^2\,\Big(-8\,\text{Log}[1+\text{Sec}[c+d\,x]]+8\,\text{Log}\Big[\sqrt{\text{Sec}[c+d\,x]}+\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]+$$

$$\sqrt{2}\,\Big(-\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]+$$

$$\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]\Big)\Big)$$

$$(1+\text{Sec}[c+d\,x])\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)+\Bigg(\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{3/2}$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(A\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\right.$$

$$\left.\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{2\,d}-\frac{(A+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\Bigg)\Bigg)\Big/$$

$$\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)$$

- **Problem 288: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 248 leaves, 6 steps):

$$-\frac{(15\,A+7\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{2\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{(9\,A+5\,C)\,\text{Sin}[c+d\,x]}{10\,a\,d\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{(13\,A+5\,C)\,\text{Sin}[c+d\,x]}{10\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{(49\,A+25\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 630 leaves):

$$-\Bigg(\Bigg((15 A+7 C) \operatorname{Cos}[c+d x]^4 \Big(\operatorname{Log}\Big[1-2 \operatorname{Sec}[c+d x]-3 \operatorname{Sec}[c+d x]^2-2 \sqrt{2} \sqrt{\operatorname{Sec}[c+d x]} \sqrt{1+\operatorname{Sec}[c+d x]} \sqrt{-1+\operatorname{Sec}[c+d x]^2}\Big]- \operatorname{Log}\Big[1-2 \operatorname{Sec}[c+d x]-3 \operatorname{Sec}[c+d x]^2+2 \sqrt{2} \sqrt{\operatorname{Sec}[c+d x]} \sqrt{1+\operatorname{Sec}[c+d x]} \sqrt{-1+\operatorname{Sec}[c+d x]^2}\Big]\Big) (1+\operatorname{Sec}[c+d x])^{5/2} \sqrt{-1+\operatorname{Sec}[c+d x]^2} \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[c+d x]\Bigg) \Big/ \Big(4 d (1+\operatorname{Cos}[c+d x]) \sqrt{2-2 \operatorname{Cos}[c+d x]^2} \sqrt{1-\operatorname{Cos}[c+d x]^2} (A+2 C+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{3/2}\Big)\Bigg)+$$

$$\frac{1}{(A+2 C+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{3/2} (a (1+\operatorname{Sec}[c+d x]))^{3/2}} \sqrt{(1+\operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]} (1+\operatorname{Sec}[c+d x])^{3/2} \left(A+C \operatorname{Sec}[c+d x]^2\right)$$

$$\Bigg(\frac{\operatorname{Sec}[\frac{c}{2}] \operatorname{Sec}[\frac{c}{2}+\frac{d x}{2}]^2 \left(-A \operatorname{Sin}[\frac{c}{2}]-C \operatorname{Sin}[\frac{c}{2}]\right)}{2 d}+\frac{(57 A+20 C) \operatorname{Cos}[d x] \operatorname{Sin}[c]}{5 d}-\frac{6 A \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{5 d}+$$

$$\frac{A \operatorname{Cos}[3 d x] \operatorname{Sin}[3 c]}{5 d}+\frac{\operatorname{Sec}[\frac{c}{2}] \operatorname{Sec}[\frac{c}{2}+\frac{d x}{2}]^3 \left(-A \operatorname{Sin}[\frac{d x}{2}]-C \operatorname{Sin}[\frac{d x}{2}]\right)}{2 d}-\frac{3 \operatorname{Sec}[\frac{c}{2}] \operatorname{Sec}[\frac{c}{2}+\frac{d x}{2}] \left(17 A \operatorname{Sin}[\frac{d x}{2}]+5 C \operatorname{Sin}[\frac{d x}{2}]\right)}{5 d}+$$

$$\frac{(57 A+20 C) \operatorname{Cos}[c] \operatorname{Sin}[d x]}{5 d}-\frac{6 A \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{5 d}+\frac{A \operatorname{Cos}[3 c] \operatorname{Sin}[3 d x]}{5 d}-\frac{3 (17 A+5 C) \operatorname{Tan}[\frac{c}{2}]}{5 d}\Bigg)$$

- **Problem 289: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c+d x]^{5/2} \left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 237 leaves, 8 steps):

$$-\frac{5 C \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{a^{5/2} d}+\frac{(3 A+115 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-$$

$$\frac{(A+C) \operatorname{Sec}[c+d x]^{7/2} \operatorname{Sin}[c+d x]}{4 d (a+a \operatorname{Sec}[c+d x])^{5/2}}+\frac{(A-15 C) \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Sec}[c+d x])^{3/2}}+\frac{(3 A+35 C) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{16 a^2 d \sqrt{a+a \operatorname{Sec}[c+d x]}}$$

Result (type 3, 903 leaves):

$$\frac{1}{16\ (A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ (a\ (1+\text{Sec}[c+d\,x]))^{5/2}}$$

$$\text{Cos}[c+d\,x]^2\ (1+\text{Sec}[c+d\,x])^{5/2}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\ \left(\frac{1}{2\,d\ (1+\text{Cos}[c+d\,x])\ \sqrt{2-2\,\text{Cos}[c+d\,x]^2}\ \sqrt{1-\text{Cos}[c+d\,x]^2}}\right.$$

$$(3\,A+35\,C)\ \text{Cos}[c+d\,x]^2\ \left(\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\ \sqrt{\text{Sec}[c+d\,x]}\ \sqrt{1+\text{Sec}[c+d\,x]}\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \right]-\right.$$

$$\left.\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\ \sqrt{\text{Sec}[c+d\,x]}\ \sqrt{1+\text{Sec}[c+d\,x]}\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \right]\right)$$

$$(1+\text{Sec}[c+d\,x])\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \text{Sin}[c+d\,x]-\frac{1}{d\ (1+\text{Cos}[c+d\,x])\ \left(1-\text{Cos}[c+d\,x]^2\right)}$$

$$20\,C\,\text{Cos}[c+d\,x]^2\ \left(-8\,\text{Log}[1+\text{Sec}[c+d\,x]]+8\,\text{Log}\left[\sqrt{\text{Sec}[c+d\,x]}\ +\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \right]+\right.$$

$$\sqrt{2}\ \left(-\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\ \sqrt{\text{Sec}[c+d\,x]}\ \sqrt{1+\text{Sec}[c+d\,x]}\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \right]+\right.$$

$$\left.\left.\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\ \sqrt{\text{Sec}[c+d\,x]}\ \sqrt{1+\text{Sec}[c+d\,x]}\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \right]\right)\right)$$

$$\left.(1+\text{Sec}[c+d\,x])\ \sqrt{-1+\text{Sec}[c+d\,x]^2}\ \text{Sin}[c+d\,x]\right)+\left(\sqrt{(1+\text{Cos}[c+d\,x])\ \text{Sec}[c+d\,x]}\ (1+\text{Sec}[c+d\,x])^{5/2}\right.$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\ \left(\frac{\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \left(A\,\text{Sin}\left[\frac{c}{2}\right]-15\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{16\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ \left(-A\,\text{Sin}\left[\frac{c}{2}\right]-C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{8\,d}+\right.$$

$$\frac{\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\ \left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-15\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\ \left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+$$

$$\left.\left.\frac{\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\ \left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+35\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+\frac{(3\,A+35\,C)\ \text{Tan}\left[\frac{c}{2}\right]}{8\,d}\right)\right)\Big/$$

$$\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ \text{Sec}[c+d\,x]^{3/2}\ (a\ (1+\text{Sec}[c+d\,x]))^{5/2}\right)$$

- **Problem 290: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 192 leaves, 7 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(5\,A-43\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A+C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}+\frac{(5\,A-11\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 901 leaves):

$$\frac{1}{16\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}\text{Cos}[c+d\,x]^2\,(1+\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{1}{2\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\,\sqrt{1-\text{Cos}[c+d\,x]^2}}\right.$$

$$(5\,A-11\,C)\,\text{Cos}[c+d\,x]^2\,\left(\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]-\right.$$

$$\left.\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]\right)$$

$$(1+\text{Sec}[c+d\,x])\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]+\frac{1}{d\,(1+\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)}$$

$$8\,C\,\text{Cos}[c+d\,x]^2\,\left(-8\,\text{Log}[1+\text{Sec}[c+d\,x]]+8\,\text{Log}\left[\sqrt{\text{Sec}[c+d\,x]}+\text{Sec}[c+d\,x]^{3/2}+\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]+\right.$$

$$\sqrt{2}\,\left(-\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]+\right.$$

$$\left.\left.\text{Log}\left[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\right]\right)\right)$$

$$\left.(1+\text{Sec}[c+d\,x])\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)+\left(\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{5/2}\right.$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\left(A\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{8\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(-9\,A\,\text{Sin}\left[\frac{c}{2}\right]+7\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{16\,d}+\right.$$

$$\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(5\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-11\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+$$

$$\left.\left.\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+7\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d}+\frac{(5\,A-11\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{8\,d}\right)\right)\Big/$$

$$\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)$$

Problem 293: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{\mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 246 leaves, 6 steps):

$$\frac{(163\,A+19\,C)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A+C)\,\mathrm{Sin}[c+d\,x]}{4\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}}-\frac{(17\,A+C)\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}}+\frac{5\,(19\,A+3\,C)\,\mathrm{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}-\frac{(299\,A+27\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 680 leaves):

$$\left((163\,A+19\,C)\,\mathrm{Cos}[c+d\,x]^4\left(\mathrm{Log}\left[1-2\,\mathrm{Sec}[c+d\,x]-3\,\mathrm{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1+\mathrm{Sec}[c+d\,x]}\,\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\right]-\mathrm{Log}\left[1-2\,\mathrm{Sec}[c+d\,x]-3\,\mathrm{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1+\mathrm{Sec}[c+d\,x]}\,\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\right]\right)(1+\mathrm{Sec}[c+d\,x])^{7/2}\,\sqrt{-1+\mathrm{Sec}[c+d\,x]^2}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(32\,d\,(1+\mathrm{Cos}[c+d\,x])\,\sqrt{2-2\,\mathrm{Cos}[c+d\,x]^2}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\right)+\frac{1}{(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{3/2}\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}}\sqrt{(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}\,(1+\mathrm{Sec}[c+d\,x])^{5/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(-A\,\mathrm{Sin}\left[\frac{c}{2}\right]-C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{8\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(33\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]+17\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{16\,d}-\frac{32\,A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{3\,d}+\frac{13\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(13\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-3\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(-A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(33\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+17\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d}-\frac{32\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{3\,d}+\frac{13\,(13\,A-3\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{24\,d}\right)$$

Problem 294: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{\mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 295 leaves, 7 steps):

$$-\frac{(283\,A+75\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{(21\,A+5\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{(157\,A+45\,C)\,\text{Sin}[c+d\,x]}{80\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{(787\,A+195\,C)\,\text{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{(2671\,A+735\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 722 leaves):

$$-\Bigg(\bigg((283\,A+75\,C)\,\text{Cos}[c+d\,x]^4\,\Big(\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2-2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]-$$
$$\text{Log}\Big[1-2\,\text{Sec}[c+d\,x]-3\,\text{Sec}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\Big]\Big)$$
$$(1+\text{Sec}[c+d\,x])^{7/2}\,\sqrt{-1+\text{Sec}[c+d\,x]^2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\bigg)\Big/$$
$$\left(32\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)\Bigg)+$$
$$\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$
$$\sqrt{(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-41\,A\,\text{Sin}\left[\frac{c}{2}\right]-25\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{16\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(A\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{8\,d}+\frac{(331\,A+60\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{15\,d}-$$
$$\frac{28\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{15\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{5\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(-2069\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-165\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{120\,d}+$$
$$\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(-41\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-25\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{8\,d}+$$
$$\frac{(331\,A+60\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{15\,d}-\frac{28\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{15\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{5\,d}-\frac{(2069\,A+165\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{120\,d}\Bigg)$$

Problem 295: Unable to integrate problem.

$$\int (a+a\,\text{Sec}[c+d\,x])^{2/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 434 leaves, 10 steps):

$$\frac{3 C (a+a \mathrm{Sec}[c+d x])^{2/3} \mathrm{Tan}[c+d x]}{5 d}+\frac{3 \sqrt{2} A \mathrm{AppellF1}\left[\frac{7}{6}, \frac{1}{2}, 1, \frac{13}{6}, \frac{1}{2}(1+\mathrm{Sec}[c+d x]), 1+\mathrm{Sec}[c+d x]\right] (a+a \mathrm{Sec}[c+d x])^{2/3} \mathrm{Tan}[c+d x]}{7 d \sqrt{1-\mathrm{Sec}[c+d x]}}+$$

$$\frac{3 C (a+a \mathrm{Sec}[c+d x])^{2/3} \mathrm{Tan}[c+d x]}{5 d (1+\mathrm{Sec}[c+d x])}-\left(3^{3/4} C \mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}}\right], \frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(a+a \mathrm{Sec}[c+d x])^{2/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\mathrm{Sec}[c+d x])^{1/3}+(1+\mathrm{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}\right)^2}} \mathrm{Tan}[c+d x]\right)\Big/$$

$$\left(5\times 2^{1/3} d (1-\mathrm{Sec}[c+d x])(1+\mathrm{Sec}[c+d x])\sqrt{-\frac{(1+\mathrm{Sec}[c+d x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves) :

$$\int (a+a \mathrm{Sec}[c+d x])^{2/3}\left(A+C \mathrm{Sec}[c+d x]^2\right) dx$$

Problem 296: Unable to integrate problem.

$$\int \frac{A+C \mathrm{Sec}[c+d x]^2}{(a+a \mathrm{Sec}[c+d x])^{1/3}} dx$$

Optimal (type 6, 384 leaves, 9 steps) :

$$\frac{3 C \mathrm{Tan}[c+d x]}{2 d (a+a \mathrm{Sec}[c+d x])^{1/3}}+\frac{3 \sqrt{2} A \mathrm{AppellF1}\left[\frac{1}{6}, \frac{1}{2}, 1, \frac{7}{6}, \frac{1}{2}(1+\mathrm{Sec}[c+d x]), 1+\mathrm{Sec}[c+d x]\right] \mathrm{Tan}[c+d x]}{d \sqrt{1-\mathrm{Sec}[c+d x]} (a+a \mathrm{Sec}[c+d x])^{1/3}}+$$

$$\left(3^{3/4} C \mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}}\right], \frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}(1+\mathrm{Sec}[c+d x])^{1/3}+(1+\mathrm{Sec}[c+d x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}\right)^2}} \mathrm{Tan}[c+d x]\right)\Big/$$

$$\left(2\times 2^{1/3} d (1-\mathrm{Sec}[c+d x])(a+a \mathrm{Sec}[c+d x])^{1/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\mathrm{Sec}[c+d x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves) :

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{(a + a\,\text{Sec}[c + d\,x])^{1/3}}\,dx$$

Problem 297: Unable to integrate problem.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{(a + a\,\text{Sec}[c + d\,x])^{4/3}}\,dx$$

Optimal (type 6, 396 leaves, 9 steps):

$$-\frac{3\,(A + C)\,\text{Tan}[c + d\,x]}{5\,d\,(a + a\,\text{Sec}[c + d\,x])^{4/3}} + \frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[\frac{1}{6}, \frac{1}{2}, 1, \frac{7}{6}, \frac{1}{2}\,(1 + \text{Sec}[c + d\,x]), 1 + \text{Sec}[c + d\,x]\right]\,\text{Tan}[c + d\,x]}{a\,d\,\sqrt{1 - \text{Sec}[c + d\,x]}\,(a + a\,\text{Sec}[c + d\,x])^{1/3}} +$$

$$\left(3^{3/4}\,(A - 4\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3} - \left(1 - \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}}{2^{1/3} - \left(1 + \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}}\right], \frac{1}{4}\left(2 + \sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3} - (1 + \text{Sec}[c + d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3} + 2^{1/3}\,(1 + \text{Sec}[c + d\,x])^{1/3} + (1 + \text{Sec}[c + d\,x])^{2/3}}{\left(2^{1/3} - \left(1 + \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}\right)^2}}\,\text{Tan}[c + d\,x]\right) \Bigg/$$

$$\left(5 \times 2^{1/3}\,a\,d\,(1 - \text{Sec}[c + d\,x])\,(a + a\,\text{Sec}[c + d\,x])^{1/3}\sqrt{-\frac{(1 + \text{Sec}[c + d\,x])^{1/3}\left(2^{1/3} - (1 + \text{Sec}[c + d\,x])^{1/3}\right)}{\left(2^{1/3} - \left(1 + \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves):

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{(a + a\,\text{Sec}[c + d\,x])^{4/3}}\,dx$$

Problem 298: Unable to integrate problem.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{(a + a\,\text{Sec}[c + d\,x])^{7/3}}\,dx$$

Optimal (type 6, 457 leaves, 10 steps):

$$-\frac{3\,(A+C)\,\text{Tan}[c+d\,x]}{11\,d\,(a+a\,\text{Sec}[c+d\,x])^{7/3}}-\frac{3\,(4\,A-7\,C)\,\text{Tan}[c+d\,x]}{55\,a^2\,d\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}-$$

$$\frac{3\sqrt{2}\,A\,\text{AppellF1}\left[-\frac{5}{6},\frac{1}{2},1,\frac{1}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\text{Tan}[c+d\,x]}{5\,a^2\,d\,\sqrt{1-\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}+$$

$$\left(3^{3/4}\,(4\,A-7\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(55\times 2^{1/3}\,a^2\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves) :

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^{7/3}}\,dx$$

■ **Problem 299: Unable to integrate problem.**

$$\int(a+a\,\text{Sec}[c+d\,x])^{4/3}\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 6, 815 leaves, 12 steps) :

$$\frac{3\,a\,C\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{7\,d}+\frac{1}{11\,d\,\sqrt{1-\text{Sec}[c+d\,x]}}$$

$$3\,\sqrt{2}\,a\,A\,\text{AppellF1}\left[\frac{11}{6},\,\frac{1}{2},\,1,\,\frac{17}{6},\,\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),\,1+\text{Sec}[c+d\,x]\right]\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]+$$

$$\frac{3\,C\,(a+a\,\text{Sec}[c+d\,x])^{4/3}\,\text{Tan}[c+d\,x]}{7\,d}-\frac{15\,\left(1+\sqrt{3}\right)\,a\,C\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{7\,d\,(1+\text{Sec}[c+d\,x])^{2/3}\,\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(15\times 2^{1/3}\,3^{1/4}\,a\,C\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\,\left(2+\sqrt{3}\right)\right]\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(7\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(5\times 3^{3/4}\,\left(1-\sqrt{3}\right)\,a\,C\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\,\left(2+\sqrt{3}\right)\right]\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(7\times 2^{2/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves):

$$\int (a+a\,\text{Sec}[c+d\,x])^{4/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

- **Problem 300: Unable to integrate problem.**

$$\int (a+a\,\text{Sec}[c+d\,x])^{1/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 774 leaves, 11 steps):

$$\frac{3\,C\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{4\,d}+\frac{3\sqrt{2}\,A\,\mathrm{AppellF1}\left[\frac{5}{6},\frac{1}{2},1,\frac{11}{6},\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),1+\mathrm{Sec}[c+d\,x]\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{5\,d\,\sqrt{1-\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{3\left(1+\sqrt{3}\right)\,C\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{4\,d\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 3^{1/4}\,C\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(2\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)\,C\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(4\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves) :

$$\int (a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Problem 301: Unable to integrate problem.

$$\int \frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 6, 791 leaves, 11 steps) :

$$-\frac{3\,(A+C)\,\mathrm{Tan}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}+\frac{3\sqrt{2}\,A\,\mathrm{AppellF1}\left[\frac{5}{6},\frac{1}{2},1,\frac{11}{6},\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),1+\mathrm{Sec}[c+d\,x]\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{5\,a\,d\,\sqrt{1-\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{3\left(1+\sqrt{3}\right)\,(A+2\,C)\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{a\,d\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 2^{1/3}\,3^{1/4}\,(A+2\,C)\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(a\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)\,(A+2\,C)\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(2^{2/3}\,a\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves) :

$$\int\frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}\,dx$$

- **Problem 302: Unable to integrate problem.**

$$\int\frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^{5/3}}\,dx$$

Optimal (type 6, 841 leaves, 12 steps) :

$$-\frac{3\,(A+C)\,\text{Tan}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/3}}-\frac{3\,(2\,A-5\,C)\,\text{Tan}[c+d\,x]}{7\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{2/3}}-\frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[-\frac{1}{6},\frac{1}{2},1,\frac{5}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\,\text{Tan}[c+d\,x]}{a\,d\,\sqrt{1-\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{2/3}}-$$

$$\frac{3\left(1+\sqrt{3}\right)\,(2\,A-5\,C)\,(1+\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{7\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 2^{1/3}\,3^{1/4}\,(2\,A-5\,C)\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(7\,a\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)\,(2\,A-5\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(1+\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(7\times 2^{2/3}\,a\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 8, 29 leaves) :

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^{5/3}}\,dx$$

- **Problem 303: Unable to integrate problem.**

$$\int\text{Sec}[c+d\,x]^m\,(a+a\,\text{Sec}[c+d\,x])^n\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 244 leaves, 8 steps) :

$$\frac{C\,\mathrm{Sec}[c+d\,x]^{1+m}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]}{d\,(1+m+n)}+\frac{1}{d\,(1+m+n)}$$
$$2^{\frac{3}{2}+n}\,C\,n\,\mathrm{AppellF1}\left[\frac{1}{2},\,1-m,\,-\frac{1}{2}-n,\,\frac{3}{2},\,1-\mathrm{Sec}[c+d\,x],\,\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x])\right]\,(1+\mathrm{Sec}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Tan}[c+d\,x]+$$
$$\frac{1}{d\,(1+m+n)}2^{\frac{1}{2}+n}\,(C\,(m-n)+A\,(1+m+n))\,\mathrm{AppellF1}\left[\frac{1}{2},\,1-m,\,\frac{1}{2}-n,\,\frac{3}{2},\,1-\mathrm{Sec}[c+d\,x],\,\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x])\right]$$
$$(1+\mathrm{Sec}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Tan}[c+d\,x]$$

Result (type 8, 35 leaves) :

$$\int \mathrm{Sec}[c+d\,x]^m\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Problem 304: Unable to integrate problem.

$$\int \mathrm{Sec}[c+d\,x]^{-1-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 253 leaves, 8 steps) :

$$\frac{A\,\mathrm{Sec}[c+d\,x]^{-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]}{d\,(1+n)}-$$
$$\left((C-A\,n+C\,n)\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}-n,\,-n,\,1-n,\,-\frac{2\,\mathrm{Sec}[c+d\,x]}{1-\mathrm{Sec}[c+d\,x]}\right]\,\mathrm{Sec}[c+d\,x]^{1-n}\,\left(\frac{1+\mathrm{Sec}[c+d\,x]}{1-\mathrm{Sec}[c+d\,x]}\right)^{\frac{1}{2}-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Sin}[c+d\,x]\right)\Big/$$
$$(d\,n\,(1+n)\,(1+\mathrm{Sec}[c+d\,x]))+\frac{1}{d}$$
$$2^{\frac{3}{2}+n}\,C\,\mathrm{AppellF1}\left[\frac{1}{2},\,1+n,\,-\frac{1}{2}-n,\,\frac{3}{2},\,1-\mathrm{Sec}[c+d\,x],\,\frac{1}{2}\,(1-\mathrm{Sec}[c+d\,x])\right]\,(1+\mathrm{Sec}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\mathrm{Tan}[c+d\,x]$$

Result (type 8, 39 leaves) :

$$\int \mathrm{Sec}[c+d\,x]^{-1-n}\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Problem 306: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d\,x]^2\,(a+a\,\mathrm{Sec}[c+d\,x])\,\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 106 leaves, 7 steps) :

$$\frac{a\,(4\,B+3\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{a\,(B+C)\,\mathrm{Tan}[c+d\,x]}{d}+$$
$$\frac{a\,(4\,B+3\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{8\,d}+\frac{a\,C\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{4\,d}+\frac{a\,(B+C)\,\mathrm{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 337 leaves) :

$$-\frac{1}{192\,d}a\,\mathrm{Sec}[c+d\,x]^4\left(36\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+27\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$12\,(4\,B+3\,C)\,\mathrm{Cos}[2\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$
$$3\,(4\,B+3\,C)\,\mathrm{Cos}[4\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$
$$36\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-27\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-24\,B\,\mathrm{Sin}[c+d\,x]-66\,C\,\mathrm{Sin}[c+d\,x]-$$
$$\left.64\,B\,\mathrm{Sin}[2\,(c+d\,x)]-64\,C\,\mathrm{Sin}[2\,(c+d\,x)]-24\,B\,\mathrm{Sin}[3\,(c+d\,x)]-18\,C\,\mathrm{Sin}[3\,(c+d\,x)]-16\,B\,\mathrm{Sin}[4\,(c+d\,x)]-16\,C\,\mathrm{Sin}[4\,(c+d\,x)]\right)$$

- **Problem 307: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 86 leaves, 7 steps):

$$\frac{a\,(B+C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{a\,(3\,B+2\,C)\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{a\,(B+C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}+\frac{a\,C\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 181 leaves):

$$-\frac{1}{24\,d}a\,\mathrm{Sec}[c+d\,x]^3\left(9\,(B+C)\,\mathrm{Cos}[c+d\,x]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+\right.$$
$$3\,(B+C)\,\mathrm{Cos}[3\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$
$$\left.4\,(3\,B+4\,C+3\,(B+C)\,\mathrm{Cos}[c+d\,x]+(3\,B+2\,C)\,\mathrm{Cos}[2\,(c+d\,x)])\,\mathrm{Sin}[c+d\,x]\right)$$

- **Problem 308: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\mathrm{Sec}[c+d\,x])\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 56 leaves, 5 steps):

$$\frac{a\,(2\,B+C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{a\,(B+C)\,\mathrm{Tan}[c+d\,x]}{d}+\frac{a\,C\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 154 leaves):

$$\frac{1}{4d}a\left(-2(2B+C)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+4B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+2C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+\frac{C}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}-\frac{C}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+4(B+C)\text{Tan}[c+dx]\right)$$

- **Problem 309: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]\,(a+a\,\text{Sec}[c+dx])\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 32 leaves, 5 steps):

$$aBx+\frac{a(B+C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{d}+\frac{aC\,\text{Tan}[c+dx]}{d}$$

Result (type 3, 159 leaves):

$$aBx-\frac{aB\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d}-\frac{aC\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d}+\frac{aB\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d}+\frac{aC\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d}+\frac{aC\,\text{Tan}[c+dx]}{d}$$

- **Problem 310: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^2\,(a+a\,\text{Sec}[c+dx])\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 32 leaves, 4 steps):

$$a(B+C)x+\frac{aC\,\text{ArcTanh}[\text{Sin}[c+dx]]}{d}+\frac{aB\,\text{Sin}[c+dx]}{d}$$

Result (type 3, 104 leaves):

$$aBx+aCx-\frac{aC\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d}+\frac{aC\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d}+\frac{aB\,\text{Cos}[dx]\,\text{Sin}[c]}{d}+\frac{aB\,\text{Cos}[c]\,\text{Sin}[dx]}{d}$$

- **Problem 314: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+dx]^2\,(a+a\,\text{Sec}[c+dx])^2\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 169 leaves, 8 steps):

$$\frac{a^2 (7 B + 6 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{a^2 (10 B + 9 C) \text{Tan}[c + d x]}{5 d} + \frac{a^2 (7 B + 6 C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{8 d} + \frac{a^2 (5 B + 6 C) \text{Sec}[c + d x]^3 \text{Tan}[c + d x]}{20 d} + \frac{C \text{Sec}[c + d x]^3 \left(a^2 + a^2 \text{Sec}[c + d x]\right) \text{Tan}[c + d x]}{5 d} + \frac{a^2 (10 B + 9 C) \text{Tan}[c + d x]^3}{15 d}$$

Result (type 3, 391 leaves):

$$-\frac{1}{1920 d} a^2 \text{Sec}[c + d x]^5 \left(105 B \text{Cos}[5 (c + d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 90 C \text{Cos}[5 (c + d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 150 (7 B + 6 C) \text{Cos}[c + d x] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]\right) + 75 (7 B + 6 C) \text{Cos}[3 (c + d x)] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right]\right) - 105 B \text{Cos}[5 (c + d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - 90 C \text{Cos}[5 (c + d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - 640 B \text{Sin}[c + d x] - 960 C \text{Sin}[c + d x] - 660 B \text{Sin}[2 (c + d x)] - 840 C \text{Sin}[2 (c + d x)] - 800 B \text{Sin}[3 (c + d x)] - 720 C \text{Sin}[3 (c + d x)] - 210 B \text{Sin}[4 (c + d x)] - 180 C \text{Sin}[4 (c + d x)] - 160 B \text{Sin}[5 (c + d x)] - 144 C \text{Sin}[5 (c + d x)]\right)$$

- **Problem 315: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c + d x] (a + a \text{Sec}[c + d x])^2 \left(B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 3, 138 leaves, 8 steps):

$$\frac{a^2 (8 B + 7 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{a^2 (8 B + 7 C) \text{Tan}[c + d x]}{6 d} + \frac{a^2 (8 B + 7 C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{24 d} + \frac{(4 B - C) (a + a \text{Sec}[c + d x])^2 \text{Tan}[c + d x]}{12 d} + \frac{C (a + a \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{4 a d}$$

Result (type 3, 339 leaves):

$$-\frac{1}{192\,d}a^2\,\mathrm{Sec}[c+d\,x]^4\left(72\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+63\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$12\,(8\,B+7\,C)\,\mathrm{Cos}[2\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$
$$3\,(8\,B+7\,C)\,\mathrm{Cos}[4\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$
$$72\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-63\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-48\,B\,\mathrm{Sin}[c+d\,x]-90\,C\,\mathrm{Sin}[c+d\,x]-$$
$$\left.112\,B\,\mathrm{Sin}[2\,(c+d\,x)]-128\,C\,\mathrm{Sin}[2\,(c+d\,x)]-48\,B\,\mathrm{Sin}[3\,(c+d\,x)]-42\,C\,\mathrm{Sin}[3\,(c+d\,x)]-40\,B\,\mathrm{Sin}[4\,(c+d\,x)]-32\,C\,\mathrm{Sin}[4\,(c+d\,x)]\right)$$

- **Problem 317: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^2\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 82 leaves, 6 steps):

$$a^2\,B\,x+\frac{a^2\,(4\,B+3\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{a^2\,(2\,B+3\,C)\,\mathrm{Tan}[c+d\,x]}{2\,d}+\frac{C\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 277 leaves):

$$\frac{1}{16}a^2\,(1+\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4$$
$$\left(4\,B\,x-\frac{2\,(4\,B+3\,C)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}+\frac{2\,(4\,B+3\,C)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{d}+\right.$$
$$\frac{C}{d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{4\,(B+2\,C)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}-$$
$$\left.\frac{C}{d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{4\,(B+2\,C)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}\right)$$

- **Problem 323: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^3\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 163 leaves, 12 steps):

$$\frac{a^3\,(15\,B+13\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{a^3\,(15\,B+13\,C)\,\mathrm{Tan}[c+d\,x]}{5\,d}+\frac{3\,a^3\,(15\,B+13\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{40\,d}+$$
$$\frac{(5\,B-C)\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Tan}[c+d\,x]}{20\,d}+\frac{C\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\mathrm{Tan}[c+d\,x]}{5\,a\,d}+\frac{a^3\,(15\,B+13\,C)\,\mathrm{Tan}[c+d\,x]^3}{60\,d}$$

Result (type 3, 391 leaves) :

$$-\frac{1}{1920\,d}a^3\,\mathrm{Sec}[c+d\,x]^5\left(225\,B\,\mathrm{Cos}[5\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+195\,C\,\mathrm{Cos}[5\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+150\,(15\,B+13\,C)\,\mathrm{Cos}[c+d\,x]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+75\,(15\,B+13\,C)\,\mathrm{Cos}[3\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-225\,B\,\mathrm{Cos}[5\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-195\,C\,\mathrm{Cos}[5\,(c+d\,x)]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-1200\,B\,\mathrm{Sin}[c+d\,x]-1600\,C\,\mathrm{Sin}[c+d\,x]-1140\,B\,\mathrm{Sin}[2\,(c+d\,x)]-1500\,C\,\mathrm{Sin}[2\,(c+d\,x)]-1560\,B\,\mathrm{Sin}[3\,(c+d\,x)]-1520\,C\,\mathrm{Sin}[3\,(c+d\,x)]-450\,B\,\mathrm{Sin}[4\,(c+d\,x)]-390\,C\,\mathrm{Sin}[4\,(c+d\,x)]-360\,B\,\mathrm{Sin}[5\,(c+d\,x)]-304\,C\,\mathrm{Sin}[5\,(c+d\,x)]\right)$$

- **Problem 324: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 125 leaves, 11 steps) :

$$\frac{5\,a^3\,(4\,B+3\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{a^3\,(4\,B+3\,C)\,\mathrm{Tan}[c+d\,x]}{d}+\frac{3\,a^3\,(4\,B+3\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{8\,d}+\frac{C\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Tan}[c+d\,x]}{4\,d}+\frac{a^3\,(4\,B+3\,C)\,\mathrm{Tan}[c+d\,x]^3}{12\,d}$$

Result (type 3, 339 leaves) :

$$\frac{1}{192\,d}a^3\,\mathrm{Sec}[c+d\,x]^4\left(-180\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-135\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-60\,(4\,B+3\,C)\,\mathrm{Cos}[2\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-15\,(4\,B+3\,C)\,\mathrm{Cos}[4\,(c+d\,x)]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+180\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+135\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+72\,B\,\mathrm{Sin}[c+d\,x]+138\,C\,\mathrm{Sin}[c+d\,x]+208\,B\,\mathrm{Sin}[2\,(c+d\,x)]+240\,C\,\mathrm{Sin}[2\,(c+d\,x)]+72\,B\,\mathrm{Sin}[3\,(c+d\,x)]+90\,C\,\mathrm{Sin}[3\,(c+d\,x)]+88\,B\,\mathrm{Sin}[4\,(c+d\,x)]+72\,C\,\mathrm{Sin}[4\,(c+d\,x)]\right)$$

- **Problem 325: Result more than twice size of optimal antiderivative.**

$$\int\mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 111 leaves, 7 steps):

$$a^3 B x+\frac{a^3 (7 B+5 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{5 a^3 (B+C) \text{Tan}[c+d x]}{2 d}+\frac{a C (a+a \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{3 d}+\frac{(3 B+5 C) \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Tan}[c+d x]}{6 d}$$

Result (type 3, 772 leaves):

$$a^3 \left(\frac{1}{8} B x (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6+\frac{(-7 B-5 C) (1+\text{Cos}[c+d x])^3 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6}{16 d}+\right.$$
$$\frac{(7 B+5 C) (1+\text{Cos}[c+d x])^3 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6}{16 d}+\frac{C (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$
$$\frac{(1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(3 B \text{Cos}\left[\frac{c}{2}\right]+10 C \text{Cos}\left[\frac{c}{2}\right]-3 B \text{Sin}\left[\frac{c}{2}\right]-8 C \text{Sin}\left[\frac{c}{2}\right]\right)}{96 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$
$$\frac{(1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(9 B \text{Sin}\left[\frac{d x}{2}\right]+11 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+\frac{C (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$
$$\frac{(1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-3 B \text{Cos}\left[\frac{c}{2}\right]-10 C \text{Cos}\left[\frac{c}{2}\right]-3 B \text{Sin}\left[\frac{c}{2}\right]-8 C \text{Sin}\left[\frac{c}{2}\right]\right)}{96 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$
$$\left.\frac{(1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(9 B \text{Sin}\left[\frac{d x}{2}\right]+11 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}\right)$$

- **Problem 327: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3 (a+a \text{Sec}[c+d x])^3 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 117 leaves, 6 steps):

$$\frac{1}{2} a^3 (7 B+6 C) x+\frac{a^3 (B+3 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{5 a^3 B \text{Sin}[c+d x]}{2 d}+\frac{a B \text{Cos}[c+d x] (a+a \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{2 d}-\frac{(B-2 C) \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{2 d}$$

Result (type 3, 272 leaves):

$$\frac{1}{32} a^3 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6$$
$$\left(2 (7 B+6 C) x-\frac{4 (B+3 C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{4 (B+3 C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\right.$$
$$\frac{4 (3 B+C) \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{B \text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{4 (3 B+C) \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{B \text{Cos}[2 c] \text{Sin}[2 d x]}{d}+$$
$$\left.\frac{4 C \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{4 C \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}\right)$$

- **Problem 332: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^3 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 131 leaves, 7 steps) :

$$\frac{3 (B-C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a d}-\frac{(3 B-4 C) \text{Tan}[c+d x]}{a d}+$$
$$\frac{3 (B-C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a d}+\frac{(B-C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{d (a+a \text{Sec}[c+d x])}-\frac{(3 B-4 C) \text{Tan}[c+d x]^3}{3 a d}$$

Result (type 3, 550 leaves) :

$$-\frac{1}{24\,a\,d\,(1+\mathrm{Cos}[c+d\,x])}\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Sec}[c+d\,x]^3$$

$$\left(9\,B\,\mathrm{Cos}\left[\frac{5}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-9\,C\,\mathrm{Cos}\left[\frac{5}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$

$$9\,B\,\mathrm{Cos}\left[\frac{7}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-9\,C\,\mathrm{Cos}\left[\frac{7}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$

$$27\,(B-C)\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$

$$27\,(B-C)\,\mathrm{Cos}\left[\frac{3}{2}(c+d\,x)\right]\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$

$$9\,B\,\mathrm{Cos}\left[\frac{5}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$

$$9\,C\,\mathrm{Cos}\left[\frac{5}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-9\,B\,\mathrm{Cos}\left[\frac{7}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$

$$9\,C\,\mathrm{Cos}\left[\frac{7}{2}(c+d\,x)\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-12\,B\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+18\,B\,\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]-$$

$$\left.30\,C\,\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]-6\,B\,\mathrm{Sin}\left[\frac{5}{2}(c+d\,x)\right]+2\,C\,\mathrm{Sin}\left[\frac{5}{2}(c+d\,x)\right]+12\,B\,\mathrm{Sin}\left[\frac{7}{2}(c+d\,x)\right]-16\,C\,\mathrm{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)$$

- **Problem 333: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^2\,\left(B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 108 leaves, 7 steps):

$$-\frac{(2\,B-3\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,a\,d}+\frac{2\,(B-C)\,\mathrm{Tan}[c+d\,x]}{a\,d}-\frac{(2\,B-3\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a\,d}+\frac{(B-C)\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])}$$

Result (type 3, 383 leaves):

$$\frac{1}{4\,a\,d\,(1+\text{Cos}[c+d\,x])}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\text{Sec}[c+d\,x]^2$$
$$\left(2\,B\,\text{Cos}\left[\frac{5}{2}(c+d\,x)\right]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-3\,C\,\text{Cos}\left[\frac{5}{2}(c+d\,x)\right]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$2\,(2\,B-3\,C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+$$
$$(2\,B-3\,C)\,\text{Cos}\left[\frac{3}{2}(c+d\,x)\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-$$
$$2\,B\,\text{Cos}\left[\frac{5}{2}(c+d\,x)\right]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+3\,C\,\text{Cos}\left[\frac{5}{2}(c+d\,x)\right]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$\left.4\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-2\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+2\,C\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+4\,B\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]-4\,C\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)$$

- **Problem 334: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 62 leaves, 6 steps):

$$\frac{(B-C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}+\frac{C\,\text{Tan}[c+d\,x]}{a\,d}-\frac{(B-C)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 234 leaves):

$$-\left(\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right.\right.$$
$$\left((B-C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+(B-C)\,\text{Cos}\left[\frac{3}{2}(c+d\,x)\right]\right.$$
$$\left.\left.\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-2\,(C-(B-2\,C)\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$
$$\left.\left(a\,d\,(1+\text{Cos}[c+d\,x])\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)$$

- **Problem 335: Result more than twice size of optimal antiderivative.**

$$\int\frac{B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 44 leaves, 4 steps):

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}+\frac{(B-C)\,\text{Tan}[c+d\,x]}{a\,d\,(1+\text{Sec}[c+d\,x])}$$

Result (type 3, 106 leaves):

$$\frac{1}{a\,d\,(1+\text{Cos}[c+d\,x])}2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(C\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+(B-C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 336: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 35 leaves, 3 steps):

$$\frac{B\,x}{a}-\frac{(B-C)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 72 leaves):

$$\frac{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(B\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+B\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+2\,(-B+C)\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{a\,d\,(1+\text{Cos}[c+d\,x])}$$

- **Problem 338: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^3\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 98 leaves, 6 steps):

$$\frac{(3\,B-2\,C)\,x}{2\,a}-\frac{2\,(B-C)\,\text{Sin}[c+d\,x]}{a\,d}+\frac{(3\,B-2\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a\,d}-\frac{(B-C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 3, 197 leaves):

$$\frac{1}{8\,a\,d\,(1+\text{Cos}[c+d\,x])}$$
$$\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(4\,(3\,B-2\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+4\,(3\,B-2\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-20\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+20\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-4\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$\left.4\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-3\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+4\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-3\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+4\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]\right)$$

- **Problem 339: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^4\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 122 leaves, 7 steps):

$$-\frac{3\,(B-C)\,x}{2\,a}+\frac{(4\,B-3\,C)\,\text{Sin}[c+d\,x]}{a\,d}-\frac{3\,(B-C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a\,d}-\frac{(B-C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}-\frac{(4\,B-3\,C)\,\text{Sin}[c+d\,x]^3}{3\,a\,d}$$

Result (type 3, 249 leaves):

$$\frac{1}{24\,a\,d\,(1+\text{Cos}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-36\,(B-C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-36\,(B-C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+69\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-60\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+21\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-12\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+18\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+18\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 340: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^3\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 156 leaves, 8 steps):

$$-\frac{(4\,B-7\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^2\,d}+\frac{2\,(5\,B-8\,C)\,\text{Tan}[c+d\,x]}{3\,a^2\,d}-\frac{(4\,B-7\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^2\,d}+\frac{(5\,B-8\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}+\frac{(B-C)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 379 leaves):

$$\frac{1}{6\,a^2\,d}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^4\text{Sec}[c+d\,x]^2\left(3\,(4\,B-7\,C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+8\,(B+5\,C)\,\text{Csc}[c+d\,x]^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4-64\,(B-C)\,\text{Csc}[c+d\,x]^5\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^8-128\,C\,\text{Csc}[c+d\,x]^7\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^{12}+(26\,B-44\,C)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,(4\,B-7\,C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-8\,(5\,B-8\,C)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+3\,(4\,B-7\,C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+\left(14\,B-20\,C+B\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5\right)$$

Problem 341: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+d\,x]^2\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 108 leaves, 7 steps):

$$\frac{(B-2C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a^2 d}-\frac{(B-4C)\,\text{Tan}[c+dx]}{3a^2 d}-\frac{(B-2C)\,\text{Tan}[c+dx]}{a^2 d\,(1+\text{Sec}[c+dx])}+\frac{(B-C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 3, 245 leaves):

$$\frac{1}{3a^2 d}\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]\left(-3(B-2C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)-4(B-C)\,\text{Csc}[c+dx]^3\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4+16(B-C)\,\text{Csc}[c+dx]^5\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]^8+(-4B+13C)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+3(B-2C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+(4B-7C)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3\right)$$

Problem 344: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+dx]\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 3, 70 leaves, 4 steps):

$$\frac{Bx}{a^2}-\frac{(4B-C)\,\text{Tan}[c+dx]}{3a^2 d\,(1+\text{Sec}[c+dx])}-\frac{(B-C)\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 3, 153 leaves):

$$\frac{1}{24a^2 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3\left(9Bdx\,\text{Cos}\left[\frac{dx}{2}\right]+9Bdx\,\text{Cos}\left[c+\frac{dx}{2}\right]+3Bdx\,\text{Cos}\left[c+\frac{3dx}{2}\right]+3Bdx\,\text{Cos}\left[2c+\frac{3dx}{2}\right]-18B\,\text{Sin}\left[\frac{dx}{2}\right]+6C\,\text{Sin}\left[\frac{dx}{2}\right]+12B\,\text{Sin}\left[c+\frac{dx}{2}\right]-6C\,\text{Sin}\left[c+\frac{dx}{2}\right]-10B\,\text{Sin}\left[c+\frac{3dx}{2}\right]+4C\,\text{Sin}\left[c+\frac{3dx}{2}\right]\right)$$

Problem 345: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+dx]^2\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 3, 98 leaves, 6 steps):

$$-\frac{(2B-C)\,x}{a^2}+\frac{2(5B-2C)\,\text{Sin}[c+dx]}{3a^2 d}-\frac{(2B-C)\,\text{Sin}[c+dx]}{a^2 d\,(1+\text{Sec}[c+dx])}-\frac{(B-C)\,\text{Sin}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 3, 245 leaves):

$$\frac{1}{12\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-18\,(2\,B-C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-18\,(2\,B-C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-12\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+6\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-12\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+6\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+66\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-36\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-30\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+24\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+41\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-20\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+9\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]\right)$$

Problem 346: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^3\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 143 leaves, 7 steps):

$$\frac{(7\,B-4\,C)\,x}{2\,a^2}-\frac{2\,(8\,B-5\,C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d}+\frac{(7\,B-4\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,d}-\frac{(8\,B-5\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(B-C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 3, 315 leaves):

$$\frac{1}{48\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(36\,(7\,B-4\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+36\,(7\,B-4\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+84\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-48\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-381\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+264\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+147\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-120\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-239\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+164\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-63\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+36\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 347: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^4\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 170 leaves, 8 steps):

$$-\frac{(10\,B-7\,C)\,x}{2\,a^2}+\frac{4\,(3\,B-2\,C)\,\text{Sin}[c+d\,x]}{a^2\,d}-\frac{(10\,B-7\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,d}-\frac{(10\,B-7\,C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(B-C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{4\,(3\,B-2\,C)\,\text{Sin}[c+d\,x]^3}{3\,a^2\,d}$$

Result (type 3, 369 leaves):

$$\frac{1}{48 a^2 d (1+\text{Cos}[c+d x])^2}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-36 (10 B-7 C) d x \text{Cos}\left[\frac{d x}{2}\right]-36 (10 B-7 C) d x \text{Cos}\left[c+\frac{d x}{2}\right]-120 B d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+84 C d x \text{Cos}\left[c+\frac{3 d x}{2}\right]-120 B d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+84 C d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+516 B \text{Sin}\left[\frac{d x}{2}\right]-381 C \text{Sin}\left[\frac{d x}{2}\right]-156 B \text{Sin}\left[c+\frac{d x}{2}\right]+147 C \text{Sin}\left[c+\frac{d x}{2}\right]+342 B \text{Sin}\left[c+\frac{3 d x}{2}\right]-239 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+118 B \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-63 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+30 B \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-15 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+30 B \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-15 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-3 B \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+3 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-3 B \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+3 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+B \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+B \text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

- **Problem 348: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^4 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 202 leaves, 9 steps):

$$-\frac{(6 B-13 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^3 d}+\frac{8 (9 B-19 C) \text{Tan}[c+d x]}{15 a^3 d}-\frac{(6 B-13 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a^3 d}+\frac{(B-C) \text{Sec}[c+d x]^4 \text{Tan}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}+\frac{(6 B-11 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{15 a d (a+a \text{Sec}[c+d x])^2}+\frac{4 (9 B-19 C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{15 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 3, 428 leaves):

$$\frac{1}{60 a^3 d}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \text{Sec}[c+d x]^2 \left(30 (6 B-13 C) \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+16 (12 B+13 C) \text{Csc}[c+d x]^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]^4+4 (87 B-197 C) \text{Tan}\left[\frac{1}{2}(c+d x)\right]+(-21 B+31 C+(24 B-34 C) \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \text{Tan}\left[\frac{1}{2}(c+d x)\right]-60 (6 B-13 C) \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-64 (9 B-19 C) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-(-6 B+11 C+(12 B-17 C) \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+30 (6 B-13 C) \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+\left(228 B-428 C+3 (B-C) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^5\right)$$

Problem 353: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]\,(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 3, 108 leaves, 5 steps):

$$\frac{B x}{a^3}-\frac{(B-C)\,\text{Tan}[c+d x]}{5 d\,(a+a\,\text{Sec}[c+d x])^3}-\frac{(7 B-2 C)\,\text{Tan}[c+d x]}{15 a d\,(a+a\,\text{Sec}[c+d x])^2}-\frac{2\,(11 B-C)\,\text{Tan}[c+d x]}{15 d\,(a^3+a^3\,\text{Sec}[c+d x])}$$

Result (type 3, 241 leaves):

$$\frac{1}{480 a^3 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5\left(150 B d x\,\text{Cos}\left[\frac{d x}{2}\right]+150 B d x\,\text{Cos}\left[c+\frac{d x}{2}\right]+75 B d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]+75 B d x\,\text{Cos}\left[2 c+\frac{3 d x}{2}\right]+15 B d x\,\text{Cos}\left[2 c+\frac{5 d x}{2}\right]+15 B d x\,\text{Cos}\left[3 c+\frac{5 d x}{2}\right]-370 B\,\text{Sin}\left[\frac{d x}{2}\right]+80 C\,\text{Sin}\left[\frac{d x}{2}\right]+270 B\,\text{Sin}\left[c+\frac{d x}{2}\right]-60 C\,\text{Sin}\left[c+\frac{d x}{2}\right]-230 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+40 C\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+90 B\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-30 C\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-64 B\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]+14 C\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]\right)$$

Problem 354: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^2\,(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 3, 136 leaves, 7 steps):

$$-\frac{(3 B-C)\,x}{a^3}+\frac{2\,(36 B-11 C)\,\text{Sin}[c+d x]}{15 a^3 d}-\frac{(B-C)\,\text{Sin}[c+d x]}{5 d\,(a+a\,\text{Sec}[c+d x])^3}-\frac{(9 B-4 C)\,\text{Sin}[c+d x]}{15 a d\,(a+a\,\text{Sec}[c+d x])^2}-\frac{(3 B-C)\,\text{Sin}[c+d x]}{d\,(a^3+a^3\,\text{Sec}[c+d x])}$$

Result (type 3, 365 leaves):

$$\frac{1}{120 a^3 d\,(1+\text{Cos}[c+d x])^3}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-300\,(3 B-C)\,d x\,\text{Cos}\left[\frac{d x}{2}\right]-300\,(3 B-C)\,d x\,\text{Cos}\left[c+\frac{d x}{2}\right]-450 B d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]+150 C d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]-450 B d x\,\text{Cos}\left[2 c+\frac{3 d x}{2}\right]+150 C d x\,\text{Cos}\left[2 c+\frac{3 d x}{2}\right]-90 B d x\,\text{Cos}\left[2 c+\frac{5 d x}{2}\right]+30 C d x\,\text{Cos}\left[2 c+\frac{5 d x}{2}\right]-90 B d x\,\text{Cos}\left[3 c+\frac{5 d x}{2}\right]+30 C d x\,\text{Cos}\left[3 c+\frac{5 d x}{2}\right]+1755 B\,\text{Sin}\left[\frac{d x}{2}\right]-740 C\,\text{Sin}\left[\frac{d x}{2}\right]-1125 B\,\text{Sin}\left[c+\frac{d x}{2}\right]+540 C\,\text{Sin}\left[c+\frac{d x}{2}\right]+1215 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-460 C\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-225 B\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+180 C\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+363 B\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-128 C\,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]+75 B\,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]+15 B\,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]+15 B\,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]\right)$$

Problem 355: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^3 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 187 leaves, 8 steps):

$$\frac{(13 B-6 C) x}{2 a^3}-\frac{8 (19 B-9 C) \text{Sin}[c+d x]}{15 a^3 d}+\frac{(13 B-6 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a^3 d}-\frac{(B-C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}-\frac{(11 B-6 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{15 a d (a+a \text{Sec}[c+d x])^2}-\frac{4 (19 B-9 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{15 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 3, 435 leaves):

$$\frac{1}{480 a^3 d (1+\text{Cos}[c+d x])^3} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Sec}\left[\frac{c}{2}\right] \left(600 (13 B-6 C) d x \text{Cos}\left[\frac{d x}{2}\right]+600 (13 B-6 C) d x \text{Cos}\left[c+\frac{d x}{2}\right]+3900 B d x \text{Cos}\left[c+\frac{3 d x}{2}\right]-1800 C d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+3900 B d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]-1800 C d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+780 B d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]-360 C d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]+780 B d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]-360 C d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]-12760 B \text{Sin}\left[\frac{d x}{2}\right]+7020 C \text{Sin}\left[\frac{d x}{2}\right]+7560 B \text{Sin}\left[c+\frac{d x}{2}\right]-4500 C \text{Sin}\left[c+\frac{d x}{2}\right]-9230 B \text{Sin}\left[c+\frac{3 d x}{2}\right]+4860 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+930 B \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-900 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-2782 B \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+1452 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-750 B \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+300 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-105 B \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+60 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-105 B \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+60 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+15 B \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+15 B \text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

Problem 361: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x] \sqrt{a+a \text{Sec}[c+d x]} \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 66 leaves, 5 steps):

$$\frac{2 \sqrt{a} B \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{d}+\frac{2 a C \text{Tan}[c+d x]}{d \sqrt{a+a \text{Sec}[c+d x]}}$$

Result (type 4, 363 leaves):

$$-\frac{1}{d}8\left(-3-2\sqrt{2}\right)B\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]$$
$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\ \sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}+\frac{2\,C\sqrt{a\,(1+\text{Sec}[c+d\,x])}\ \text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{d}$$

- **Problem 362: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\text{Cos}[c+d\,x]^2\sqrt{a+a\,\text{Sec}[c+d\,x]}\ \left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 68 leaves, 4 steps):

$$\frac{\sqrt{a}\ (B+2\,C)\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a\,B\,\text{Sin}[c+d\,x]}{d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 396 leaves):

$$\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\left(-\frac{1}{2}B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{1}{2}B\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]\right)}{d}-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)(B+2C)\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\sqrt{a(1+\text{Sec}[c+dx])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 363: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^3\sqrt{a+a\,\text{Sec}[c+dx]}\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 117 leaves, 5 steps):

$$\frac{\sqrt{a}\,(3B+4C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{4d}+\frac{a\,(3B+4C)\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a\,B\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{2d\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 4, 418 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(-\frac{1}{8}(B+4C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}(B+2C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{8}B\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(3B+4C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 364: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4\sqrt{a+a\,\text{Sec}[c+d x]}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 160 leaves, 6 steps):

$$\frac{\sqrt{a}\,(5B+6C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8d}+\frac{a(5B+6C)\,\text{Sin}[c+d x]}{8d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a(5B+6C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{12d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a B\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{3d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 4, 443 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}$$
$$\left(-\frac{1}{48}(11B+6C)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{1}{12}(4B+3C)\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]+\frac{1}{16}(B+2C)\,\text{Sin}\left[\frac{5}{2}(c+dx)\right]+\frac{1}{24}B\,\text{Sin}\left[\frac{7}{2}(c+dx)\right]\right)+$$
$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(5B+6C)\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\sqrt{a(1+\text{Sec}[c+dx])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 369: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]\,(a+a\,\text{Sec}[c+dx])^{3/2}\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 105 leaves, 6 steps):

$$\frac{2a^{3/2}B\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{d}+\frac{2a^2(3B+4C)\,\text{Tan}[c+dx]}{3d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{2aC\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Tan}[c+dx]}{3d}$$

Result (type 4, 408 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(\frac{1}{3}(3B+5C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{3}C\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)B\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 370: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2 (a+a\,\text{Sec}[c+d x])^{3/2}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 103 leaves, 5 steps):

$$\frac{a^{3/2}(3B+2C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{a^2(B-2C)\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{2aC\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d}$$

Result (type 4, 408 leaves):

$$\frac{1}{d}\text{Cos}[c+dx]\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(\frac{1}{4}(-B+4C)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{1}{4}B\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]\right)-$$

$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)(3B+2C)\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 372: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^4(a+a\,\text{Sec}[c+dx])^{3/2}\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 164 leaves, 6 steps):

$$\frac{a^{3/2}(11B+14C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{8d}+\frac{a^2(11B+14C)\,\text{Sin}[c+dx]}{8d\sqrt{a+a\,\text{Sec}[c+dx]}}+$$

$$\frac{a^2(7B+6C)\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{12d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{aB\,\text{Cos}[c+dx]^2\sqrt{a+a\,\text{Sec}[c+dx]}\;\text{Sin}[c+dx]}{3d}$$

Result (type 4, 3073 leaves):

$$a\left(-\frac{1}{d}2\left(-3-2\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\right.$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)(1+\text{Cos}[c+dx])$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2} (c+d x)\right] \text{Sec}[c+d x] \sqrt{a (1+\text{Sec}[c+d x])} \sqrt{3-2 \sqrt{2}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2}+$$

$$\frac{1}{4 \sqrt{1+\text{Sec}[c+d x]}} B (1+\text{Cos}[c+d x]) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{a (1+\text{Sec}[c+d x])}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{1+\text{Sec}[c+d x]} \left(-\frac{1}{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+\frac{1}{2} \text{Sin}\left[\frac{3}{2} (c+d x)\right]\right)}{d}-\frac{1}{d} 4 \left(-3-2 \sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]^4\right.$$

$$\sqrt{\frac{7-5 \sqrt{2}+\left(10-7 \sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]+2 \text{EllipticPi}\left[-3+2 \sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2} \text{Sec}\left[\frac{1}{2} (c+d x)\right]$$

$$\left.\text{Sec}[c+d x] \sqrt{1+\text{Sec}[c+d x]} \sqrt{3-2 \sqrt{2}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2}\right)+\frac{1}{2 \sqrt{1+\text{Sec}[c+d x]}}$$

$$C (1+\text{Cos}[c+d x]) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{a (1+\text{Sec}[c+d x])} \left(\frac{\text{Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{1+\text{Sec}[c+d x]} \left(-\frac{1}{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+\frac{1}{2} \text{Sin}\left[\frac{3}{2} (c+d x)\right]\right)}{d}-\right.$$

$$\frac{1}{d} 4 \left(-3-2 \sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]^4 \sqrt{\frac{7-5 \sqrt{2}+\left(10-7 \sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}}$$

$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]+\right.$$

$$2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\Bigg)\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\Bigg)+$$

$$\frac{1}{2\sqrt{1+\text{Sec}[c+d\,x]}}B\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\Bigg(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\left(-\frac{1}{8}\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{4}\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{8}\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)}{d}+$$

$$\frac{1}{d}3\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\Bigg)+$$

$$\frac{1}{4\sqrt{1+\text{Sec}[c+d\,x]}}C\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\Bigg(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\left(-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)}{2\,d}+\frac{1}{2\,d\sqrt{\text{Sec}[c+d\,x]}}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{1}{2}\sqrt{\text{Sec}[c+d\,x]}\left(\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\left.\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\mathrm{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\right)\right)+$$

$$\frac{1}{4\sqrt{1+\mathrm{Sec}[c+d\,x]}}B\,(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}$$

$$\left(\frac{1}{2}\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\mathrm{Sec}[c+d\,x]}\left(-\frac{1}{2}\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{2}\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)}{d}-\frac{1}{d}4\left(-3-2\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\right.\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left.\mathrm{Sec}[c+d\,x]\sqrt{1+\mathrm{Sec}[c+d\,x]}\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\right)+$$

$$\frac{1}{2}\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\mathrm{Sec}[c+d\,x]}\left(2\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)}{6\,d}+\frac{1}{2\,d\sqrt{\mathrm{Sec}[c+d\,x]}}\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{1+\text{Sec}[c+d x]}\left(\frac{1}{2}\sqrt{\text{Sec}[c+d x]}\left(\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)\Bigg)\Bigg)\Bigg)$$

- **Problem 373: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^5\,(a+a\,\text{Sec}[c+d x])^{3/2}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 209 leaves, 7 steps):

$$\frac{a^{3/2}(75B+88C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^2(75B+88C)\,\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2(75B+88C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{96 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a^2(9B+8C)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{24 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a B\,\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\;\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 4534 leaves):

$$a\left(-\frac{1}{d}2\left(-3-2\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\right.$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)(1+\text{Cos}[c+d x])$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2} (c+d x)\right] \text{Sec}[c+d x] \sqrt{a (1+\text{Sec}[c+d x])} \sqrt{3-2 \sqrt{2}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2} +$$

$$\frac{1}{4 \sqrt{1+\text{Sec}[c+d x]}} B (1+\text{Cos}[c+d x]) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{a (1+\text{Sec}[c+d x])}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{1+\text{Sec}[c+d x]} \left(-\frac{1}{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+\frac{1}{2} \text{Sin}\left[\frac{3}{2} (c+d x)\right]\right)}{d}-\frac{1}{d} 4 \left(-3-2 \sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]^4\right.$$

$$\sqrt{\frac{7-5 \sqrt{2}+\left(10-7 \sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]+2 \text{EllipticPi}\left[-3+2 \sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3-2 \sqrt{2}}}\right], 17-12 \sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \text{Sec}\left[\frac{1}{4} (c+d x)\right]^2} \text{Sec}\left[\frac{1}{2} (c+d x)\right]$$

$$\left.\text{Sec}[c+d x] \sqrt{1+\text{Sec}[c+d x]} \sqrt{3-2 \sqrt{2}-\text{Tan}\left[\frac{1}{4} (c+d x)\right]^2}\right) +$$

$$\frac{1}{8 \sqrt{1+\text{Sec}[c+d x]}} 3 C (1+\text{Cos}[c+d x]) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{a (1+\text{Sec}[c+d x])}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2} (c+d x)\right] \sqrt{1+\text{Sec}[c+d x]} \left(-\frac{1}{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]+\frac{1}{2} \text{Sin}\left[\frac{3}{2} (c+d x)\right]\right)}{d}-\frac{1}{d} 4 \left(-3-2 \sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]^4\right.$$

$$\sqrt{\frac{7-5 \sqrt{2}+\left(10-7 \sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2} (c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2} (c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]$$

$$\left.\text{Sec}[c+d x]\sqrt{1+\text{Sec}[c+d x]}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)+$$

$$\frac{1}{8\sqrt{1+\text{Sec}[c+d x]}}3\,B\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d x])}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{1+\text{Sec}[c+d x]}\left(-\frac{1}{8}\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{8}\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)}{d}+\right.$$

$$\frac{1}{d}3\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{1+\text{Sec}[c+d x]}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)+$$

$$\frac{1}{4\sqrt{1+\text{Sec}[c+d x]}}C\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d x])}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{1+\text{Sec}[c+d x]}\left(-\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)}{2d}+\frac{1}{2d\sqrt{\text{Sec}[c+d x]}}\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{1+\text{Sec}[c+d x]}\left(\frac{1}{2}\sqrt{\text{Sec}[c+d x]}\left(\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)\Bigg)+$$

$$\frac{1}{8\sqrt{1+\text{Sec}[c+d x]}}C\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d x])}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{1+\text{Sec}[c+d x]}\left(2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\text{Sin}\left[\frac{7}{2}(c+d x)\right]\right)}{6 d}+\frac{1}{2 d\sqrt{\text{Sec}[c+d x]}}\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{1+\text{Sec}[c+d x]}\left(\frac{1}{2}\sqrt{\text{Sec}[c+d x]}\left(\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)\Bigg)+$$

$$\frac{1}{4\sqrt{1+\text{Sec}[c+d\,x]}}\,B\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left(\frac{1}{2}\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\,\left(-\frac{1}{2}\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{2}\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)}{d}-\right.\right.$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$

$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$

$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{1+\text{Sec}[c+d\,x]}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\right)+$$

$$\frac{1}{2}\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\,\left(2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)}{6\,d}+\frac{1}{2\,d\sqrt{\text{Sec}[c+d\,x]}}\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{1}{2}\sqrt{\text{Sec}[c+d\,x]}\left(\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\right.$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{8\sqrt{1+\text{Sec}[c+d\,x]}}\,B\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\Bigg(\frac{1}{2}\Bigg(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\,\left(-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)}{2\,d}+\frac{1}{2\,d\sqrt{\text{Sec}[c+d\,x]}}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\,\Bigg(\frac{1}{2}\sqrt{\text{Sec}[c+d\,x]}\,\left(\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+4\left(-3-2\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\Bigg)\Bigg)+$$

$$\frac{1}{2}\Bigg(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\,\left(2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)}{6\,d}+\frac{1}{2\,d\sqrt{\text{Sec}[c+d\,x]}}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1+\text{Sec}[c+d\,x]}\,\Bigg(-\frac{1}{8}\sqrt{\text{Sec}[c+d\,x]}\,\left(3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]-2\,\text{Sin}\left[\frac{9}{2}(c+d\,x)\right]\right)+$$

$$3\left(2+\frac{3}{\sqrt{2}}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\left.\left.\left.\left.\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)\right)\right)\right)$$

- **Problem 378: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]\,(a+a\,\text{Sec}[c+d x])^{5/2}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,dx$$

Optimal (type 3, 142 leaves, 7 steps):

$$\frac{2 a^{5/2} B\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{2 a^3 (35 B+32 C)\,\text{Tan}[c+d x]}{15 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{2 a^2 (5 B+8 C)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{15 d}+\frac{2 a C (a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Tan}[c+d x]}{5 d}$$

Result (type 4, 455 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(\frac{1}{30}(40 B+43 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{10}C\,\text{Sec}[c+d x]^2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{30}\text{Sec}[c+d x]\left(5 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+14 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)-$$
$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)B\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 379: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2\,(a+a\,\text{Sec}[c+d x])^{5/2}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 143 leaves, 6 steps):

$$\frac{a^{5/2}(5 B+2 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}-\frac{a^3(3 B+14 C)\,\text{Sin}[c+d x]}{3 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{2 a^2(B+2 C)\sqrt{a+a\,\text{Sec}[c+d x]}\;\text{Sin}[c+d x]}{d}+\frac{2 a C(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 4, 434 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(\frac{1}{24}(9 B+32 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{6} C\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{8} B\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)+$$
$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(5 B+2 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Cos}[c+d x]$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 380: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3 (a+a\,\text{Sec}[c+d x])^{5/2}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 154 leaves, 6 steps):

$$\frac{a^{5/2}(19 B+20 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{4 d}+\frac{a^3 (9 B-4 C)\,\text{Sin}[c+d x]}{4 d\sqrt{a+a\,\text{Sec}[c+d x]}}-$$
$$\frac{a^2 (B-4 C)\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{2 d}+\frac{a B\,\text{Cos}[c+d x] (a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{2 d}$$

Result (type 4, 437 leaves):

$$\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}$$
$$\left(\frac{3}{32}(-3 B+4 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{16}(5 B+2 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{32}B\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$
$$\frac{1}{8 d}\left(4+3\sqrt{2}\right)(19 B+20 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\text{Cos}[c+d x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 382: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^5 (a+a\,\text{Sec}[c+d x])^{5/2}\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 209 leaves, 7 steps) :

$$\frac{a^{5/2}(163 B+200 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+\frac{a^3(163 B+200 C)\,\text{Sin}[c+d x]}{64 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^3(95 B+104 C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{96 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a^2(11 B+8 C)\,\text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{24 d}+\frac{a B\,\text{Cos}[c+d x]^3(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 479 leaves) :

$$\frac{1}{d}\text{Cos}[c+d x]^2 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \left(-\frac{(265 B+376 C) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{1536}+\right.$$

$$\left.\frac{1}{192}(55 B+64 C) \text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{512}(47 B+40 C) \text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{192}(5 B+2 C) \text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{256} B \text{Sin}\left[\frac{9}{2}(c+d x)\right]\right)+$$

$$\frac{1}{64 d}\left(2+\frac{3}{\sqrt{2}}\right)(163 B+200 C) \text{Cos}\left[\frac{1}{4}(c+d x)\right]^4 \sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}} \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\text{Cos}[c+d x] \left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2} \sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a (1+\text{Sec}[c+d x]))^{5/2} \sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 383: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d x]^6 (a+a \text{Sec}[c+d x])^{5/2} \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 254 leaves, 8 steps):

$$\frac{a^{5/2}(283 B+326 C) \text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{128 d}+\frac{a^3 (283 B+326 C) \text{Sin}[c+d x]}{128 d \sqrt{a+a \text{Sec}[c+d x]}}+$$

$$\frac{a^3 (283 B+326 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{192 d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{a^3 (157 B+170 C) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{240 d \sqrt{a+a \text{Sec}[c+d x]}}+$$

$$\frac{a^2 (13 B+10 C) \text{Cos}[c+d x]^3 \sqrt{a+a \text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{40 d}+\frac{a B \text{Cos}[c+d x]^4 (a+a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 4, 500 leaves):

$$\frac{1}{d}\mathrm{Cos}[c+d x]^2\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}$$

$$\left(-\frac{(2309 B+2650 C)\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{15360}+\frac{(509 B+550 C)\,\mathrm{Sin}\left[\frac{3}{2}(c+d x)\right]}{1920}+\frac{(95 B+94 C)\,\mathrm{Sin}\left[\frac{5}{2}(c+d x)\right]}{1024}+\right.$$

$$\left.\frac{1}{960}(32 B+25 C)\,\mathrm{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{512}(5 B+2 C)\,\mathrm{Sin}\left[\frac{9}{2}(c+d x)\right]+\frac{1}{640} B\,\mathrm{Sin}\left[\frac{11}{2}(c+d x)\right]\right)+$$

$$\frac{1}{256 d}\left(4+3\sqrt{2}\right)(283 B+326 C)\,\mathrm{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\mathrm{Cos}[c+d x]\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 404: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d x]\left(B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)}{(a+a\,\mathrm{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 126 leaves, 5 steps):

$$\frac{(5 B+19 C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d x]}{\sqrt{2}\sqrt{a+a\,\mathrm{Sec}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2} d}-\frac{(B-C)\,\mathrm{Tan}[c+d x]}{4 d (a+a\,\mathrm{Sec}[c+d x])^{5/2}}+\frac{(5 B-13 C)\,\mathrm{Tan}[c+d x]}{16 a d (a+a\,\mathrm{Sec}[c+d x])^{3/2}}$$

Result (type 3, 256 leaves):

$$\frac{(5\,B+19\,C)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sec}[c+d\,x]^{5/2}\,\sqrt{1+\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}+$$

$$\frac{1}{d\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^3\,\left(-\frac{1}{2}\,(-B+9\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$
$$\left.\frac{1}{2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\left(-B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+\frac{1}{4}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(3\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+5\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

- **Problem 405: Result more than twice size of optimal antiderivative.**

$$\int\frac{B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 126 leaves, 5 steps):

$$\frac{(3\,B+5\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}+\frac{(B-C)\,\text{Tan}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}+\frac{(3\,B+5\,C)\,\text{Tan}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 298 leaves):

$$\left((3\,B+5\,C)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{1+\text{Sec}[c+d\,x]}\,(B+C\,\text{Sec}[c+d\,x])\right)\Big/$$
$$\left(4\,d\,(C+B\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\text{Sec}[c+d\,x]^2\,(B+C\,\text{Sec}[c+d\,x])\,\left(\frac{1}{2}\,(7\,B+C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\left(B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+\right.\right.$$
$$\left.\left.\frac{1}{4}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(-11\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)\Big/\left(d\,(C+B\,\text{Cos}[c+d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)$$

- **Problem 408: Result more than twice size of optimal antiderivative.**

$$\int\text{Sec}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 152 leaves, 7 steps):

$$\frac{a\,(4\,A+3\,(B+C))\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a\,(5\,A+5\,B+4\,C)\,\text{Tan}[c+d\,x]}{5\,d}+\frac{a\,(4\,A+3\,(B+C))\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+$$
$$\frac{a\,(B+C)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a\,C\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}+\frac{a\,(5\,A+5\,B+4\,C)\,\text{Tan}[c+d\,x]^3}{15\,d}$$

Result (type 3, 660 leaves) :

$$-\frac{a\,A\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{3\,a\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}-\frac{3\,a\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+$$
$$\frac{a\,A\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{3\,a\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{3\,a\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+$$
$$\frac{a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{a\,C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{a\,A}{4\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{3\,a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{3\,a\,C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-$$
$$\frac{a\,C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-\frac{a\,A}{4\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{3\,a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-$$
$$\frac{3\,a\,C}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,a\,A\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,B\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{8\,a\,C\,\mathrm{Tan}[c+d\,x]}{15\,d}+$$
$$\frac{a\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{a\,B\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{4\,a\,C\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{15\,d}+\frac{a\,C\,\mathrm{Sec}[c+d\,x]^4\,\mathrm{Tan}[c+d\,x]}{5\,d}$$

- **Problem 409: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^2\,(a+a\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 127 leaves, 7 steps) :

$$\frac{a\,(4\,A+4\,B+3\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{a\,(3\,A+2\,(B+C))\,\mathrm{Tan}[c+d\,x]}{3\,d}+$$
$$\frac{a\,(4\,A+4\,B+3\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{8\,d}+\frac{a\,(B+C)\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{a\,C\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 545 leaves) :

$$-\frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}-\frac{a B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}-$$
$$\frac{3 a C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+\frac{a B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+$$
$$\frac{3 a C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{a C}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{a A}{4 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{a B}{4 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{3 a C}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a C}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-$$
$$\frac{a A}{4 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a B}{4 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{3 a C}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{a A \operatorname{Tan}[c+d x]}{d}+\frac{2 a B \operatorname{Tan}[c+d x]}{3 d}+\frac{2 a C \operatorname{Tan}[c+d x]}{3 d}+\frac{a B \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}+\frac{a C \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

- **Problem 410: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]\,(a+a \operatorname{Sec}[c+d x])\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 92 leaves, 6 steps):

$$\frac{a(2 A+B+C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 d}+\frac{a(3 A+3 B+2 C) \operatorname{Tan}[c+d x]}{3 d}+\frac{a(B+C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 d}+\frac{a C \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 3, 995 leaves):

$$a\left(\frac{(-2A-B-C)\,\text{Cos}[c+dx]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+\right.$$
$$\frac{(2A+B+C)\,\text{Cos}[c+dx]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$
$$\frac{C\,\text{Cos}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{dx}{2}\right]}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(3B\,\text{Cos}\left[\frac{c}{2}\right]+4C\,\text{Cos}\left[\frac{c}{2}\right]-3B\,\text{Sin}\left[\frac{c}{2}\right]-2C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{6d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\frac{2\,\text{Cos}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+3B\,\text{Sin}\left[\frac{dx}{2}\right]+2C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}+$$
$$\frac{C\,\text{Cos}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{dx}{2}\right]}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\frac{\text{Cos}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-3B\,\text{Cos}\left[\frac{c}{2}\right]-4C\,\text{Cos}\left[\frac{c}{2}\right]-3B\,\text{Sin}\left[\frac{c}{2}\right]-2C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{6d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\left.\frac{2\,\text{Cos}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+3B\,\text{Sin}\left[\frac{dx}{2}\right]+2C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}\right)$$

- **Problem 411: Result more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+dx])\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 63 leaves, 5 steps):

$$a\,A\,x+\frac{a\,(2A+2B+C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{a\,(B+C)\,\text{Tan}[c+dx]}{d}+\frac{a\,C\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2d}$$

Result (type 3, 305 leaves):

$$\left(a \operatorname{Cos}[c+d x]^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right.$$
$$\left(4 A x-\frac{2 (2 A+2 B+C) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{2 (2 A+2 B+C) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\right.$$
$$\frac{C}{d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{4 (B+C) \operatorname{Sin}\left[\frac{d x}{2}\right]}{d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$
$$\left.\left.\frac{C}{d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{4 (B+C) \operatorname{Sin}\left[\frac{d x}{2}\right]}{d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)\right) \Big/$$
$$(2 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 (c+d x)]))$$

- **Problem 412: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x] (a+a \operatorname{Sec}[c+d x]) \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 46 leaves, 5 steps):

$$a (A+B) x+\frac{a (B+C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}+\frac{a A \operatorname{Sin}[c+d x]}{d}+\frac{a C \operatorname{Tan}[c+d x]}{d}$$

Result (type 3, 187 leaves):

$$a A x+a B x-\frac{a B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}-\frac{a C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+$$
$$\frac{a C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a A \operatorname{Cos}[d x] \operatorname{Sin}[c]}{d}+\frac{a A \operatorname{Cos}[c] \operatorname{Sin}[d x]}{d}+\frac{a C \operatorname{Tan}[c+d x]}{d}$$

- **Problem 417: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]^3 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 222 leaves, 8 steps):

$$\frac{a^2 (14 A+12 B+11 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{16 d}+\frac{a^2 (10 A+9 B+8 C) \operatorname{Tan}[c+d x]}{5 d}+\frac{a^2 (14 A+12 B+11 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{16 d}+$$
$$\frac{a^2 (10 A+12 B+9 C) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{40 d}+\frac{C \operatorname{Sec}[c+d x]^3 (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]}{6 d}+$$
$$\frac{(3 B+C) \operatorname{Sec}[c+d x]^3 \left(a^2+a^2 \operatorname{Sec}[c+d x]\right) \operatorname{Tan}[c+d x]}{15 d}+\frac{a^2 (10 A+9 B+8 C) \operatorname{Tan}[c+d x]^3}{15 d}$$

Result (type 3, 959 leaves):

$\left((-14 A-12 B-11 C) \operatorname{Cos}[c+d x]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$
$(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$
$\left((14 A+12 B+11 C) \operatorname{Cos}[c+d x]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$
$(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$
$\frac{C \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sec}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[d x]}{12 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$
$\left(\operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sec}[c+d x] (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (5 C \operatorname{Sin}[c]+6 B \operatorname{Sin}[d x]+12 C \operatorname{Sin}[d x])\right) /$
$(60 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+\left(\operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right.$
$\left.(24 B \operatorname{Sin}[c]+48 C \operatorname{Sin}[c]+30 A \operatorname{Sin}[d x]+60 B \operatorname{Sin}[d x]+55 C \operatorname{Sin}[d x])\right) / (240 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$
$\left(\operatorname{Cos}[c+d x] \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right.$
$\left.(30 A \operatorname{Sin}[c]+60 B \operatorname{Sin}[c]+55 C \operatorname{Sin}[c]+80 A \operatorname{Sin}[d x]+72 B \operatorname{Sin}[d x]+64 C \operatorname{Sin}[d x])\right) /$
$(240 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+\left(\operatorname{Cos}[c+d x]^2 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2\right.$
$\left.\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (160 A \operatorname{Sin}[c]+144 B \operatorname{Sin}[c]+128 C \operatorname{Sin}[c]+210 A \operatorname{Sin}[d x]+180 B \operatorname{Sin}[d x]+165 C \operatorname{Sin}[d x])\right) /$
$(480 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+\left(\operatorname{Cos}[c+d x]^3 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2\right.$
$\left.\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (210 A \operatorname{Sin}[c]+180 B \operatorname{Sin}[c]+165 C \operatorname{Sin}[c]+320 A \operatorname{Sin}[d x]+288 B \operatorname{Sin}[d x]+256 C \operatorname{Sin}[d x])\right) /$
$(480 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))$

- **Problem 418: Result more than twice size of optimal antiderivative.**

$\int \operatorname{Sec}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$

Optimal (type 3, 190 leaves, 8 steps):

$\frac{a^2 (8 A+7 B+6 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{8 d}+\frac{a^2 (8 A+7 B+6 C) \operatorname{Tan}[c+d x]}{6 d}+\frac{a^2 (8 A+7 B+6 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{24 d}+$
$\frac{(20 A-5 B+6 C) (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]}{60 d}+\frac{C \operatorname{Sec}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^2 \operatorname{Tan}[c+d x]}{5 d}+\frac{(5 B+2 C) (a+a \operatorname{Sec}[c+d x])^3 \operatorname{Tan}[c+d x]}{20 a d}$

Result (type 3, 417 leaves):

$$-\frac{1}{3840\, d\, (A+2\, C+2\, B\, \text{Cos}[c+d\, x]+A\, \text{Cos}[2\, (c+d\, x)])} a^2\, (1+\text{Cos}[c+d\, x])^2\, \left(C+B\, \text{Cos}[c+d\, x]+A\, \text{Cos}[c+d\, x]^2\right)\, \text{Sec}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \text{Sec}[c+d\, x]^5$$
$$\left(240\, (8\, A+7\, B+6\, C)\, \text{Cos}[c+d\, x]^5\, \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]-\text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]+\text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]\right)-\right.$$
$$\text{Sec}[c]\, (80\, (16\, A+14\, B+15\, C)\, \text{Sin}[d\, x]-240\, (3\, A+2\, B+C)\, \text{Sin}[2\, c+d\, x]+240\, A\, \text{Sin}[c+2\, d\, x]+330\, B\, \text{Sin}[c+2\, d\, x]+420\, C\, \text{Sin}[c+2\, d\, x]+$$
$$240\, A\, \text{Sin}[3\, c+2\, d\, x]+330\, B\, \text{Sin}[3\, c+2\, d\, x]+420\, C\, \text{Sin}[3\, c+2\, d\, x]+880\, A\, \text{Sin}[2\, c+3\, d\, x]+800\, B\, \text{Sin}[2\, c+3\, d\, x]+$$
$$720\, C\, \text{Sin}[2\, c+3\, d\, x]-120\, A\, \text{Sin}[4\, c+3\, d\, x]+120\, A\, \text{Sin}[3\, c+4\, d\, x]+105\, B\, \text{Sin}[3\, c+4\, d\, x]+90\, C\, \text{Sin}[3\, c+4\, d\, x]+120\, A\, \text{Sin}[5\, c+4\, d\, x]+$$
$$\left.105\, B\, \text{Sin}[5\, c+4\, d\, x]+90\, C\, \text{Sin}[5\, c+4\, d\, x]+200\, A\, \text{Sin}[4\, c+5\, d\, x]+160\, B\, \text{Sin}[4\, c+5\, d\, x]+144\, C\, \text{Sin}[4\, c+5\, d\, x])\right)$$

- **Problem 419: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\, x]\, (a+a\, \text{Sec}[c+d\, x])^2\, \left(A+B\, \text{Sec}[c+d\, x]+C\, \text{Sec}[c+d\, x]^2\right)\, dx$$

Optimal (type 3, 147 leaves, 7 steps):

$$\frac{a^2\, (12\, A+8\, B+7\, C)\, \text{ArcTanh}[\text{Sin}[c+d\, x]]}{8\, d}+\frac{a^2\, (12\, A+8\, B+7\, C)\, \text{Tan}[c+d\, x]}{6\, d}+$$
$$\frac{a^2\, (12\, A+8\, B+7\, C)\, \text{Sec}[c+d\, x]\, \text{Tan}[c+d\, x]}{24\, d}+\frac{(4\, B-C)\, (a+a\, \text{Sec}[c+d\, x])^2\, \text{Tan}[c+d\, x]}{12\, d}+\frac{C\, (a+a\, \text{Sec}[c+d\, x])^3\, \text{Tan}[c+d\, x]}{4\, a\, d}$$

Result (type 3, 386 leaves):

$$-\frac{1}{384\, d\, (A+2\, C+2\, B\, \text{Cos}[c+d\, x]+A\, \text{Cos}[2\, (c+d\, x)])} a^2\, (1+\text{Cos}[c+d\, x])^2\, \left(C+B\, \text{Cos}[c+d\, x]+A\, \text{Cos}[c+d\, x]^2\right)\, \text{Sec}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \text{Sec}[c+d\, x]^4$$
$$\left(24\, (12\, A+8\, B+7\, C)\, \text{Cos}[c+d\, x]^4\, \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]-\text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]+\text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]\right)-\right.$$
$$\text{Sec}[c]\, (-24\, (6\, A+5\, B+4\, C)\, \text{Sin}[c]+3\, (4\, A+8\, B+15\, C)\, \text{Sin}[d\, x]+12\, A\, \text{Sin}[2\, c+d\, x]+24\, B\, \text{Sin}[2\, c+d\, x]+$$
$$45\, C\, \text{Sin}[2\, c+d\, x]+144\, A\, \text{Sin}[c+2\, d\, x]+136\, B\, \text{Sin}[c+2\, d\, x]+128\, C\, \text{Sin}[c+2\, d\, x]-48\, A\, \text{Sin}[3\, c+2\, d\, x]-$$
$$24\, B\, \text{Sin}[3\, c+2\, d\, x]+12\, A\, \text{Sin}[2\, c+3\, d\, x]+24\, B\, \text{Sin}[2\, c+3\, d\, x]+21\, C\, \text{Sin}[2\, c+3\, d\, x]+12\, A\, \text{Sin}[4\, c+3\, d\, x]+$$
$$\left.24\, B\, \text{Sin}[4\, c+3\, d\, x]+21\, C\, \text{Sin}[4\, c+3\, d\, x]+48\, A\, \text{Sin}[3\, c+4\, d\, x]+40\, B\, \text{Sin}[3\, c+4\, d\, x]+32\, C\, \text{Sin}[3\, c+4\, d\, x])\right)$$

- **Problem 420: Result more than twice size of optimal antiderivative.**

$$\int (a+a\, \text{Sec}[c+d\, x])^2\, \left(A+B\, \text{Sec}[c+d\, x]+C\, \text{Sec}[c+d\, x]^2\right)\, dx$$

Optimal (type 3, 120 leaves, 6 steps):

$$a^2\, A\, x+\frac{a^2\, (4\, A+3\, B+2\, C)\, \text{ArcTanh}[\text{Sin}[c+d\, x]]}{2\, d}+\frac{a^2\, (2\, A+3\, B+2\, C)\, \text{Tan}[c+d\, x]}{2\, d}+$$
$$\frac{C\, (a+a\, \text{Sec}[c+d\, x])^2\, \text{Tan}[c+d\, x]}{3\, d}+\frac{(3\, B+2\, C)\, \left(a^2+a^2\, \text{Sec}[c+d\, x]\right)\, \text{Tan}[c+d\, x]}{6\, d}$$

Result (type 3, 1307 leaves):

$$\frac{A\,x\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\left((-4\,A-3\,B-2\,C)\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left((4\,A+3\,B+2\,C)\,\text{Cos}[c+d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\frac{C\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\left(\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,B\,\text{Cos}\left[\frac{c}{2}\right]+7\,C\,\text{Cos}\left[\frac{c}{2}\right]-3\,B\,\text{Sin}\left[\frac{c}{2}\right]-5\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(24\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$
$$\left(6\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)+$$

$$\frac{C\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+$$

$$\left(\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-3\,B\,\text{Cos}\left[\frac{c}{2}\right]-7\,C\,\text{Cos}\left[\frac{c}{2}\right]-3\,B\,\text{Sin}\left[\frac{c}{2}\right]-5\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(24\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$
$$\left(6\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)$$

- **Problem 421: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 121 leaves, 6 steps) :

$$a^2 (2A+B)x+\frac{a^2 (2A+4B+3C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{A\,(a+a\,\text{Sec}[c+dx])^2\,\text{Sin}[c+dx]}{d}-\frac{a^2 (2A-2B-3C)\,\text{Tan}[c+dx]}{2d}-\frac{(2A-C)\left(a^2+a^2\,\text{Sec}[c+dx]\right)\text{Tan}[c+dx]}{2d}$$

Result (type 3, 1091 leaves):

$$\frac{(2A+B)\,x\,\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{2\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$
$$\left((-2A-4B-3C)\,\text{Cos}[c+dx]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$
$$\left((2A+4B+3C)\,\text{Cos}[c+dx]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$
$$\frac{A\,\text{Cos}[dx]\,\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]}{2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$
$$\frac{A\,\text{Cos}[c]\,\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[dx]}{2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$
$$\frac{C\,\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{8d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\left(\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(B\,\text{Sin}\left[\frac{dx}{2}\right]+2C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/$$
$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)-$$
$$\frac{C\,\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{8d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\left(\text{Cos}[c+dx]^4\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(B\,\text{Sin}\left[\frac{dx}{2}\right]+2C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/$$
$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)$$

- **Problem 422: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^2\,(a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 128 leaves, 5 steps):

$$\frac{1}{2} a^2 (3 A + 4 B + 2 C) x + \frac{a^2 (B + 2 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{a^2 (3 A + 2 B - 2 C) \text{Sin}[c + d x]}{2 d} + \frac{A \text{Cos}[c + d x] (a + a \text{Sec}[c + d x])^2 \text{Sin}[c + d x]}{2 d} - \frac{(A - 2 C) \left(a^2 + a^2 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{2 d}$$

Result (type 3, 1016 leaves):

$$a^2 \left(\frac{(3 A + 4 B + 2 C) x \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)}{4 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])} + \right.$$
$$\left((-B - 2 C) \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/$$
$$(2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left((B + 2 C) \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/$$
$$(2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left((2 A + B) \text{Cos}[d x] \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}[c]\right) \Big/$$
$$(2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(A \text{Cos}[2 d x] \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}[2 c]\right) \Big/$$
$$(8 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left((2 A + B) \text{Cos}[c] \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}[d x]\right) \Big/$$
$$(2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(A \text{Cos}[2 c] \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}[2 d x]\right) \Big/$$
$$(8 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\frac{C \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}\left[\frac{d x}{2}\right]}{2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{c}{2}\right] - \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} +$$
$$\left. \frac{C \text{Cos}[c + d x]^2 (1 + \text{Cos}[c + d x])^2 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}\left[\frac{d x}{2}\right]}{2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{c}{2}\right] + \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} \right)$$

- **Problem 427: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c + d x]^3 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 3, 274 leaves, 9 steps):

$$\frac{a^3 (26 A + 23 B + 21 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{16 d} + \frac{a^3 (133 A + 119 B + 108 C) \text{Tan}[c + d x]}{35 d} +$$

$$\frac{a^3 (26 A + 23 B + 21 C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{16 d} + \frac{a^3 (154 A + 147 B + 129 C) \text{Sec}[c + d x]^3 \text{Tan}[c + d x]}{280 d} +$$

$$\frac{C \text{Sec}[c + d x]^3 (a + a \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{7 d} + \frac{(7 B + 3 C) \text{Sec}[c + d x]^3 \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Tan}[c + d x]}{42 a d} +$$

$$\frac{(3 A + 4 B + 3 C) \text{Sec}[c + d x]^3 \left(a^3 + a^3 \text{Sec}[c + d x]\right) \text{Tan}[c + d x]}{15 d} + \frac{a^3 (133 A + 119 B + 108 C) \text{Tan}[c + d x]^3}{105 d}$$

Result (type 3, 1087 leaves) :

$$\left((-26 A-23 B-21 C) \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ (64 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left((26 A+23 B+21 C) \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ (64 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\frac{C \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[d x]}{28 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\left(\operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}[c+d x] (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (6 C \operatorname{Sin}[c]+7 B \operatorname{Sin}[d x]+21 C \operatorname{Sin}[d x])\right) \Big/ (168 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+\left(\operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (35 B \operatorname{Sin}[c]+105 C \operatorname{Sin}[c]+42 A \operatorname{Sin}[d x]+126 B \operatorname{Sin}[d x]+162 C \operatorname{Sin}[d x])\right) \Big/ (840 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left(\operatorname{Cos}[c+d x] \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (168 A \operatorname{Sin}[c]+504 B \operatorname{Sin}[c]+648 C \operatorname{Sin}[c]+630 A \operatorname{Sin}[d x]+805 B \operatorname{Sin}[d x]+735 C \operatorname{Sin}[d x])\right) \Big/ (3360 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left(\operatorname{Cos}[c+d x]^2 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (630 A \operatorname{Sin}[c]+805 B \operatorname{Sin}[c]+735 C \operatorname{Sin}[c]+1064 A \operatorname{Sin}[d x]+952 B \operatorname{Sin}[d x]+864 C \operatorname{Sin}[d x])\right) \Big/ (3360 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left(\operatorname{Cos}[c+d x]^3 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (2128 A \operatorname{Sin}[c]+1904 B \operatorname{Sin}[c]+1728 C \operatorname{Sin}[c]+2730 A \operatorname{Sin}[d x]+2415 B \operatorname{Sin}[d x]+2205 C \operatorname{Sin}[d x])\right) \Big/ (6720 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left(\operatorname{Cos}[c+d x]^4 \operatorname{Sec}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) (2730 A \operatorname{Sin}[c]+2415 B \operatorname{Sin}[c]+2205 C \operatorname{Sin}[c]+4256 A \operatorname{Sin}[d x]+3808 B \operatorname{Sin}[d x]+3456 C \operatorname{Sin}[d x])\right) \Big/ (6720 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))$$

- **Problem 428: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]^2 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 216 leaves, 12 steps) :

$$\frac{a^3 (30 A + 26 B + 23 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{16 d} + \frac{a^3 (30 A + 26 B + 23 C) \text{Tan}[c + d x]}{10 d} + \frac{3 a^3 (30 A + 26 B + 23 C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{80 d} + \frac{(30 A - 6 B + 7 C) (a + a \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{120 d} + \frac{C \text{Sec}[c + d x]^2 (a + a \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{6 d} + \frac{(2 B + C) (a + a \text{Sec}[c + d x])^4 \text{Tan}[c + d x]}{10 a d} + \frac{a^3 (30 A + 26 B + 23 C) \text{Tan}[c + d x]^3}{120 d}$$

Result (type 3, 959 leaves) :

$$\left((-30 A - 26 B - 23 C) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ (64 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left((30 A + 26 B + 23 C) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ (64 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\frac{C \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Sec}[c + d x] (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}[d x]}{24 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])} +$$
$$\left(\text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (5 C \text{Sin}[c] + 6 B \text{Sin}[d x] + 18 C \text{Sin}[d x])\right) \Big/ (120 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(\text{Cos}[c + d x] \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (24 B \text{Sin}[c] + 72 C \text{Sin}[c] + 30 A \text{Sin}[d x] + 90 B \text{Sin}[d x] + 115 C \text{Sin}[d x])\right) \Big/ (480 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(\text{Cos}[c + d x]^2 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (30 A \text{Sin}[c] + 90 B \text{Sin}[c] + 115 C \text{Sin}[c] + 120 A \text{Sin}[d x] + 152 B \text{Sin}[d x] + 136 C \text{Sin}[d x])\right) \Big/ (480 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(\text{Cos}[c + d x]^3 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (240 A \text{Sin}[c] + 304 B \text{Sin}[c] + 272 C \text{Sin}[c] + 450 A \text{Sin}[d x] + 390 B \text{Sin}[d x] + 345 C \text{Sin}[d x])\right) \Big/ (960 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(\text{Cos}[c + d x]^4 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (450 A \text{Sin}[c] + 390 B \text{Sin}[c] + 345 C \text{Sin}[c] + 720 A \text{Sin}[d x] + 608 B \text{Sin}[d x] + 544 C \text{Sin}[d x])\right) \Big/ (960 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]))$$

Problem 429: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d x]\,(a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 175 leaves, 11 steps):

$$\frac{a^3 (20 A+15 B+13 C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d x]]}{8 d}+\frac{a^3 (20 A+15 B+13 C)\,\mathrm{Tan}[c+d x]}{5 d}+\frac{3 a^3 (20 A+15 B+13 C)\,\mathrm{Sec}[c+d x]\,\mathrm{Tan}[c+d x]}{40 d}+\frac{(5 B-C)\,(a+a\,\mathrm{Sec}[c+d x])^3\,\mathrm{Tan}[c+d x]}{20 d}+\frac{C\,(a+a\,\mathrm{Sec}[c+d x])^4\,\mathrm{Tan}[c+d x]}{5 a d}+\frac{a^3 (20 A+15 B+13 C)\,\mathrm{Tan}[c+d x]^3}{60 d}$$

Result (type 3, 629 leaves):

$$\left((-20 A-15 B-13 C)\,\mathrm{Cos}[c+d x]^5\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right)\Big/ \\ (32 d\,(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]))+ \\ \left((20 A+15 B+13 C)\,\mathrm{Cos}[c+d x]^5\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right)\Big/ \\ (32 d\,(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]))+ \\ \frac{1}{7680 d\,(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])}\mathrm{Sec}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) \\ (2720 A\,\mathrm{Sin}[d x]+2400 B\,\mathrm{Sin}[d x]+2320 C\,\mathrm{Sin}[d x]-1680 A\,\mathrm{Sin}[2 c+d x]-1200 B\,\mathrm{Sin}[2 c+d x]-720 C\,\mathrm{Sin}[2 c+d x]+ \\ 360 A\,\mathrm{Sin}[c+2 d x]+570 B\,\mathrm{Sin}[c+2 d x]+750 C\,\mathrm{Sin}[c+2 d x]+360 A\,\mathrm{Sin}[3 c+2 d x]+570 B\,\mathrm{Sin}[3 c+2 d x]+ \\ 750 C\,\mathrm{Sin}[3 c+2 d x]+1840 A\,\mathrm{Sin}[2 c+3 d x]+1680 B\,\mathrm{Sin}[2 c+3 d x]+1520 C\,\mathrm{Sin}[2 c+3 d x]-360 A\,\mathrm{Sin}[4 c+3 d x]- \\ 120 B\,\mathrm{Sin}[4 c+3 d x]+180 A\,\mathrm{Sin}[3 c+4 d x]+225 B\,\mathrm{Sin}[3 c+4 d x]+195 C\,\mathrm{Sin}[3 c+4 d x]+180 A\,\mathrm{Sin}[5 c+4 d x]+ \\ 225 B\,\mathrm{Sin}[5 c+4 d x]+195 C\,\mathrm{Sin}[5 c+4 d x]+440 A\,\mathrm{Sin}[4 c+5 d x]+360 B\,\mathrm{Sin}[4 c+5 d x]+304 C\,\mathrm{Sin}[4 c+5 d x])$$

Problem 430: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 162 leaves, 7 steps):

$$a^3 A x+\frac{a^3 (28 A+20 B+15 C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d x]]}{8 d}+\frac{5 a^3 (4 A+4 B+3 C)\,\mathrm{Tan}[c+d x]}{8 d}+\frac{C\,(a+a\,\mathrm{Sec}[c+d x])^3\,\mathrm{Tan}[c+d x]}{4 d}+\frac{(4 B+3 C)\left(a^2+a^2\,\mathrm{Sec}[c+d x]\right)^2\mathrm{Tan}[c+d x]}{12 a d}+\frac{(12 A+20 B+15 C)\left(a^3+a^3\,\mathrm{Sec}[c+d x]\right)\mathrm{Tan}[c+d x]}{24 d}$$

Result (type 3, 464 leaves):

$$\frac{1}{768\, d\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, (c + d\, x)])} a^3\, (1 + \text{Cos}[c + d\, x])^3\, \left(C + B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[c + d\, x]^2\right)\, \text{Sec}\left[\frac{1}{2}\, (c + d\, x)\right]^6\, \text{Sec}[c + d\, x]^4$$
$$\left(-24\, (28\, A + 20\, B + 15\, C)\, \text{Cos}[c + d\, x]^4\, \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (c + d\, x)\right] - \text{Sin}\left[\frac{1}{2}\, (c + d\, x)\right]\right] - \text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (c + d\, x)\right] + \text{Sin}\left[\frac{1}{2}\, (c + d\, x)\right]\right]\right) +\right.$$
$$\text{Sec}[c]\, (72\, A\, d\, x\, \text{Cos}[c] + 48\, A\, d\, x\, \text{Cos}[c + 2\, d\, x] + 48\, A\, d\, x\, \text{Cos}[3\, c + 2\, d\, x] + 12\, A\, d\, x\, \text{Cos}[3\, c + 4\, d\, x] + 12\, A\, d\, x\, \text{Cos}[5\, c + 4\, d\, x] -$$
$$216\, A\, \text{Sin}[c] - 264\, B\, \text{Sin}[c] - 216\, C\, \text{Sin}[c] + 12\, A\, \text{Sin}[d\, x] + 36\, B\, \text{Sin}[d\, x] + 69\, C\, \text{Sin}[d\, x] + 12\, A\, \text{Sin}[2\, c + d\, x] +$$
$$36\, B\, \text{Sin}[2\, c + d\, x] + 69\, C\, \text{Sin}[2\, c + d\, x] + 216\, A\, \text{Sin}[c + 2\, d\, x] + 280\, B\, \text{Sin}[c + 2\, d\, x] + 264\, C\, \text{Sin}[c + 2\, d\, x] - 72\, A\, \text{Sin}[3\, c + 2\, d\, x] -$$
$$72\, B\, \text{Sin}[3\, c + 2\, d\, x] - 24\, C\, \text{Sin}[3\, c + 2\, d\, x] + 12\, A\, \text{Sin}[2\, c + 3\, d\, x] + 36\, B\, \text{Sin}[2\, c + 3\, d\, x] + 45\, C\, \text{Sin}[2\, c + 3\, d\, x] + 12\, A\, \text{Sin}[4\, c + 3\, d\, x] +$$
$$\left.36\, B\, \text{Sin}[4\, c + 3\, d\, x] + 45\, C\, \text{Sin}[4\, c + 3\, d\, x] + 72\, A\, \text{Sin}[3\, c + 4\, d\, x] + 88\, B\, \text{Sin}[3\, c + 4\, d\, x] + 72\, C\, \text{Sin}[3\, c + 4\, d\, x])\right)$$

- **Problem 431: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d\, x]\, (a + a\, \text{Sec}[c + d\, x])^3\, \left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)\, dx$$

Optimal (type 3, 156 leaves, 7 steps):

$$a^3\, (3\, A + B)\, x + \frac{a^3\, (6\, A + 7\, B + 5\, C)\, \text{ArcTanh}[\text{Sin}[c + d\, x]]}{2\, d} + \frac{A\, (a + a\, \text{Sec}[c + d\, x])^3\, \text{Sin}[c + d\, x]}{d} +$$
$$\frac{5\, a^3\, (B + C)\, \text{Tan}[c + d\, x]}{2\, d} - \frac{(3\, A - C)\, \left(a^2 + a^2\, \text{Sec}[c + d\, x]\right)^2\, \text{Tan}[c + d\, x]}{3\, a\, d} - \frac{(6\, A - 3\, B - 5\, C)\, \left(a^3 + a^3\, \text{Sec}[c + d\, x]\right)\, \text{Tan}[c + d\, x]}{6\, d}$$

Result (type 3, 1503 leaves):

$$\frac{(3A+B)\,x\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{4\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$

$$\left((-6A-7B-5C)\,\text{Cos}[c+dx]^5\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(8d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$

$$\left((6A+7B+5C)\,\text{Cos}[c+dx]^5\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(8d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$

$$\frac{A\,\text{Cos}[dx]\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\text{Sin}[c]}{4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$

$$\frac{A\,\text{Cos}[c]\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\text{Sin}[dx]}{4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$

$$\frac{C\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\text{Sin}\left[\frac{dx}{2}\right]}{24d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$

$$\left(\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\left(3B\,\text{Cos}\left[\frac{c}{2}\right]+10C\,\text{Cos}\left[\frac{c}{2}\right]-3B\,\text{Sin}\left[\frac{c}{2}\right]-8C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(48d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$

$$\left(\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+9B\,\text{Sin}\left[\frac{dx}{2}\right]+11C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/$$
$$\left(12d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)+$$

$$\frac{C\,\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\text{Sin}\left[\frac{dx}{2}\right]}{24d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$

$$\left(\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\left(-3B\,\text{Cos}\left[\frac{c}{2}\right]-10C\,\text{Cos}\left[\frac{c}{2}\right]-3B\,\text{Sin}\left[\frac{c}{2}\right]-8C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(48d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$

$$\left(\text{Cos}[c+dx]^5\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,(a+a\,\text{Sec}[c+dx])^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+9B\,\text{Sin}\left[\frac{dx}{2}\right]+11C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/$$
$$\left(12d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)$$

Problem 432: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^2 (a+a \text{Sec}[c+d x])^3 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 171 leaves, 6 steps):

$$\frac{1}{2} a^3 (7 A+6 B+2 C) x+\frac{a^3 (2 A+6 B+7 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{5 a^3 (A-C) \text{Sin}[c+d x]}{2 d}+\frac{A \text{Cos}[c+d x] (a+a \text{Sec}[c+d x])^3 \text{Sin}[c+d x]}{2 d}-\frac{(A-C) \left(a^2+a^2 \text{Sec}[c+d x]\right)^2 \text{Sin}[c+d x]}{2 a d}-\frac{(A-2 B-4 C) \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{2 d}$$

Result (type 3, 1302 leaves):

$$\frac{(7 A+6 B+2 C)\, x \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{8\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\left((-2 A-6 B-7 C) \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$(8 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left((2 A+6 B+7 C) \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$(8 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\left((3 A+B) \operatorname{Cos}[d x] \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[c]\right) \Big/$$
$$(4 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\frac{A \operatorname{Cos}[2 d x] \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 c]}{16 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\left((3 A+B) \operatorname{Cos}[c] \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[d x]\right) \Big/$$
$$(4 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$

$$\frac{A \operatorname{Cos}[2 c] \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 d x]}{16 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\frac{C \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{16 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\left(\operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(B \operatorname{Sin}\left[\frac{d x}{2}\right]+3 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)\right) \Big/$$
$$\left(4 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)-$$

$$\frac{C \operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{16 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\left(\operatorname{Cos}[c+d x]^5 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(B \operatorname{Sin}\left[\frac{d x}{2}\right]+3 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)\right) \Big/$$
$$\left(4 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

- **Problem 433: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]^3 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 169 leaves, 6 steps):

$$\frac{1}{2} a^3 (5 A+7 B+6 C) x+\frac{a^3 (B+3 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{5 a^3 (A+B) \text{Sin}[c+d x]}{2 d}+\frac{A \text{Cos}[c+d x]^2 (a+a \text{Sec}[c+d x])^3 \text{Sin}[c+d x]}{3 d}+\frac{(A+B) \text{Cos}[c+d x] \left(a^2+a^2 \text{Sec}[c+d x]\right)^2 \text{Sin}[c+d x]}{2 a d}-\frac{(5 A+3 B-6 C) \left(a^3+a^3 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{6 d}$$

Result (type 3, 379 leaves):

$$\frac{1}{48 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)])} a^3 \text{Cos}[c+d x]^2 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(6 (5 A+7 B+6 C) x-\frac{12 (B+3 C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{12 (B+3 C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{3 (15 A+4 (3 B+C)) \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{3 (3 A+B) \text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{A \text{Cos}[3 d x] \text{Sin}[3 c]}{d}+\frac{3 (15 A+4 (3 B+C)) \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{3 (3 A+B) \text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{A \text{Cos}[3 c] \text{Sin}[3 d x]}{d}+\frac{12 C \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{12 C \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}\right)$$

- **Problem 438: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^2 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 252 leaves, 15 steps):

$$\frac{a^4 (56 A+49 B+44 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{16 d}+\frac{4 a^4 (56 A+49 B+44 C) \text{Tan}[c+d x]}{35 d}+\frac{27 a^4 (56 A+49 B+44 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{560 d}+\frac{a^4 (56 A+49 B+44 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{280 d}+\frac{(42 A-7 B+8 C) (a+a \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{210 d}+\frac{C \text{Sec}[c+d x]^2 (a+a \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{7 d}+\frac{(7 B+4 C) (a+a \text{Sec}[c+d x])^5 \text{Tan}[c+d x]}{42 a d}+\frac{2 a^4 (56 A+49 B+44 C) \text{Tan}[c+d x]^3}{105 d}$$

Result (type 3, 1087 leaves):

$$\left((-56\,A-49\,B-44\,C)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(128\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\left((56\,A+49\,B+44\,C)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(128\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\frac{C\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[d\,x]}{56\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}+$$
$$\left(\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,(6\,C\,\text{Sin}[c]+7\,B\,\text{Sin}[d\,x]+28\,C\,\text{Sin}[d\,x])\right)\Big/$$
$$(336\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\left(\text{Cos}[c+d\,x]\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.(35\,B\,\text{Sin}[c]+140\,C\,\text{Sin}[c]+42\,A\,\text{Sin}[d\,x]+168\,B\,\text{Sin}[d\,x]+288\,C\,\text{Sin}[d\,x])\right)\Big/\,(1680\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$
$$\left(\text{Cos}[c+d\,x]^2\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.(168\,A\,\text{Sin}[c]+672\,B\,\text{Sin}[c]+1152\,C\,\text{Sin}[c]+840\,A\,\text{Sin}[d\,x]+1435\,B\,\text{Sin}[d\,x]+1540\,C\,\text{Sin}[d\,x])\right)\Big/$$
$$(6720\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+\left(\text{Cos}[c+d\,x]^3\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,(840\,A\,\text{Sin}[c]+1435\,B\,\text{Sin}[c]+1540\,C\,\text{Sin}[c]+1904\,A\,\text{Sin}[d\,x]+2016\,B\,\text{Sin}[d\,x]+1816\,C\,\text{Sin}[d\,x])\right)\Big/$$
$$(6720\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+\left(\text{Cos}[c+d\,x]^4\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,(3808\,A\,\text{Sin}[c]+4032\,B\,\text{Sin}[c]+3632\,C\,\text{Sin}[c]+5880\,A\,\text{Sin}[d\,x]+5145\,B\,\text{Sin}[d\,x]+4620\,C\,\text{Sin}[d\,x])\right)\Big/$$
$$(13\,440\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+\left(\text{Cos}[c+d\,x]^5\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,(5880\,A\,\text{Sin}[c]+5145\,B\,\text{Sin}[c]+4620\,C\,\text{Sin}[c]+9296\,A\,\text{Sin}[d\,x]+8064\,B\,\text{Sin}[d\,x]+7264\,C\,\text{Sin}[d\,x])\right)\Big/$$
$$(13\,440\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 439: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 209 leaves, 14 steps):

$$\frac{7 a^4 (10 A + 8 B + 7 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{16 d} + \frac{4 a^4 (10 A + 8 B + 7 C) \text{Tan}[c + d x]}{5 d} + \frac{27 a^4 (10 A + 8 B + 7 C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{80 d} + \frac{a^4 (10 A + 8 B + 7 C) \text{Sec}[c + d x]^3 \text{Tan}[c + d x]}{40 d} + \frac{(6 B - C) (a + a \text{Sec}[c + d x])^4 \text{Tan}[c + d x]}{30 d} + \frac{C (a + a \text{Sec}[c + d x])^5 \text{Tan}[c + d x]}{6 a d} + \frac{2 a^4 (10 A + 8 B + 7 C) \text{Tan}[c + d x]^3}{15 d}$$

Result (type 3, 961 leaves):

$$-\left(7 (10 A + 8 B + 7 C) \text{Cos}[c + d x]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ (128 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(7 (10 A + 8 B + 7 C) \text{Cos}[c + d x]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/$$
$$(128 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) + \frac{C \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}[d x]}{48 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])} +$$
$$\left(\text{Cos}[c + d x] \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (5 C \text{Sin}[c] + 6 B \text{Sin}[d x] + 24 C \text{Sin}[d x])\right) \Big/$$
$$(240 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(\text{Cos}[c + d x]^2 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right.$$
$$\left.(24 B \text{Sin}[c] + 96 C \text{Sin}[c] + 30 A \text{Sin}[d x] + 120 B \text{Sin}[d x] + 205 C \text{Sin}[d x])\right) \Big/ (960 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) +$$
$$\left(\text{Cos}[c + d x]^3 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right.$$
$$\left.(30 A \text{Sin}[c] + 120 B \text{Sin}[c] + 205 C \text{Sin}[c] + 160 A \text{Sin}[d x] + 272 B \text{Sin}[d x] + 288 C \text{Sin}[d x])\right) \Big/$$
$$(960 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) + \left(\text{Cos}[c + d x]^4 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4\right.$$
$$\left.\left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (320 A \text{Sin}[c] + 544 B \text{Sin}[c] + 576 C \text{Sin}[c] + 810 A \text{Sin}[d x] + 840 B \text{Sin}[d x] + 735 C \text{Sin}[d x])\right) \Big/$$
$$(1920 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])) + \left(\text{Cos}[c + d x]^5 \text{Sec}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 (a + a \text{Sec}[c + d x])^4\right.$$
$$\left.\left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) (810 A \text{Sin}[c] + 840 B \text{Sin}[c] + 735 C \text{Sin}[c] + 1600 A \text{Sin}[d x] + 1328 B \text{Sin}[d x] + 1152 C \text{Sin}[d x])\right) \Big/$$
$$(1920 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]))$$

Problem 440: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 195 leaves, 8 steps):

$$a^4\,A\,x+\frac{a^4\,(48\,A+35\,B+28\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{a^4\,(40\,A+35\,B+28\,C)\,\mathrm{Tan}[c+d\,x]}{8\,d}+\frac{a\,(5\,B+4\,C)\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Tan}[c+d\,x]}{20\,d}+\frac{C\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\mathrm{Tan}[c+d\,x]}{5\,d}+\frac{(20\,A+35\,B+28\,C)\,\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)^2\,\mathrm{Tan}[c+d\,x]}{60\,d}+\frac{(32\,A+35\,B+28\,C)\,\left(a^4+a^4\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Tan}[c+d\,x]}{24\,d}$$

Result (type 3, 725 leaves):

$$\left((-48\,A-35\,B-28\,C)\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(64\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))+$$
$$\left((48\,A+35\,B+28\,C)\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(64\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))+$$
$$\frac{1}{15\,360\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$(600\,A\,d\,x\,\mathrm{Cos}[d\,x]+600\,A\,d\,x\,\mathrm{Cos}[2\,c+d\,x]+300\,A\,d\,x\,\mathrm{Cos}[2\,c+3\,d\,x]+300\,A\,d\,x\,\mathrm{Cos}[4\,c+3\,d\,x]+60\,A\,d\,x\,\mathrm{Cos}[4\,c+5\,d\,x]+$$
$$60\,A\,d\,x\,\mathrm{Cos}[6\,c+5\,d\,x]+4880\,A\,\mathrm{Sin}[d\,x]+5120\,B\,\mathrm{Sin}[d\,x]+4720\,C\,\mathrm{Sin}[d\,x]-3120\,A\,\mathrm{Sin}[2\,c+d\,x]-2880\,B\,\mathrm{Sin}[2\,c+d\,x]-$$
$$1920\,C\,\mathrm{Sin}[2\,c+d\,x]+480\,A\,\mathrm{Sin}[c+2\,d\,x]+930\,B\,\mathrm{Sin}[c+2\,d\,x]+1320\,C\,\mathrm{Sin}[c+2\,d\,x]+480\,A\,\mathrm{Sin}[3\,c+2\,d\,x]+930\,B\,\mathrm{Sin}[3\,c+2\,d\,x]+$$
$$1320\,C\,\mathrm{Sin}[3\,c+2\,d\,x]+3280\,A\,\mathrm{Sin}[2\,c+3\,d\,x]+3520\,B\,\mathrm{Sin}[2\,c+3\,d\,x]+3200\,C\,\mathrm{Sin}[2\,c+3\,d\,x]-720\,A\,\mathrm{Sin}[4\,c+3\,d\,x]-$$
$$480\,B\,\mathrm{Sin}[4\,c+3\,d\,x]-120\,C\,\mathrm{Sin}[4\,c+3\,d\,x]+240\,A\,\mathrm{Sin}[3\,c+4\,d\,x]+405\,B\,\mathrm{Sin}[3\,c+4\,d\,x]+420\,C\,\mathrm{Sin}[3\,c+4\,d\,x]+$$
$$240\,A\,\mathrm{Sin}[5\,c+4\,d\,x]+405\,B\,\mathrm{Sin}[5\,c+4\,d\,x]+420\,C\,\mathrm{Sin}[5\,c+4\,d\,x]+800\,A\,\mathrm{Sin}[4\,c+5\,d\,x]+800\,B\,\mathrm{Sin}[4\,c+5\,d\,x]+664\,C\,\mathrm{Sin}[4\,c+5\,d\,x])$$

Problem 441: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 196 leaves, 8 steps):

$$a^4\,(4\,A+B)\,x+\frac{a^4\,(52\,A+48\,B+35\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}+\frac{A\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\mathrm{Sin}[c+d\,x]}{d}+\frac{5\,a^4\,(4\,A+8\,B+7\,C)\,\mathrm{Tan}[c+d\,x]}{8\,d}-\frac{a\,(4\,A-C)\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\mathrm{Tan}[c+d\,x]}{4\,d}-\frac{(12\,A-4\,B-7\,C)\,\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)^2\,\mathrm{Tan}[c+d\,x]}{12\,d}-\frac{(12\,A-32\,B-35\,C)\,\left(a^4+a^4\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Tan}[c+d\,x]}{24\,d}$$

Result (type 3, 738 leaves):

$$\left(\left(-52\,A-48\,B-35\,C\right)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(64\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,+$$
$$\left(\left(52\,A+48\,B+35\,C\right)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(64\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,+$$
$$\frac{1}{1536\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^2\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$(288\,A\,d\,x\,\text{Cos}[c]+72\,B\,d\,x\,\text{Cos}[c]+192\,A\,d\,x\,\text{Cos}[c+2\,d\,x]+48\,B\,d\,x\,\text{Cos}[c+2\,d\,x]+192\,A\,d\,x\,\text{Cos}[3\,c+2\,d\,x]+48\,B\,d\,x\,\text{Cos}[3\,c+2\,d\,x]+$$
$$48\,A\,d\,x\,\text{Cos}[3\,c+4\,d\,x]+12\,B\,d\,x\,\text{Cos}[3\,c+4\,d\,x]+48\,A\,d\,x\,\text{Cos}[5\,c+4\,d\,x]+12\,B\,d\,x\,\text{Cos}[5\,c+4\,d\,x]-288\,A\,\text{Sin}[c]-$$
$$480\,B\,\text{Sin}[c]-480\,C\,\text{Sin}[c]+24\,A\,\text{Sin}[d\,x]+48\,B\,\text{Sin}[d\,x]+105\,C\,\text{Sin}[d\,x]+24\,A\,\text{Sin}[2\,c+d\,x]+48\,B\,\text{Sin}[2\,c+d\,x]+$$
$$105\,C\,\text{Sin}[2\,c+d\,x]+288\,A\,\text{Sin}[c+2\,d\,x]+496\,B\,\text{Sin}[c+2\,d\,x]+544\,C\,\text{Sin}[c+2\,d\,x]-96\,A\,\text{Sin}[3\,c+2\,d\,x]-144\,B\,\text{Sin}[3\,c+2\,d\,x]-$$
$$96\,C\,\text{Sin}[3\,c+2\,d\,x]+30\,A\,\text{Sin}[2\,c+3\,d\,x]+48\,B\,\text{Sin}[2\,c+3\,d\,x]+81\,C\,\text{Sin}[2\,c+3\,d\,x]+30\,A\,\text{Sin}[4\,c+3\,d\,x]+48\,B\,\text{Sin}[4\,c+3\,d\,x]+$$
$$81\,C\,\text{Sin}[4\,c+3\,d\,x]+96\,A\,\text{Sin}[3\,c+4\,d\,x]+160\,B\,\text{Sin}[3\,c+4\,d\,x]+160\,C\,\text{Sin}[3\,c+4\,d\,x]+6\,A\,\text{Sin}[4\,c+5\,d\,x]+6\,A\,\text{Sin}[6\,c+5\,d\,x])$$

- **Problem 442: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 209 leaves, 7 steps):

$$\frac{1}{2}\,a^4\,(13\,A+8\,B+2\,C)\,x+\frac{a^4\,(8\,A+13\,B+12\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{5\,a^4\,(A-B-2\,C)\,\text{Sin}[c+d\,x]}{2\,d}-$$
$$\frac{a\,(3\,A-2\,C)\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{6\,d}+\frac{A\,\text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{2\,d}-$$
$$\frac{(A-B-2\,C)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{2\,d}+\frac{(3\,A+18\,B+22\,C)\,\left(a^4+a^4\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{6\,d}$$

Result (type 3, 739 leaves):

$$\left((-8A-13B-12C)\,\text{Cos}[c+dx]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(16\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$
$$\left((8A+13B+12C)\,\text{Cos}[c+dx]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(16\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$
$$\frac{1}{1536\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}\text{Cos}[c+dx]^3\,\text{Sec}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$(468\,A\,d\,x\,\text{Cos}[dx]+288\,B\,d\,x\,\text{Cos}[dx]+72\,C\,d\,x\,\text{Cos}[dx]+468\,A\,d\,x\,\text{Cos}[2c+dx]+288\,B\,d\,x\,\text{Cos}[2c+dx]+72\,C\,d\,x\,\text{Cos}[2c+dx]+$$
$$156\,A\,d\,x\,\text{Cos}[2c+3dx]+96\,B\,d\,x\,\text{Cos}[2c+3dx]+24\,C\,d\,x\,\text{Cos}[2c+3dx]+156\,A\,d\,x\,\text{Cos}[4c+3dx]+96\,B\,d\,x\,\text{Cos}[4c+3dx]+$$
$$24\,C\,d\,x\,\text{Cos}[4c+3dx]+102\,A\,\text{Sin}[dx]+384\,B\,\text{Sin}[dx]+672\,C\,\text{Sin}[dx]-42\,A\,\text{Sin}[2c+dx]-192\,B\,\text{Sin}[2c+dx]-$$
$$288\,C\,\text{Sin}[2c+dx]+96\,A\,\text{Sin}[c+2dx]+48\,B\,\text{Sin}[c+2dx]+96\,C\,\text{Sin}[c+2dx]+96\,A\,\text{Sin}[3c+2dx]+48\,B\,\text{Sin}[3c+2dx]+$$
$$96\,C\,\text{Sin}[3c+2dx]+57\,A\,\text{Sin}[2c+3dx]+192\,B\,\text{Sin}[2c+3dx]+320\,C\,\text{Sin}[2c+3dx]+9\,A\,\text{Sin}[4c+3dx]+$$
$$48\,A\,\text{Sin}[3c+4dx]+12\,B\,\text{Sin}[3c+4dx]+48\,A\,\text{Sin}[5c+4dx]+12\,B\,\text{Sin}[5c+4dx]+3\,A\,\text{Sin}[4c+5dx]+3\,A\,\text{Sin}[6c+5dx])$$

- **Problem 443: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^3\,(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 217 leaves, 7 steps):

$$\frac{1}{2}a^4\,(12A+13B+8C)\,x+\frac{a^4\,(2A+8B+13C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{5\,a^4\,(2A+B-C)\,\text{Sin}[c+dx]}{2d}+$$
$$\frac{a\,(4A+3B)\,\text{Cos}[c+dx]\,(a+a\,\text{Sec}[c+dx])^3\,\text{Sin}[c+dx]}{6d}+\frac{A\,\text{Cos}[c+dx]^2\,(a+a\,\text{Sec}[c+dx])^4\,\text{Sin}[c+dx]}{3d}-$$
$$\frac{(2A+B-C)\left(a^2+a^2\,\text{Sec}[c+dx]\right)^2\text{Sin}[c+dx]}{2d}-\frac{(8A-3B-18C)\left(a^4+a^4\,\text{Sec}[c+dx]\right)\text{Sin}[c+dx]}{6d}$$

Result (type 3, 1518 leaves):

$$\frac{(12A+13B+8C)\,x\,\text{Cos}[c+dx]^6\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{16\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}+$$
$$\left((-2A-8B-13C)\,\text{Cos}[c+dx]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(16\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$
$$\left((2A+8B+13C)\,\text{Cos}[c+dx]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(16\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$
$$\left((27A+16B+4C)\,\text{Cos}[dx]\,\text{Cos}[c+dx]^6\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^8(a+a\,\text{Sec}[c+dx])^4\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$(32\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+$$

$$\left((4 A+B) \operatorname{Cos}[2 d x] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 c]\right) \Big/$$
$$(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$
$$\frac{A \operatorname{Cos}[3 d x] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[3 c]}{96 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$$
$$\left((27 A+16 B+4 C) \operatorname{Cos}[c] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[d x]\right) \Big/$$
$$(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$
$$\left((4 A+B) \operatorname{Cos}[2 c] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[2 d x]\right) \Big/$$
$$(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+$$
$$\frac{A \operatorname{Cos}[3 c] \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[3 d x]}{96 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])}+$$
$$\frac{C \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$
$$\left(\operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(B \operatorname{Sin}\left[\frac{d x}{2}\right]+4 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)\right) \Big/$$
$$\left(8 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)-$$
$$\frac{C \operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$
$$\left(\operatorname{Cos}[c+d x]^6 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(B \operatorname{Sin}\left[\frac{d x}{2}\right]+4 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)\right) \Big/$$
$$\left(8 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

- **Problem 444: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]^4 (a+a \operatorname{Sec}[c+d x])^4 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 217 leaves, 7 steps) :

$$\frac{1}{8} a^4 (35 A + 48 B + 52 C) x + \frac{a^4 (B + 4 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{5 a^4 (7 A + 8 B + 4 C) \text{Sin}[c + d x]}{8 d} + \frac{a (A + B) \text{Cos}[c + d x]^2 (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{3 d} + \frac{A \text{Cos}[c + d x]^3 (a + a \text{Sec}[c + d x])^4 \text{Sin}[c + d x]}{4 d} + \frac{(7 A + 8 B + 4 C) \text{Cos}[c + d x] \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{8 d} - \frac{(35 A + 32 B - 12 C) \left(a^4 + a^4 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{24 d}$$

Result (type 3, 1436 leaves) :

$$a^4 \left(\frac{(35 A + 48 B + 52 C)\, x \,\text{Cos}[c + d x]^2 \,(1 + \text{Cos}[c + d x])^4 \,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)}{64\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])} + \right.$$

$$\left((-B - 4 C)\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\right) \Big/$$

$$(8 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((B + 4 C)\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\right) \Big/$$

$$(8 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((28 A + 27 B + 16 C)\,\text{Cos}[d x]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[c]\right) \Big/$$

$$(32 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((7 A + 4 B + C)\,\text{Cos}[2 d x]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[2 c]\right) \Big/$$

$$(32 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((4 A + B)\,\text{Cos}[3 d x]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[3 c]\right) \Big/$$

$$(96 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left(A\,\text{Cos}[4 d x]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[4 c]\right) \Big/$$

$$(256 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((28 A + 27 B + 16 C)\,\text{Cos}[c]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[d x]\right) \Big/$$

$$(32 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((7 A + 4 B + C)\,\text{Cos}[2 c]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[2 d x]\right) \Big/$$

$$(32 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left((4 A + B)\,\text{Cos}[3 c]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[3 d x]\right) \Big/$$

$$(96 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\left(A\,\text{Cos}[4 c]\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}[4 d x]\right) \Big/$$

$$(256 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])) +$$

$$\frac{C\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}\left[\frac{d x}{2}\right]}{8 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])\left(\text{Cos}\left[\frac{c}{2}\right] - \text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} +$$

$$\left.\frac{C\,\text{Cos}[c + d x]^2\,(1 + \text{Cos}[c + d x])^4\,\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sin}\left[\frac{d x}{2}\right]}{8 d\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])\left(\text{Cos}\left[\frac{c}{2}\right] + \text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)}\right)$$

- **Problem 449: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d\,x]^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 183 leaves, 7 steps):

$$\frac{3\,(4\,A-4\,B+5\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,a\,d}-\frac{(3\,A-4\,B+4\,C)\,\text{Tan}[c+d\,x]}{a\,d}+\frac{3\,(4\,A-4\,B+5\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,a\,d}+\frac{(4\,A-4\,B+5\,C)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,a\,d}-\frac{(A-B+C)\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}-\frac{(3\,A-4\,B+4\,C)\,\text{Tan}[c+d\,x]^3}{3\,a\,d}$$

Result (type 3, 1099 leaves):

$$-\left(3\ (4 A-4 B+5 C)\ \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \mathrm{Cos}[c+d x]\ \mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\ \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right)\Big/$$
$$(2 d\ (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\ (a+a\,\mathrm{Sec}[c+d x]))+$$
$$\left(3\ (4 A-4 B+5 C)\ \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \mathrm{Cos}[c+d x]\ \mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\ \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right)\Big/$$
$$(2 d\ (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\ (a+a\,\mathrm{Sec}[c+d x]))+$$
$$\frac{1}{192 d\ (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\ (a+a\,\mathrm{Sec}[c+d x])}\ \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\ \mathrm{Sec}\left[\frac{c}{2}\right]\ \mathrm{Sec}[c]\ \mathrm{Sec}[c+d x]^3$$
$$\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\ \left(-60 A\,\mathrm{Sin}\left[\frac{d x}{2}\right]+108 B\,\mathrm{Sin}\left[\frac{d x}{2}\right]-75 C\,\mathrm{Sin}\left[\frac{d x}{2}\right]-60 A\,\mathrm{Sin}\left[\frac{3 d x}{2}\right]+124 B\,\mathrm{Sin}\left[\frac{3 d x}{2}\right]-\right.$$
$$91 C\,\mathrm{Sin}\left[\frac{3 d x}{2}\right]+204 A\,\mathrm{Sin}\left[c-\frac{d x}{2}\right]-252 B\,\mathrm{Sin}\left[c-\frac{d x}{2}\right]+219 C\,\mathrm{Sin}\left[c-\frac{d x}{2}\right]-60 A\,\mathrm{Sin}\left[c+\frac{d x}{2}\right]+12 B\,\mathrm{Sin}\left[c+\frac{d x}{2}\right]+$$
$$21 C\,\mathrm{Sin}\left[c+\frac{d x}{2}\right]+84 A\,\mathrm{Sin}\left[2 c+\frac{d x}{2}\right]-132 B\,\mathrm{Sin}\left[2 c+\frac{d x}{2}\right]+165 C\,\mathrm{Sin}\left[2 c+\frac{d x}{2}\right]+36 A\,\mathrm{Sin}\left[c+\frac{3 d x}{2}\right]+28 B\,\mathrm{Sin}\left[c+\frac{3 d x}{2}\right]+$$
$$5 C\,\mathrm{Sin}\left[c+\frac{3 d x}{2}\right]+36 A\,\mathrm{Sin}\left[2 c+\frac{3 d x}{2}\right]-36 B\,\mathrm{Sin}\left[2 c+\frac{3 d x}{2}\right]+69 C\,\mathrm{Sin}\left[2 c+\frac{3 d x}{2}\right]+132 A\,\mathrm{Sin}\left[3 c+\frac{3 d x}{2}\right]-132 B\,\mathrm{Sin}\left[3 c+\frac{3 d x}{2}\right]+$$
$$165 C\,\mathrm{Sin}\left[3 c+\frac{3 d x}{2}\right]-156 A\,\mathrm{Sin}\left[c+\frac{5 d x}{2}\right]+220 B\,\mathrm{Sin}\left[c+\frac{5 d x}{2}\right]-211 C\,\mathrm{Sin}\left[c+\frac{5 d x}{2}\right]-60 A\,\mathrm{Sin}\left[2 c+\frac{5 d x}{2}\right]+$$
$$124 B\,\mathrm{Sin}\left[2 c+\frac{5 d x}{2}\right]-115 C\,\mathrm{Sin}\left[2 c+\frac{5 d x}{2}\right]-60 A\,\mathrm{Sin}\left[3 c+\frac{5 d x}{2}\right]+60 B\,\mathrm{Sin}\left[3 c+\frac{5 d x}{2}\right]-51 C\,\mathrm{Sin}\left[3 c+\frac{5 d x}{2}\right]+$$
$$36 A\,\mathrm{Sin}\left[4 c+\frac{5 d x}{2}\right]-36 B\,\mathrm{Sin}\left[4 c+\frac{5 d x}{2}\right]+45 C\,\mathrm{Sin}\left[4 c+\frac{5 d x}{2}\right]-12 A\,\mathrm{Sin}\left[2 c+\frac{7 d x}{2}\right]+28 B\,\mathrm{Sin}\left[2 c+\frac{7 d x}{2}\right]-19 C\,\mathrm{Sin}\left[2 c+\frac{7 d x}{2}\right]+$$
$$12 A\,\mathrm{Sin}\left[3 c+\frac{7 d x}{2}\right]+4 B\,\mathrm{Sin}\left[3 c+\frac{7 d x}{2}\right]+5 C\,\mathrm{Sin}\left[3 c+\frac{7 d x}{2}\right]+12 A\,\mathrm{Sin}\left[4 c+\frac{7 d x}{2}\right]-12 B\,\mathrm{Sin}\left[4 c+\frac{7 d x}{2}\right]+21 C\,\mathrm{Sin}\left[4 c+\frac{7 d x}{2}\right]+$$
$$36 A\,\mathrm{Sin}\left[5 c+\frac{7 d x}{2}\right]-36 B\,\mathrm{Sin}\left[5 c+\frac{7 d x}{2}\right]+45 C\,\mathrm{Sin}\left[5 c+\frac{7 d x}{2}\right]-48 A\,\mathrm{Sin}\left[3 c+\frac{9 d x}{2}\right]+64 B\,\mathrm{Sin}\left[3 c+\frac{9 d x}{2}\right]-64 C\,\mathrm{Sin}\left[3 c+\frac{9 d x}{2}\right]-$$
$$\left.24 A\,\mathrm{Sin}\left[4 c+\frac{9 d x}{2}\right]+40 B\,\mathrm{Sin}\left[4 c+\frac{9 d x}{2}\right]-40 C\,\mathrm{Sin}\left[4 c+\frac{9 d x}{2}\right]-24 A\,\mathrm{Sin}\left[5 c+\frac{9 d x}{2}\right]+24 B\,\mathrm{Sin}\left[5 c+\frac{9 d x}{2}\right]-24 C\,\mathrm{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)\right)$$

Problem 450: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Sec}[c+d x]^3\ \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)}{a+a\,\mathrm{Sec}[c+d x]}\,dx$$

Optimal (type 3, 148 leaves, 6 steps):

$$-\frac{(2 A-3 B+3 C)\ \mathrm{ArcTanh}[\mathrm{Sin}[c+d x]]}{2 a d}+\frac{(3 A-3 B+4 C)\ \mathrm{Tan}[c+d x]}{a d}-$$
$$\frac{(2 A-3 B+3 C)\ \mathrm{Sec}[c+d x]\ \mathrm{Tan}[c+d x]}{2 a d}-\frac{(A-B+C)\ \mathrm{Sec}[c+d x]^3\ \mathrm{Tan}[c+d x]}{d\ (a+a\,\mathrm{Sec}[c+d x])}+\frac{(3 A-3 B+4 C)\ \mathrm{Tan}[c+d x]^3}{3 a d}$$

Result (type 3, 898 leaves):

$$\left(2\,(2A-3B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\right)-\left(2\,(2A-3B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\right)+\frac{1}{24\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\,\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-6A\,\text{Sin}\left[\frac{dx}{2}\right]+6B\,\text{Sin}\left[\frac{dx}{2}\right]+6C\,\text{Sin}\left[\frac{dx}{2}\right]+30A\,\text{Sin}\left[\frac{3dx}{2}\right]-27B\,\text{Sin}\left[\frac{3dx}{2}\right]+39C\,\text{Sin}\left[\frac{3dx}{2}\right]-12A\,\text{Sin}\left[c-\frac{dx}{2}\right]+12B\,\text{Sin}\left[c-\frac{dx}{2}\right]-24C\,\text{Sin}\left[c-\frac{dx}{2}\right]-6A\,\text{Sin}\left[c+\frac{dx}{2}\right]+6B\,\text{Sin}\left[c+\frac{dx}{2}\right]-6C\,\text{Sin}\left[c+\frac{dx}{2}\right]-24A\,\text{Sin}\left[2c+\frac{dx}{2}\right]+24B\,\text{Sin}\left[2c+\frac{dx}{2}\right]-24C\,\text{Sin}\left[2c+\frac{dx}{2}\right]+12A\,\text{Sin}\left[c+\frac{3dx}{2}\right]-9B\,\text{Sin}\left[c+\frac{3dx}{2}\right]+21C\,\text{Sin}\left[c+\frac{3dx}{2}\right]+12A\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-9B\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+9C\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-6A\,\text{Sin}\left[3c+\frac{3dx}{2}\right]+9B\,\text{Sin}\left[3c+\frac{3dx}{2}\right]-9C\,\text{Sin}\left[3c+\frac{3dx}{2}\right]+6A\,\text{Sin}\left[c+\frac{5dx}{2}\right]-3B\,\text{Sin}\left[c+\frac{5dx}{2}\right]+7C\,\text{Sin}\left[c+\frac{5dx}{2}\right]+3B\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+C\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+3B\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-3C\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-6A\,\text{Sin}\left[4c+\frac{5dx}{2}\right]+9B\,\text{Sin}\left[4c+\frac{5dx}{2}\right]-9C\,\text{Sin}\left[4c+\frac{5dx}{2}\right]+12A\,\text{Sin}\left[2c+\frac{7dx}{2}\right]-12B\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+16C\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+6A\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-6B\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+10C\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+6A\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-6B\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+6C\,\text{Sin}\left[4c+\frac{7dx}{2}\right]\right)$$

Problem 451: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 119 leaves, 6 steps):

$$\frac{(2A-2B+3C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2ad}-\frac{(A-2B+2C)\,\text{Tan}[c+dx]}{ad}+\frac{(2A-2B+3C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2ad}-\frac{(A-B+C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 3, 900 leaves):

$$-\left(2\,(2A-2B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/ \\ (d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+$$

$$\left(2\,(2A-2B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/ \\ (d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-$$

$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Cos}[c+dx]\,\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/ \\ (d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+$$

$$\frac{C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}-$$

$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/ \\ \left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)-$$

$$\frac{C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}-$$

$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/ \\ \left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)$$

- **Problem 452: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{a+a\,\text{Sec}[c+dx]}\,dx$$

Optimal (type 3, 63 leaves, 4 steps) :

$$\frac{(B-C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a\,d}+\frac{C\,\text{Tan}[c+dx]}{a\,d}+\frac{(A-B+C)\,\text{Tan}[c+dx]}{a\,d\,(1+\text{Sec}[c+dx])}$$

Result (type 3, 255 leaves) :

$$\frac{1}{a\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,(c+d\,x)])\,(1+\mathrm{Sec}[c+d\,x])}\,4\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Cos}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left((A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-(B-C)\,\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\right.\right.$$
$$\left.\left.(C\,\mathrm{Sin}[d\,x])\Big/\left(\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)\right)$$

- **Problem 453: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 52 leaves, 4 steps):

$$\frac{A\,x}{a}+\frac{C\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{a\,d}-\frac{(A-B+C)\,\mathrm{Tan}[c+d\,x]}{a\,d\,(1+\mathrm{Sec}[c+d\,x])}$$

Result (type 3, 163 leaves):

$$\left(4\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(C+B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[c+d\,x]^2\right)\right.$$
$$\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(A\,d\,x-C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-\right.$$
$$\left.\left.(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/\,(a\,d\,(1+\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,(c+d\,x)]))$$

- **Problem 456: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 139 leaves, 6 steps):

$$-\frac{(3\,A-3\,B+2\,C)\,x}{2\,a}+\frac{(4\,A-3\,B+3\,C)\,\mathrm{Sin}[c+d\,x]}{a\,d}-$$
$$\frac{(3\,A-3\,B+2\,C)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,a\,d}-\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{d\,(a+a\,\mathrm{Sec}[c+d\,x])}-\frac{(4\,A-3\,B+3\,C)\,\mathrm{Sin}[c+d\,x]^3}{3\,a\,d}$$

Result (type 3, 307 leaves):

$$\frac{1}{24\,a\,d\,(1+\text{Cos}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-12\,(3\,A-3\,B+2\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-12\,(3\,A-3\,B+2\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+69\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-60\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+60\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+21\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-12\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+12\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+18\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+18\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

- **Problem 457: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$\frac{3\,(5\,A-4\,B+4\,C)\,x}{8\,a}-\frac{(4\,A-4\,B+3\,C)\,\text{Sin}[c+d\,x]}{a\,d}+\frac{3\,(5\,A-4\,B+4\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{8\,a\,d}+\frac{(5\,A-4\,B+4\,C)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{4\,a\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}+\frac{(4\,A-4\,B+3\,C)\,\text{Sin}[c+d\,x]^3}{3\,a\,d}$$

Result (type 3, 393 leaves):

$$\frac{1}{192\,a\,d\,(1+\text{Cos}[c+d\,x])}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(72\,(5\,A-4\,B+4\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+72\,(5\,A-4\,B+4\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-552\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+552\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-480\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-168\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+168\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-96\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-120\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+144\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-72\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-120\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+144\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-72\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+40\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-16\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+24\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+40\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-16\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+24\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-5\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+8\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-5\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+8\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

- **Problem 458: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 3, 194 leaves, 7 steps):

$$-\frac{(4A-7B+10C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2a^2d}+\frac{(5A-8B+12C)\,\text{Tan}[c+dx]}{a^2d}-\frac{(4A-7B+10C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2a^2d}-\frac{(4A-7B+10C)\,\text{Sec}[c+dx]^3\,\text{Tan}[c+dx]}{3a^2d\,(1+\text{Sec}[c+dx])}-\frac{(A-B+C)\,\text{Sec}[c+dx]^4\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}+\frac{(5A-8B+12C)\,\text{Tan}[c+dx]^3}{3a^2d}$$

Result (type 3, 1069 leaves):

$$\frac{4\,(4A-7B+10C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}-\frac{4\,(4A-7B+10C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}+\frac{1}{48d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+dx]^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-48A\,\text{Sin}\left[\frac{dx}{2}\right]+45B\,\text{Sin}\left[\frac{dx}{2}\right]-6C\,\text{Sin}\left[\frac{dx}{2}\right]+132A\,\text{Sin}\left[\frac{3dx}{2}\right]-201B\,\text{Sin}\left[\frac{3dx}{2}\right]+310C\,\text{Sin}\left[\frac{3dx}{2}\right]-120A\,\text{Sin}\left[c-\frac{dx}{2}\right]+195B\,\text{Sin}\left[c-\frac{dx}{2}\right]-306C\,\text{Sin}\left[c-\frac{dx}{2}\right]+48A\,\text{Sin}\left[c+\frac{dx}{2}\right]-51B\,\text{Sin}\left[c+\frac{dx}{2}\right]+42C\,\text{Sin}\left[c+\frac{dx}{2}\right]-120A\,\text{Sin}\left[2c+\frac{dx}{2}\right]+189B\,\text{Sin}\left[2c+\frac{dx}{2}\right]-270C\,\text{Sin}\left[2c+\frac{dx}{2}\right]-8A\,\text{Sin}\left[c+\frac{3dx}{2}\right]-B\,\text{Sin}\left[c+\frac{3dx}{2}\right]+50C\,\text{Sin}\left[c+\frac{3dx}{2}\right]+72A\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-81B\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+90C\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-68A\,\text{Sin}\left[3c+\frac{3dx}{2}\right]+119B\,\text{Sin}\left[3c+\frac{3dx}{2}\right]-170C\,\text{Sin}\left[3c+\frac{3dx}{2}\right]+84A\,\text{Sin}\left[c+\frac{5dx}{2}\right]-129B\,\text{Sin}\left[c+\frac{5dx}{2}\right]+198C\,\text{Sin}\left[c+\frac{5dx}{2}\right]-9B\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+42C\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+48A\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-57B\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+66C\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-36A\,\text{Sin}\left[4c+\frac{5dx}{2}\right]+63B\,\text{Sin}\left[4c+\frac{5dx}{2}\right]-90C\,\text{Sin}\left[4c+\frac{5dx}{2}\right]+48A\,\text{Sin}\left[2c+\frac{7dx}{2}\right]-75B\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+114C\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+6A\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-15B\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+36C\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+30A\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-39B\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+48C\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-12A\,\text{Sin}\left[5c+\frac{7dx}{2}\right]+21B\,\text{Sin}\left[5c+\frac{7dx}{2}\right]-30C\,\text{Sin}\left[5c+\frac{7dx}{2}\right]+20A\,\text{Sin}\left[3c+\frac{9dx}{2}\right]-32B\,\text{Sin}\left[3c+\frac{9dx}{2}\right]+48C\,\text{Sin}\left[3c+\frac{9dx}{2}\right]+6A\,\text{Sin}\left[4c+\frac{9dx}{2}\right]-12B\,\text{Sin}\left[4c+\frac{9dx}{2}\right]+22C\,\text{Sin}\left[4c+\frac{9dx}{2}\right]+14A\,\text{Sin}\left[5c+\frac{9dx}{2}\right]-20B\,\text{Sin}\left[5c+\frac{9dx}{2}\right]+26C\,\text{Sin}\left[5c+\frac{9dx}{2}\right]\right)$$

- **Problem 459: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^3\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 3, 169 leaves, 7 steps):

$$\frac{(2A-4B+7C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2a^2 d}-\frac{2(2A-5B+8C)\,\text{Tan}[c+dx]}{3a^2 d}+\frac{(2A-4B+7C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2a^2 d}-\frac{(2A-5B+8C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3a^2 d\,(1+\text{Sec}[c+dx])}-\frac{(A-B+C)\,\text{Sec}[c+dx]^3\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 3, 901 leaves):

$$-\frac{4(2A-4B+7C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}+$$

$$\frac{4(2A-4B+7C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}+$$

$$\frac{1}{24d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]\,\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(20A\,\text{Sin}\left[\frac{dx}{2}\right]-14B\,\text{Sin}\left[\frac{dx}{2}\right]+14C\,\text{Sin}\left[\frac{dx}{2}\right]-22A\,\text{Sin}\left[\frac{3dx}{2}\right]+64B\,\text{Sin}\left[\frac{3dx}{2}\right]-97C\,\text{Sin}\left[\frac{3dx}{2}\right]+36A\,\text{Sin}\left[c-\frac{dx}{2}\right]-84B\,\text{Sin}\left[c-\frac{dx}{2}\right]+\right.$$

$$126C\,\text{Sin}\left[c-\frac{dx}{2}\right]-36A\,\text{Sin}\left[c+\frac{dx}{2}\right]+42B\,\text{Sin}\left[c+\frac{dx}{2}\right]-42C\,\text{Sin}\left[c+\frac{dx}{2}\right]+20A\,\text{Sin}\left[2c+\frac{dx}{2}\right]-56B\,\text{Sin}\left[2c+\frac{dx}{2}\right]+$$

$$98C\,\text{Sin}\left[2c+\frac{dx}{2}\right]+18A\,\text{Sin}\left[c+\frac{3dx}{2}\right]-6B\,\text{Sin}\left[c+\frac{3dx}{2}\right]+3C\,\text{Sin}\left[c+\frac{3dx}{2}\right]-22A\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+34B\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-$$

$$37C\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+18A\,\text{Sin}\left[3c+\frac{3dx}{2}\right]-36B\,\text{Sin}\left[3c+\frac{3dx}{2}\right]+63C\,\text{Sin}\left[3c+\frac{3dx}{2}\right]-18A\,\text{Sin}\left[c+\frac{5dx}{2}\right]+48B\,\text{Sin}\left[c+\frac{5dx}{2}\right]-$$

$$75C\,\text{Sin}\left[c+\frac{5dx}{2}\right]+6A\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+6B\,\text{Sin}\left[2c+\frac{5dx}{2}\right]-15C\,\text{Sin}\left[2c+\frac{5dx}{2}\right]-18A\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+30B\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-$$

$$39C\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+6A\,\text{Sin}\left[4c+\frac{5dx}{2}\right]-12B\,\text{Sin}\left[4c+\frac{5dx}{2}\right]+21C\,\text{Sin}\left[4c+\frac{5dx}{2}\right]-8A\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+20B\,\text{Sin}\left[2c+\frac{7dx}{2}\right]-$$

$$\left.32C\,\text{Sin}\left[2c+\frac{7dx}{2}\right]+6B\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-12C\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-8A\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+14B\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-20C\,\text{Sin}\left[4c+\frac{7dx}{2}\right]\right)$$

- **Problem 460: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 3, 112 leaves, 6 steps):

$$\frac{(B-2C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a^2 d}+\frac{(A-B+4C)\,\text{Tan}[c+dx]}{3a^2 d}-\frac{(B-2C)\,\text{Tan}[c+dx]}{a^2 d\,(1+\text{Sec}[c+dx])}-\frac{(A-B+C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 3, 312 leaves):

$$\frac{1}{3 a^2 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)]) (1+\text{Sec}[c+d x])^2} 4 \text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left((A-B+C) \text{Sec}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]+2 (A-4 B+7 C) \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]+\text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(-6 (B-2 C) \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+(6 C \text{Sin}[d x]) \Big/ \left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)\right)+(A-B+C) \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Tan}\left[\frac{c}{2}\right]\right)$$

■ Problem 461: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 81 leaves, 4 steps):

$$\frac{C \text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{(A+2 B-5 C) \text{Tan}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}+\frac{(A-B+C) \text{Tan}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 219 leaves):

$$-\left(\left(4 \text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(C+B \text{Cos}[c+d x]+A \text{Cos}[c+d x]^2\right) \left(6 C \text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+(A-B+C) \text{Sec}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]-2 (2 A+B-4 C) \text{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \text{Sec}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]+(A-B+C) \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Tan}\left[\frac{c}{2}\right]\right)\right) \Big/ \left(3 a^2 d (1+\text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)])\right)\right)$$

■ Problem 462: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 74 leaves, 3 steps):

$$\frac{A x}{a^2}-\frac{(4 A-B-2 C) \text{Tan}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B+C) \text{Tan}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 175 leaves):

$$\frac{1}{24 a^2 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \left(9 A d x \text{Cos}\left[\frac{d x}{2}\right]+9 A d x \text{Cos}\left[c+\frac{d x}{2}\right]+3 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+3 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]-18 A \text{Sin}\left[\frac{d x}{2}\right]+6 B \text{Sin}\left[\frac{d x}{2}\right]+6 C \text{Sin}\left[\frac{d x}{2}\right]+12 A \text{Sin}\left[c+\frac{d x}{2}\right]-6 B \text{Sin}\left[c+\frac{d x}{2}\right]-10 A \text{Sin}\left[c+\frac{3 d x}{2}\right]+4 B \text{Sin}\left[c+\frac{3 d x}{2}\right]+2 C \text{Sin}\left[c+\frac{3 d x}{2}\right]\right)$$

Problem 463: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$-\frac{(2 A-B) x}{a^2}+\frac{(10 A-4 B+C) \text{Sin}[c+d x]}{3 a^2 d}-\frac{(2 A-B) \text{Sin}[c+d x]}{a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B+C) \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 279 leaves):

$$\frac{1}{12 a^2 d (1+\text{Cos}[c+d x])^2}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(-18 (2 A-B) d x \text{Cos}\left[\frac{d x}{2}\right]-18 (2 A-B) d x \text{Cos}\left[c+\frac{d x}{2}\right]-12 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+6 B d x \text{Cos}\left[c+\frac{3 d x}{2}\right]-12 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+6 B d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+66 A \text{Sin}\left[\frac{d x}{2}\right]-36 B \text{Sin}\left[\frac{d x}{2}\right]+12 C \text{Sin}\left[\frac{d x}{2}\right]-30 A \text{Sin}\left[c+\frac{d x}{2}\right]+24 B \text{Sin}\left[c+\frac{d x}{2}\right]-12 C \text{Sin}\left[c+\frac{d x}{2}\right]+41 A \text{Sin}\left[c+\frac{3 d x}{2}\right]-20 B \text{Sin}\left[c+\frac{3 d x}{2}\right]+8 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+9 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+3 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+3 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]\right)$$

Problem 464: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^2\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 156 leaves, 6 steps):

$$\frac{(7 A-4 B+2 C) x}{2 a^2}-\frac{2 (8 A-5 B+2 C) \text{Sin}[c+d x]}{3 a^2 d}+\frac{(7 A-4 B+2 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a^2 d}-\frac{(8 A-5 B+2 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B+C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 3, 377 leaves):

$$\frac{1}{192 a^2 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\Big(36(7A-4B+2C)\,d x\,\text{Cos}\left[\frac{d x}{2}\right]+36(7A-4B+2C)\,d x\,\text{Cos}\left[c+\frac{d x}{2}\right]+84 A d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]-48 B d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]+$$
$$24 C d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]+84 A d x\,\text{Cos}\left[2c+\frac{3 d x}{2}\right]-48 B d x\,\text{Cos}\left[2c+\frac{3 d x}{2}\right]+24 C d x\,\text{Cos}\left[2c+\frac{3 d x}{2}\right]-381 A\,\text{Sin}\left[\frac{d x}{2}\right]+$$
$$264 B\,\text{Sin}\left[\frac{d x}{2}\right]-144 C\,\text{Sin}\left[\frac{d x}{2}\right]+147 A\,\text{Sin}\left[c+\frac{d x}{2}\right]-120 B\,\text{Sin}\left[c+\frac{d x}{2}\right]+96 C\,\text{Sin}\left[c+\frac{d x}{2}\right]-239 A\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+$$
$$164 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-80 C\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-63 A\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]+36 B\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]-15 A\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]+$$
$$12 B\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]-15 A\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]+12 B\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]+3 A\,\text{Sin}\left[3c+\frac{7 d x}{2}\right]+3 A\,\text{Sin}\left[4c+\frac{7 d x}{2}\right]\Big)$$

Problem 465: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+a\,\text{Sec}[c+d x])^2}\,dx$$

Optimal (type 3, 185 leaves, 7 steps):

$$-\frac{(10A-7B+4C)\,x}{2a^2}+\frac{(12A-8B+5C)\,\text{Sin}[c+d x]}{a^2 d}-\frac{(10A-7B+4C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2a^2 d}-$$
$$\frac{(10A-7B+4C)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{3a^2 d\,(1+\text{Sec}[c+d x])}-\frac{(A-B+C)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{3d\,(a+a\,\text{Sec}[c+d x])^2}-\frac{(12A-8B+5C)\,\text{Sin}[c+d x]^3}{3a^2 d}$$

Result (type 3, 473 leaves):

$$\frac{1}{192 a^2 d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3$$
$$\Big(-36(10A-7B+4C)\,d x\,\text{Cos}\left[\frac{d x}{2}\right]-36(10A-7B+4C)\,d x\,\text{Cos}\left[c+\frac{d x}{2}\right]-120 A d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]+84 B d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]-$$
$$48 C d x\,\text{Cos}\left[c+\frac{3 d x}{2}\right]-120 A d x\,\text{Cos}\left[2c+\frac{3 d x}{2}\right]+84 B d x\,\text{Cos}\left[2c+\frac{3 d x}{2}\right]-48 C d x\,\text{Cos}\left[2c+\frac{3 d x}{2}\right]+516 A\,\text{Sin}\left[\frac{d x}{2}\right]-$$
$$381 B\,\text{Sin}\left[\frac{d x}{2}\right]+264 C\,\text{Sin}\left[\frac{d x}{2}\right]-156 A\,\text{Sin}\left[c+\frac{d x}{2}\right]+147 B\,\text{Sin}\left[c+\frac{d x}{2}\right]-120 C\,\text{Sin}\left[c+\frac{d x}{2}\right]+342 A\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-$$
$$239 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+164 C\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+118 A\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]-63 B\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]+36 C\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]+$$
$$30 A\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]-15 B\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]+12 C\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]+30 A\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]-15 B\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]+12 C\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]-$$
$$3 A\,\text{Sin}\left[3c+\frac{7 d x}{2}\right]+3 B\,\text{Sin}\left[3c+\frac{7 d x}{2}\right]-3 A\,\text{Sin}\left[4c+\frac{7 d x}{2}\right]+3 B\,\text{Sin}\left[4c+\frac{7 d x}{2}\right]+A\,\text{Sin}\left[4c+\frac{9 d x}{2}\right]+A\,\text{Sin}\left[5c+\frac{9 d x}{2}\right]\Big)$$

Problem 466: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 216 leaves, 8 steps):

$$\frac{(2 A-6 B+13 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^3 d}-\frac{2 (11 A-36 B+76 C) \text{Tan}[c+d x]}{15 a^3 d}+\frac{(2 A-6 B+13 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a^3 d}-\frac{(A-B+C) \text{Sec}[c+d x]^4 \text{Tan}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}-\frac{(A-6 B+11 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{15 a d (a+a \text{Sec}[c+d x])^2}-\frac{(11 A-36 B+76 C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{15 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 3, 1081 leaves):

$$-\left(8\,(2A-6B+13C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\mathrm{Sec}[c+dx]\,\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)+$$
$$\left(8\,(2A-6B+13C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\mathrm{Sec}[c+dx]\,\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)+$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^3\,\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right.$$
$$\left(490\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-870\,B\,\mathrm{Sin}\left[\frac{dx}{2}\right]+1235\,C\,\mathrm{Sin}\left[\frac{dx}{2}\right]-530\,A\,\mathrm{Sin}\left[\frac{3dx}{2}\right]+1830\,B\,\mathrm{Sin}\left[\frac{3dx}{2}\right]-3805\,C\,\mathrm{Sin}\left[\frac{3dx}{2}\right]+654\,A\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]-\right.$$
$$2094\,B\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]+4329\,C\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]-654\,A\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+1314\,B\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]-1989\,C\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+490\,A\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]-$$
$$1650\,B\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]+3575\,C\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]+350\,A\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-450\,B\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]+475\,C\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-530\,A\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+$$
$$1230\,B\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]-2005\,C\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+350\,A\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]-1050\,B\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]+2275\,C\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]-$$
$$378\,A\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]+1278\,B\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]-2673\,C\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]+150\,A\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-90\,B\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-105\,C\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-$$
$$378\,A\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+918\,B\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]-1593\,C\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+150\,A\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]-450\,B\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]+$$
$$975\,C\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]-190\,A\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]+630\,B\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]-1325\,C\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]+30\,A\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]+$$
$$60\,B\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]-255\,C\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]-190\,A\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]+480\,B\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]-875\,C\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]+$$
$$30\,A\,\mathrm{Sin}\left[5c+\frac{7dx}{2}\right]-90\,B\,\mathrm{Sin}\left[5c+\frac{7dx}{2}\right]+195\,C\,\mathrm{Sin}\left[5c+\frac{7dx}{2}\right]-44\,A\,\mathrm{Sin}\left[3c+\frac{9dx}{2}\right]+144\,B\,\mathrm{Sin}\left[3c+\frac{9dx}{2}\right]-304\,C\,\mathrm{Sin}\left[3c+\frac{9dx}{2}\right]+$$
$$\left.\left.30\,B\,\mathrm{Sin}\left[4c+\frac{9dx}{2}\right]-90\,C\,\mathrm{Sin}\left[4c+\frac{9dx}{2}\right]-44\,A\,\mathrm{Sin}\left[5c+\frac{9dx}{2}\right]+114\,B\,\mathrm{Sin}\left[5c+\frac{9dx}{2}\right]-214\,C\,\mathrm{Sin}\left[5c+\frac{9dx}{2}\right]\right)\right)\Big/$$
$$\left(240\,d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])^3\right)$$

- **Problem 467: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+dx]^3\,\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)}{(a+a\,\mathrm{Sec}[c+dx])^3}\,dx$$

Optimal (type 3, 161 leaves, 7 steps) :

$$\frac{(B-3C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^3 d}+\frac{(2A-7B+27C)\,\text{Tan}[c+d x]}{15 a^3 d}-\frac{(A-B+C)\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{5 d\,(a+a\,\text{Sec}[c+d x])^3}+\frac{(A+4B-9C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{15 a d\,(a+a\,\text{Sec}[c+d x])^2}-\frac{(B-3C)\,\text{Tan}[c+d x]}{d\,(a^3+a^3\,\text{Sec}[c+d x])}$$

Result (type 3, 839 leaves):

$$\left(16\,(-B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\,\text{Sec}[c+d x]\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/ \left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^3\right)-\left(16\,(-B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\,\text{Sec}[c+d x]\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/ \left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^3\right)+\frac{1}{60 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^3}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-20 A\,\text{Sin}\left[\frac{d x}{2}\right]+160 B\,\text{Sin}\left[\frac{d x}{2}\right]-255 C\,\text{Sin}\left[\frac{d x}{2}\right]+22 A\,\text{Sin}\left[\frac{3 d x}{2}\right]-167 B\,\text{Sin}\left[\frac{3 d x}{2}\right]+567 C\,\text{Sin}\left[\frac{3 d x}{2}\right]-10 A\,\text{Sin}\left[c-\frac{d x}{2}\right]+170 B\,\text{Sin}\left[c-\frac{d x}{2}\right]-600 C\,\text{Sin}\left[c-\frac{d x}{2}\right]+10 A\,\text{Sin}\left[c+\frac{d x}{2}\right]-170 B\,\text{Sin}\left[c+\frac{d x}{2}\right]+375 C\,\text{Sin}\left[c+\frac{d x}{2}\right]-20 A\,\text{Sin}\left[2c+\frac{d x}{2}\right]+160 B\,\text{Sin}\left[2c+\frac{d x}{2}\right]-480 C\,\text{Sin}\left[2c+\frac{d x}{2}\right]+75 B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]-60 C\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+22 A\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]-167 B\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]+402 C\,\text{Sin}\left[2c+\frac{3 d x}{2}\right]+75 B\,\text{Sin}\left[3c+\frac{3 d x}{2}\right]-225 C\,\text{Sin}\left[3c+\frac{3 d x}{2}\right]+10 A\,\text{Sin}\left[c+\frac{5 d x}{2}\right]-95 B\,\text{Sin}\left[c+\frac{5 d x}{2}\right]+315 C\,\text{Sin}\left[c+\frac{5 d x}{2}\right]+15 B\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]+30 C\,\text{Sin}\left[2c+\frac{5 d x}{2}\right]+10 A\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]-95 B\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]+240 C\,\text{Sin}\left[3c+\frac{5 d x}{2}\right]+15 B\,\text{Sin}\left[4c+\frac{5 d x}{2}\right]-45 C\,\text{Sin}\left[4c+\frac{5 d x}{2}\right]+2 A\,\text{Sin}\left[2c+\frac{7 d x}{2}\right]-22 B\,\text{Sin}\left[2c+\frac{7 d x}{2}\right]+72 C\,\text{Sin}\left[2c+\frac{7 d x}{2}\right]+15 C\,\text{Sin}\left[3c+\frac{7 d x}{2}\right]+2 A\,\text{Sin}\left[4c+\frac{7 d x}{2}\right]-22 B\,\text{Sin}\left[4c+\frac{7 d x}{2}\right]+57 C\,\text{Sin}\left[4c+\frac{7 d x}{2}\right]\right)$$

- **Problem 468: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^2\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+a\,\text{Sec}[c+d x])^3}\,dx$$

Optimal (type 3, 132 leaves, 5 steps):

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^3 d}-\frac{(A-B+C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{5 d\,(a+a\,\text{Sec}[c+d x])^3}-\frac{(3A+2B-7C)\,\text{Tan}[c+d x]}{15 a d\,(a+a\,\text{Sec}[c+d x])^2}+\frac{(6A+4B-29C)\,\text{Tan}[c+d x]}{15 d\,(a^3+a^3\,\text{Sec}[c+d x])}$$

Result (type 3, 277 leaves):

$$-\Bigg(\Bigg(\Big(C+B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[c+d\,x]^2\Big)$$
$$\Big(240\,C\,\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^6\Big(\mathrm{Log}\Big[\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]-\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big]-\mathrm{Log}\Big[\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]+\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big]\Big)-$$
$$\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\Big(5\,(3\,A+4\,B-29\,C)\,\mathrm{Sin}\Big[\frac{d\,x}{2}\Big]-15\,(A-5\,C)\,\mathrm{Sin}\Big[c+\frac{d\,x}{2}\Big]+15\,A\,\mathrm{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]+10\,B\,\mathrm{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]-$$
$$95\,C\,\mathrm{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]+15\,C\,\mathrm{Sin}\Big[2\,c+\frac{3\,d\,x}{2}\Big]+3\,A\,\mathrm{Sin}\Big[2\,c+\frac{5\,d\,x}{2}\Big]+2\,B\,\mathrm{Sin}\Big[2\,c+\frac{5\,d\,x}{2}\Big]-22\,C\,\mathrm{Sin}\Big[2\,c+\frac{5\,d\,x}{2}\Big]\Big)\Big)\Big)\Big/$$
$$\Big(15\,a^3\,d\,(1+\mathrm{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,(c+d\,x)])\Big)\Bigg)$$

Problem 470: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 115 leaves, 4 steps):

$$\frac{A\,x}{a^3}-\frac{(A-B+C)\,\mathrm{Tan}[c+d\,x]}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}-\frac{(7\,A-2\,B-3\,C)\,\mathrm{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{(22\,A-2\,B-3\,C)\,\mathrm{Tan}[c+d\,x]}{15\,d\,\big(a^3+a^3\,\mathrm{Sec}[c+d\,x]\big)}$$

Result (type 3, 289 leaves):

$$\frac{1}{480\,a^3\,d}$$
$$\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\mathrm{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^5\Big(150\,A\,d\,x\,\mathrm{Cos}\Big[\frac{d\,x}{2}\Big]+150\,A\,d\,x\,\mathrm{Cos}\Big[c+\frac{d\,x}{2}\Big]+75\,A\,d\,x\,\mathrm{Cos}\Big[c+\frac{3\,d\,x}{2}\Big]+75\,A\,d\,x\,\mathrm{Cos}\Big[2\,c+\frac{3\,d\,x}{2}\Big]+15\,A\,d\,x\,\mathrm{Cos}\Big[2\,c+\frac{5\,d\,x}{2}\Big]+$$
$$15\,A\,d\,x\,\mathrm{Cos}\Big[3\,c+\frac{5\,d\,x}{2}\Big]-370\,A\,\mathrm{Sin}\Big[\frac{d\,x}{2}\Big]+80\,B\,\mathrm{Sin}\Big[\frac{d\,x}{2}\Big]+30\,C\,\mathrm{Sin}\Big[\frac{d\,x}{2}\Big]+270\,A\,\mathrm{Sin}\Big[c+\frac{d\,x}{2}\Big]-$$
$$60\,B\,\mathrm{Sin}\Big[c+\frac{d\,x}{2}\Big]-30\,C\,\mathrm{Sin}\Big[c+\frac{d\,x}{2}\Big]-230\,A\,\mathrm{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]+40\,B\,\mathrm{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]+30\,C\,\mathrm{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]+$$
$$90\,A\,\mathrm{Sin}\Big[2\,c+\frac{3\,d\,x}{2}\Big]-30\,B\,\mathrm{Sin}\Big[2\,c+\frac{3\,d\,x}{2}\Big]-64\,A\,\mathrm{Sin}\Big[2\,c+\frac{5\,d\,x}{2}\Big]+14\,B\,\mathrm{Sin}\Big[2\,c+\frac{5\,d\,x}{2}\Big]+6\,C\,\mathrm{Sin}\Big[2\,c+\frac{5\,d\,x}{2}\Big]\Big)$$

Problem 471: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 141 leaves, 6 steps):

$$-\frac{(3\,A-B)\,x}{a^3}+\frac{2\,(36\,A-11\,B+C)\,\mathrm{Sin}[c+d\,x]}{15\,a^3\,d}-\frac{(A-B+C)\,\mathrm{Sin}[c+d\,x]}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}-\frac{(9\,A-4\,B-C)\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{(3\,A-B)\,\mathrm{Sin}[c+d\,x]}{d\,\big(a^3+a^3\,\mathrm{Sec}[c+d\,x]\big)}$$

Result (type 3, 419 leaves):

$$\frac{1}{960\,a^3\,d}\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\left(-300\,(3\,A-B)\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]-300\,(3\,A-B)\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]-450\,A\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+150\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]-450\,A\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+\right.$$
$$150\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-90\,A\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-90\,A\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,B\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$
$$1755\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-740\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+160\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-1125\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+540\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-120\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+$$
$$1215\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-460\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+80\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-225\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+180\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-60\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$\left.363\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-128\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+28\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+75\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+15\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+15\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

- **Problem 472: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 201 leaves, 7 steps):

$$\frac{(13\,A-6\,B+2\,C)\,x}{2\,a^3}-\frac{2\,(76\,A-36\,B+11\,C)\,\mathrm{Sin}[c+d\,x]}{15\,a^3\,d}+\frac{(13\,A-6\,B+2\,C)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,a^3\,d}-$$
$$\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}-\frac{(11\,A-6\,B+C)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}-\frac{(76\,A-36\,B+11\,C)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\mathrm{Sec}[c+d\,x]\right)}$$

Result (type 3, 557 leaves):

$$\frac{1}{3840\, a^3\, d} \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2}\,(c + d\,x)\right]^5$$

$$\left(600\,(13\,A - 6\,B + 2\,C)\,d\,x\,\operatorname{Cos}\left[\frac{d\,x}{2}\right] + 600\,(13\,A - 6\,B + 2\,C)\,d\,x\,\operatorname{Cos}\left[c + \frac{d\,x}{2}\right] + 3900\,A\,d\,x\,\operatorname{Cos}\left[c + \frac{3\,d\,x}{2}\right] - 1800\,B\,d\,x\,\operatorname{Cos}\left[c + \frac{3\,d\,x}{2}\right] + \right.$$

$$600\,C\,d\,x\,\operatorname{Cos}\left[c + \frac{3\,d\,x}{2}\right] + 3900\,A\,d\,x\,\operatorname{Cos}\left[2\,c + \frac{3\,d\,x}{2}\right] - 1800\,B\,d\,x\,\operatorname{Cos}\left[2\,c + \frac{3\,d\,x}{2}\right] + 600\,C\,d\,x\,\operatorname{Cos}\left[2\,c + \frac{3\,d\,x}{2}\right] + 780\,A\,d\,x\,\operatorname{Cos}\left[2\,c + \frac{5\,d\,x}{2}\right] -$$

$$360\,B\,d\,x\,\operatorname{Cos}\left[2\,c + \frac{5\,d\,x}{2}\right] + 120\,C\,d\,x\,\operatorname{Cos}\left[2\,c + \frac{5\,d\,x}{2}\right] + 780\,A\,d\,x\,\operatorname{Cos}\left[3\,c + \frac{5\,d\,x}{2}\right] - 360\,B\,d\,x\,\operatorname{Cos}\left[3\,c + \frac{5\,d\,x}{2}\right] + 120\,C\,d\,x\,\operatorname{Cos}\left[3\,c + \frac{5\,d\,x}{2}\right] -$$

$$12\,760\,A\,\operatorname{Sin}\left[\frac{d\,x}{2}\right] + 7020\,B\,\operatorname{Sin}\left[\frac{d\,x}{2}\right] - 2960\,C\,\operatorname{Sin}\left[\frac{d\,x}{2}\right] + 7560\,A\,\operatorname{Sin}\left[c + \frac{d\,x}{2}\right] - 4500\,B\,\operatorname{Sin}\left[c + \frac{d\,x}{2}\right] + 2160\,C\,\operatorname{Sin}\left[c + \frac{d\,x}{2}\right] -$$

$$9230\,A\,\operatorname{Sin}\left[c + \frac{3\,d\,x}{2}\right] + 4860\,B\,\operatorname{Sin}\left[c + \frac{3\,d\,x}{2}\right] - 1840\,C\,\operatorname{Sin}\left[c + \frac{3\,d\,x}{2}\right] + 930\,A\,\operatorname{Sin}\left[2\,c + \frac{3\,d\,x}{2}\right] - 900\,B\,\operatorname{Sin}\left[2\,c + \frac{3\,d\,x}{2}\right] + 720\,C\,\operatorname{Sin}\left[2\,c + \frac{3\,d\,x}{2}\right] -$$

$$2782\,A\,\operatorname{Sin}\left[2\,c + \frac{5\,d\,x}{2}\right] + 1452\,B\,\operatorname{Sin}\left[2\,c + \frac{5\,d\,x}{2}\right] - 512\,C\,\operatorname{Sin}\left[2\,c + \frac{5\,d\,x}{2}\right] - 750\,A\,\operatorname{Sin}\left[3\,c + \frac{5\,d\,x}{2}\right] + 300\,B\,\operatorname{Sin}\left[3\,c + \frac{5\,d\,x}{2}\right] -$$

$$\left.105\,A\,\operatorname{Sin}\left[3\,c + \frac{7\,d\,x}{2}\right] + 60\,B\,\operatorname{Sin}\left[3\,c + \frac{7\,d\,x}{2}\right] - 105\,A\,\operatorname{Sin}\left[4\,c + \frac{7\,d\,x}{2}\right] + 60\,B\,\operatorname{Sin}\left[4\,c + \frac{7\,d\,x}{2}\right] + 15\,A\,\operatorname{Sin}\left[4\,c + \frac{9\,d\,x}{2}\right] + 15\,A\,\operatorname{Sin}\left[5\,c + \frac{9\,d\,x}{2}\right]\right)$$

- **Problem 473: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c + d\,x]^3\,\left(A + B\,\operatorname{Sec}[c + d\,x] + C\,\operatorname{Sec}[c + d\,x]^2\right)}{(a + a\,\operatorname{Sec}[c + d\,x])^3}\,dx$$

Optimal (type 3, 237 leaves, 8 steps):

$$-\frac{(23\,A - 13\,B + 6\,C)\,x}{2\,a^3} + \frac{4\,(34\,A - 19\,B + 9\,C)\,\operatorname{Sin}[c + d\,x]}{5\,a^3\,d} - \frac{(23\,A - 13\,B + 6\,C)\,\operatorname{Cos}[c + d\,x]\,\operatorname{Sin}[c + d\,x]}{2\,a^3\,d} - \frac{(A - B + C)\,\operatorname{Cos}[c + d\,x]^2\,\operatorname{Sin}[c + d\,x]}{5\,d\,(a + a\,\operatorname{Sec}[c + d\,x])^3} -$$

$$\frac{(13\,A - 8\,B + 3\,C)\,\operatorname{Cos}[c + d\,x]^2\,\operatorname{Sin}[c + d\,x]}{15\,a\,d\,(a + a\,\operatorname{Sec}[c + d\,x])^2} - \frac{(23\,A - 13\,B + 6\,C)\,\operatorname{Cos}[c + d\,x]^2\,\operatorname{Sin}[c + d\,x]}{3\,d\,\left(a^3 + a^3\,\operatorname{Sec}[c + d\,x]\right)} - \frac{4\,(34\,A - 19\,B + 9\,C)\,\operatorname{Sin}[c + d\,x]^3}{15\,a^3\,d}$$

Result (type 3, 655 leaves):

$$\frac{1}{3840 a^3 d} \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^5$$
$$\left(-600 (23 A-13 B+6 C) d x \text{Cos}\left[\frac{d x}{2}\right]-600 (23 A-13 B+6 C) d x \text{Cos}\left[c+\frac{d x}{2}\right]-6900 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+3900 B d x \text{Cos}\left[c+\frac{3 d x}{2}\right]-\right.$$
$$1800 C d x \text{Cos}\left[c+\frac{3 d x}{2}\right]-6900 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+3900 B d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]-1800 C d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]-$$
$$1380 A d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]+780 B d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]-360 C d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]-1380 A d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]+780 B d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]-$$
$$360 C d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]+20410 A \text{Sin}\left[\frac{d x}{2}\right]-12760 B \text{Sin}\left[\frac{d x}{2}\right]+7020 C \text{Sin}\left[\frac{d x}{2}\right]-11110 A \text{Sin}\left[c+\frac{d x}{2}\right]+7560 B \text{Sin}\left[c+\frac{d x}{2}\right]-$$
$$4500 C \text{Sin}\left[c+\frac{d x}{2}\right]+15380 A \text{Sin}\left[c+\frac{3 d x}{2}\right]-9230 B \text{Sin}\left[c+\frac{3 d x}{2}\right]+4860 C \text{Sin}\left[c+\frac{3 d x}{2}\right]-380 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+$$
$$930 B \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-900 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+4777 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-2782 B \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+1452 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+$$
$$1625 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-750 B \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+300 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+230 A \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-105 B \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+$$
$$60 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+230 A \text{Sin}\left[4 c+\frac{7 d x}{2}\right]-105 B \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+60 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]-20 A \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+$$
$$\left.15 B \text{Sin}\left[4 c+\frac{9 d x}{2}\right]-20 A \text{Sin}\left[5 c+\frac{9 d x}{2}\right]+15 B \text{Sin}\left[5 c+\frac{9 d x}{2}\right]+5 A \text{Sin}\left[5 c+\frac{11 d x}{2}\right]+5 A \text{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

- **Problem 474: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^5 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^4} \, dx$$

Optimal (type 3, 254 leaves, 9 steps):

$$\frac{(2 A-8 B+21 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^4 d}-\frac{8 (20 A-83 B+216 C) \text{Tan}[c+d x]}{105 a^4 d}+$$
$$\frac{(2 A-8 B+21 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a^4 d}-\frac{(10 A-52 B+129 C) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{105 a^4 d (1+\text{Sec}[c+d x])^2}-$$
$$\frac{4 (20 A-83 B+216 C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{105 a^4 d (1+\text{Sec}[c+d x])}-\frac{(A-B+C) \text{Sec}[c+d x]^5 \text{Tan}[c+d x]}{7 d (a+a \text{Sec}[c+d x])^4}+\frac{(B-2 C) \text{Sec}[c+d x]^4 \text{Tan}[c+d x]}{5 a d (a+a \text{Sec}[c+d x])^3}$$

Result (type 3, 1322 leaves):

$$-\left(16\,(2A-8B+21C)\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\operatorname{Log}\left[\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sin\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)+$$

$$\left(16\,(2A-8B+21C)\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\operatorname{Log}\left[\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\sin\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(4\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(A\sin\left[\frac{c}{2}\right]-B\sin\left[\frac{c}{2}\right]+C\sin\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(7\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(8\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(10A\sin\left[\frac{c}{2}\right]-17B\sin\left[\frac{c}{2}\right]+24C\sin\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(35\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(16\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(55A\sin\left[\frac{c}{2}\right]-139B\sin\left[\frac{c}{2}\right]+258C\sin\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(105\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(4\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(A\sin\left[\frac{d\,x}{2}\right]-B\sin\left[\frac{d\,x}{2}\right]+C\sin\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$

$$\left(7\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(8\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(10A\sin\left[\frac{d\,x}{2}\right]-17B\sin\left[\frac{d\,x}{2}\right]+24C\sin\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$

$$\left(35\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(16\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(55A\sin\left[\frac{d\,x}{2}\right]-139B\sin\left[\frac{d\,x}{2}\right]+258C\sin\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$

$$\left(105\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)-$$

$$\left(32\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\sec\left[\frac{c}{2}\right]\sec[c+d\,x]^2\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\left(160A\sin\left[\frac{d\,x}{2}\right]-559B\sin\left[\frac{d\,x}{2}\right]+1308C\sin\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$

$$\left(105\,d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)+$$

$$\frac{16\,C\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\sec[c]\sec[c+d\,x]^4\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)\sin[d\,x]}{d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4}+$$

$$\left(16\cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\sec[c]\sec[c+d\,x]^3\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)(C\sin[c]+2B\sin[d\,x]-8C\sin[d\,x])\right)\Big/$$

$$\left(d\,(A+2C+2B\cos[c+d\,x]+A\cos[2c+2d\,x])\,(a+a\sec[c+d\,x])^4\right)$$

- **Problem 475: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sec[c+d\,x]^4\left(A+B\sec[c+d\,x]+C\sec[c+d\,x]^2\right)}{(a+a\sec[c+d\,x])^4}\,dx$$

Optimal (type 3, 204 leaves, 8 steps):

$$\frac{(B-4C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^4 d}+\frac{(6A-55B+244C)\,\text{Tan}[c+d x]}{105 a^4 d}+\frac{(3A+25B-88C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{105 a^4 d\,(1+\text{Sec}[c+d x])^2}-\frac{(B-4C)\,\text{Tan}[c+d x]}{a^4 d\,(1+\text{Sec}[c+d x])}-\frac{(A-B+C)\,\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{7 d\,(a+a\,\text{Sec}[c+d x])^4}+\frac{(2A+5B-12C)\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{35 a d\,(a+a\,\text{Sec}[c+d x])^3}$$

Result (type 3, 1208 leaves):

$$\left(32\,(-B+4C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)-$$
$$\left(32\,(-B+4C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(A\,\text{Sin}\left[\frac{c}{2}\right]-B\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(7 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(8\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(3A\,\text{Sin}\left[\frac{c}{2}\right]-10B\,\text{Sin}\left[\frac{c}{2}\right]+17C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(35 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(16\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(6A\,\text{Sin}\left[\frac{c}{2}\right]-55B\,\text{Sin}\left[\frac{c}{2}\right]+139C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(105 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)\right)\Big/$$
$$\left(7 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(8\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(3A\,\text{Sin}\left[\frac{d x}{2}\right]-10B\,\text{Sin}\left[\frac{d x}{2}\right]+17C\,\text{Sin}\left[\frac{d x}{2}\right]\right)\right)\Big/$$
$$\left(35 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(16\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(6A\,\text{Sin}\left[\frac{d x}{2}\right]-55B\,\text{Sin}\left[\frac{d x}{2}\right]+139C\,\text{Sin}\left[\frac{d x}{2}\right]\right)\right)\Big/$$
$$\left(105 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\left(32\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^7\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(6A\,\text{Sin}\left[\frac{d x}{2}\right]-160B\,\text{Sin}\left[\frac{d x}{2}\right]+559C\,\text{Sin}\left[\frac{d x}{2}\right]\right)\right)\Big/$$
$$\left(105 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4\right)+$$
$$\frac{32\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\text{Sec}[c]\,\text{Sec}[c+d x]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[d x]}{d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^4}$$

Problem 479: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 148 leaves, 5 steps):

$$\frac{A\,x}{a^4}-\frac{(55\,A-6\,B-8\,C)\,\text{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}-\frac{2\,(80\,A-3\,B-4\,C)\,\text{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B+C)\,\text{Tan}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{(10\,A-3\,B-4\,C)\,\text{Tan}[c+d\,x]}{35\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 405 leaves):

$$\frac{1}{13\,440\,a^4\,d}\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^7$$
$$\left(3675\,A\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+3675\,A\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+2205\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+2205\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+735\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+\right.$$
$$735\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+105\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+105\,A\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-9940\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+1260\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+560\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$8260\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1260\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-350\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-7140\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+882\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+336\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$3780\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-630\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-210\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2800\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+294\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$\left.182\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+840\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-210\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-520\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+72\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+26\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 480: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 176 leaves, 7 steps):

$$-\frac{(4\,A-B)\,x}{a^4}+\frac{2\,(332\,A-80\,B+3\,C)\,\text{Sin}[c+d\,x]}{105\,a^4\,d}-\frac{(88\,A-25\,B-3\,C)\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\text{Sec}[c+d\,x])^2}-$$
$$\frac{(4\,A-B)\,\text{Sin}[c+d\,x]}{a^4\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{7\,d\,(a+a\,\text{Sec}[c+d\,x])^4}-\frac{(12\,A-5\,B-2\,C)\,\text{Sin}[c+d\,x]}{35\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^3}$$

Result (type 3, 567 leaves):

$$\frac{1}{26880\, a^4\, d}\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^7\left(-7350\,(4A-B)\,d\,x\operatorname{Cos}\left[\frac{d x}{2}\right]-7350\,(4A-B)\,d\,x\operatorname{Cos}\left[c+\frac{d x}{2}\right]-17640\,A\,d\,x\operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+4410\,B\,d\,x\operatorname{Cos}\left[c+\frac{3 d x}{2}\right]-\right.$$
$$17640\,A\,d\,x\operatorname{Cos}\left[2c+\frac{3 d x}{2}\right]+4410\,B\,d\,x\operatorname{Cos}\left[2c+\frac{3 d x}{2}\right]-5880\,A\,d\,x\operatorname{Cos}\left[2c+\frac{5 d x}{2}\right]+1470\,B\,d\,x\operatorname{Cos}\left[2c+\frac{5 d x}{2}\right]-$$
$$5880\,A\,d\,x\operatorname{Cos}\left[3c+\frac{5 d x}{2}\right]+1470\,B\,d\,x\operatorname{Cos}\left[3c+\frac{5 d x}{2}\right]-840\,A\,d\,x\operatorname{Cos}\left[3c+\frac{7 d x}{2}\right]+210\,B\,d\,x\operatorname{Cos}\left[3c+\frac{7 d x}{2}\right]-$$
$$840\,A\,d\,x\operatorname{Cos}\left[4c+\frac{7 d x}{2}\right]+210\,B\,d\,x\operatorname{Cos}\left[4c+\frac{7 d x}{2}\right]+60830\,A\operatorname{Sin}\left[\frac{d x}{2}\right]-19880\,B\operatorname{Sin}\left[\frac{d x}{2}\right]+2520\,C\operatorname{Sin}\left[\frac{d x}{2}\right]-46130\,A\operatorname{Sin}\left[c+\frac{d x}{2}\right]+$$
$$16520\,B\operatorname{Sin}\left[c+\frac{d x}{2}\right]-2520\,C\operatorname{Sin}\left[c+\frac{d x}{2}\right]+46116\,A\operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-14280\,B\operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+1764\,C\operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-$$
$$18060\,A\operatorname{Sin}\left[2c+\frac{3 d x}{2}\right]+7560\,B\operatorname{Sin}\left[2c+\frac{3 d x}{2}\right]-1260\,C\operatorname{Sin}\left[2c+\frac{3 d x}{2}\right]+19292\,A\operatorname{Sin}\left[2c+\frac{5 d x}{2}\right]-5600\,B\operatorname{Sin}\left[2c+\frac{5 d x}{2}\right]+$$
$$588\,C\operatorname{Sin}\left[2c+\frac{5 d x}{2}\right]-2100\,A\operatorname{Sin}\left[3c+\frac{5 d x}{2}\right]+1680\,B\operatorname{Sin}\left[3c+\frac{5 d x}{2}\right]-420\,C\operatorname{Sin}\left[3c+\frac{5 d x}{2}\right]+3791\,A\operatorname{Sin}\left[3c+\frac{7 d x}{2}\right]-$$
$$\left.1040\,B\operatorname{Sin}\left[3c+\frac{7 d x}{2}\right]+144\,C\operatorname{Sin}\left[3c+\frac{7 d x}{2}\right]+735\,A\operatorname{Sin}\left[4c+\frac{7 d x}{2}\right]+105\,A\operatorname{Sin}\left[4c+\frac{9 d x}{2}\right]+105\,A\operatorname{Sin}\left[5c+\frac{9 d x}{2}\right]\right)$$

- **Problem 481: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\operatorname{Cos}[c+d x]^2\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)}{(a+a\operatorname{Sec}[c+d x])^4}\,dx$$

Optimal (type 3, 239 leaves, 8 steps) :

$$\frac{(21A-8B+2C)\,x}{2a^4}-\frac{8\,(216A-83B+20C)\operatorname{Sin}[c+d x]}{105\,a^4\,d}+\frac{(21A-8B+2C)\operatorname{Cos}[c+d x]\operatorname{Sin}[c+d x]}{2\,a^4\,d}-\frac{(129A-52B+10C)\operatorname{Cos}[c+d x]\operatorname{Sin}[c+d x]}{105\,a^4\,d\,(1+\operatorname{Sec}[c+d x])^2}-$$
$$\frac{4\,(216A-83B+20C)\operatorname{Cos}[c+d x]\operatorname{Sin}[c+d x]}{105\,a^4\,d\,(1+\operatorname{Sec}[c+d x])}-\frac{(A-B+C)\operatorname{Cos}[c+d x]\operatorname{Sin}[c+d x]}{7\,d\,(a+a\operatorname{Sec}[c+d x])^4}-\frac{(2A-B)\operatorname{Cos}[c+d x]\operatorname{Sin}[c+d x]}{5\,a\,d\,(a+a\operatorname{Sec}[c+d x])^3}$$

Result (type 3, 1290 leaves) :

$$\frac{16\,(21\,A-8\,B+2\,C)\,x\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}+$$

$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(A\,\text{Sin}\left[\frac{c}{2}\right]-B\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\left(8\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(39\,A\,\text{Sin}\left[\frac{c}{2}\right]-32\,B\,\text{Sin}\left[\frac{c}{2}\right]+25\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(35\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\left(16\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(447\,A\,\text{Sin}\left[\frac{c}{2}\right]-286\,B\,\text{Sin}\left[\frac{c}{2}\right]+160\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(105\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$
$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\left(8\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(39\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-32\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+25\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$
$$\left(35\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\left(16\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(447\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-286\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+160\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$
$$\left(105\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\left(32\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(1653\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-764\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+260\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$
$$\left(105\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\frac{(4\,A-B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{16\,i\,\text{Cos}[c+d\,x]}{d}-\frac{16\,\text{Sin}[c+d\,x]}{d}\right)}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}+$$

$$\frac{(4\,A-B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(\frac{16\,i\,\text{Cos}[c+d\,x]}{d}-\frac{16\,\text{Sin}[c+d\,x]}{d}\right)}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}+$$

$$\frac{8\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[2\,c+2\,d\,x]}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}$$

- **Problem 486: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$\frac{2\sqrt{a}\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a\,(3\,B+C)\,\text{Tan}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,C\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 506 leaves) :

$$\left(\text{Cos}[c+d\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{4}{3}\,(3\,B+2\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{4}{3}\,C\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,16\left(-3-2\sqrt{2}\right)A\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Cos}[c+d\,x]$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 487: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 98 leaves, 5 steps) :

$$\frac{\sqrt{a}\,(A+2\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{A\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}-\frac{a\,(A-2\,C)\,\text{Tan}[c+d\,x]}{d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 402 leaves) :

$$\frac{\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a(1+\text{Sec}[c+dx])}\left(\frac{1}{2}(-A+4C)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\frac{1}{2}A\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]\right)}{d}-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)(A+2B)\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+dx)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+dx)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\right)\text{Sec}\left[\frac{1}{4}(c+dx)\right]^2}\;\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Sec}[c+dx]\sqrt{a(1+\text{Sec}[c+dx])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+dx)\right]^2}$$

- **Problem 488: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]^2\sqrt{a+a\,\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 117 leaves, 4 steps):

$$\frac{\sqrt{a}\,(3A+4B+8C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{4d}+\frac{a(A+4B)\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{A\,\text{Cos}[c+dx]\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2d}$$

Result (type 4, 421 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(-\frac{1}{8}(A+4 B)\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{4}(A+2 B)\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{8}A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(3 A+4 B+8 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\sqrt{a(1+\text{Sec}[c+d x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

- **Problem 489: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 163 leaves, 5 steps):

$$\frac{\sqrt{a}(5 A+6 B+8 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8 d}+\frac{a(5 A+6 B+8 C)\,\text{Sin}[c+d x]}{8 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a(A+6 B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{12 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{A\,\text{Cos}[c+d x]^2\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 4, 452 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left(-\frac{1}{48}(11\,A+6\,B+24\,C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{12}(4\,A+3\,B+6\,C)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{16}(A+2\,B)\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\frac{1}{24}A\,\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(5\,A+6\,B+8\,C)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 490: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^4\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 209 leaves, 6 steps):

$$\frac{\sqrt{a}\,(35\,A+40\,B+48\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{64\,d}+\frac{a\,(35\,A+40\,B+48\,C)\,\text{Sin}[c+d\,x]}{64\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a\,(35\,A+40\,B+48\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{96\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(A+8\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{24\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{A\,\text{Cos}[c+d\,x]^3\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 476 leaves):

$$\frac{1}{d}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(-\frac{1}{384}(41\,A+88\,B+48\,C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{48}(11\,A+16\,B+12\,C)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{128}(15\,A+8\,B+16\,C)\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\frac{1}{48}(A+2\,B)\,\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]+\frac{1}{64}A\,\text{Sin}\left[\frac{9}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{\left(-64+48\sqrt{2}\right)d}(35\,A+40\,B+48\,C)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 494: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 142 leaves, 6 steps):

$$\frac{2\,a^{3/2}\,A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,(15\,A+20\,B+12\,C)\,\text{Tan}[c+d\,x]}{15\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,a\,(5\,B+3\,C)\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,C\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 4, 554 leaves):

$$\left(\text{Cos}[c+d\,x]^3\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(\frac{2}{15}(15\,A+25\,B+18\,C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{5}C\,\text{Sec}[c+d\,x]^2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{2}{15}\text{Sec}[c+d\,x]\left(5\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+9\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\Big/$$
$$(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,8\left(-3-2\sqrt{2}\right)A\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4$$
$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\,\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$
$$\text{Cos}[c+d\,x]^2\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3$$
$$(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 496: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 157 leaves, 5 steps):

$$\frac{a^{3/2}\,(7\,A+12\,B+8\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,d}+\frac{a^2\,(5\,A+4\,B-8\,C)\,\text{Sin}[c+d\,x]}{4\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}-$$
$$\frac{a\,(A-4\,C)\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{A\,\text{Cos}[c+d\,x]\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 436 leaves):

$$\frac{1}{2}\left(\frac{1}{d}\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a(1+\text{Sec}[c+d\,x]))^{3/2}\right.$$

$$\left(-\frac{1}{8}(5A+4B-16C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{4}(3A+2B)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{8}A\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)(7A+12B+8C)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a(1+\text{Sec}[c+d\,x]))^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}\right)$$

- **Problem 498: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 215 leaves, 6 steps):

$$\frac{a^{3/2}(75A+88B+112C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{64\,d}+\frac{a^2(75A+88B+112C)\,\text{Sin}[c+d\,x]}{64\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2(39A+56B+48C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{96\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a(3A+8B)\,\text{Cos}[c+d\,x]^2\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{A\,\text{Cos}[c+d\,x]^3(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 586 leaves):

$$\Big(\text{Cos}[c+d x]^3\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^3 (a (1+\text{Sec}[c+d x]))^{3/2}$$

$$(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)\Big(-\frac{1}{384}(129 A+136 B+240 C)\,\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]+\frac{1}{48}(27 A+28 B+36 C)\,\text{Sin}\Big[\frac{3}{2}(c+d x)\Big]+$$

$$\frac{1}{128}(23 A+24 B+16 C)\,\text{Sin}\Big[\frac{5}{2}(c+d x)\Big]+\frac{1}{48}(3 A+2 B)\,\text{Sin}\Big[\frac{7}{2}(c+d x)\Big]+\frac{1}{64}A\,\text{Sin}\Big[\frac{9}{2}(c+d x)\Big]\Big)\Big)\Big/$$

$$(d (A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]))+\frac{1}{\left(-64+48\sqrt{2}\right) d (A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])}$$

$$(75 A+88 B+112 C)\,\text{Cos}\Big[\frac{1}{4}(c+d x)\Big]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\right)\text{Cos}[c+d x]^2$$

$$\left(\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\Big],17-12\sqrt{2}\Big]+2\,\text{EllipticPi}\Big[-3+2\sqrt{2},-\text{ArcSin}\Big[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\Big],17-12\sqrt{2}\Big]\right)$$

$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\right)\text{Sec}\Big[\frac{1}{4}(c+d x)\Big]^2}\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\right)\text{Sec}\Big[\frac{1}{4}(c+d x)\Big]^2}$$

$$\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^3 (a (1+\text{Sec}[c+d x]))^{3/2}(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)\sqrt{3-2\sqrt{2}-\text{Tan}\Big[\frac{1}{4}(c+d x)\Big]^2}$$

- **Problem 499: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^5 (a+a\,\text{Sec}[c+d x])^{3/2}(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)\,dx$$

Optimal (type 3, 263 leaves, 7 steps):

$$\frac{a^{3/2}(133 A+150 B+176 C)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\Big]}{128 d}+\frac{a^2 (133 A+150 B+176 C)\,\text{Sin}[c+d x]}{128 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a^2 (133 A+150 B+176 C)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{192 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2 (67 A+90 B+80 C)\,\text{Cos}[c+d x]^2\,\text{Sin}[c+d x]}{240 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a (3 A+10 B)\,\text{Cos}[c+d x]^3\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{40 d}+\frac{A\,\text{Cos}[c+d x]^4 (a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{5 d}$$

Result (type 4, 611 leaves):

$$\frac{1}{d\,(A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])}\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(1019A+1290B+1360C)\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{3840}+\frac{1}{480}(239A+270B+280C)\,\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{256}(49A+46B+48C)\,\mathrm{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\right.$$
$$\left.\frac{1}{240}(17A+15B+10C)\,\mathrm{Sin}\left[\frac{7}{2}(c+d\,x)\right]+\frac{1}{128}(3A+2B)\,\mathrm{Sin}\left[\frac{9}{2}(c+d\,x)\right]+\frac{1}{160}A\,\mathrm{Sin}\left[\frac{11}{2}(c+d\,x)\right]\right)+$$
$$\frac{1}{64\,d\,(A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])}\left(4+3\sqrt{2}\right)(133A+150B+176C)\,\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4$$
$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Cos}[c+d\,x]^2$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},\,-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}$$
$$\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\mathrm{Sec}[c+d\,x]))^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 503: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 182 leaves, 7 steps):

$$\frac{2a^{5/2}A\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{d}+\frac{2a^3(245A+224B+160C)\,\mathrm{Tan}[c+d\,x]}{105\,d\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{2a^2(35A+56B+40C)\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Tan}[c+d\,x]}{105\,d}+$$
$$\frac{2a\,(7B+5C)\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Tan}[c+d\,x]}{35\,d}+\frac{2C\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Tan}[c+d\,x]}{7\,d}$$

Result (type 4, 606 leaves):

$$\frac{1}{d\,(A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])}\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}$$
$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{1}{105}(280A+301B+230C)\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{7}C\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{35}\mathrm{Sec}[c+d\,x]^2\right.$$
$$\left.\left(7B\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+20C\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)+\frac{1}{105}\mathrm{Sec}[c+d\,x]\left(35A\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+98B\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+115C\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)-$$

$$\frac{1}{d\,(A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])}4\left(-3-2\sqrt{2}\right)A\,\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Cos}[c+d\,x]^3$$
$$\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\mathrm{EllipticPi}\left[-3+2\sqrt{2},-\mathrm{ArcSin}\left[\frac{\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\mathrm{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\;\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5$$
$$(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\sqrt{3-2\sqrt{2}-\mathrm{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

- **Problem 505: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]^2\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 197 leaves, 6 steps):

$$\frac{a^{5/2}\,(19A+20B+8C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{4\,d}+\frac{a^3\,(27A-12B-56C)\,\mathrm{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}-\frac{a^2\,(A-4B-8C)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d}-$$
$$\frac{a\,(3A-4C)\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{6\,d}+\frac{A\,\mathrm{Cos}[c+d\,x]\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 467 leaves):

$$\frac{1}{2}\left(\frac{1}{d}\text{Cos}[c+d x]^2\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\right.$$
$$\left(-\frac{1}{48}(27 A-36 B-128 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{3}C\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{8}(5 A+2 B)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{16}A\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)+$$
$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(19 A+20 B+8 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\text{Cos}[c+d x]\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5(a(1+\text{Sec}[c+d x]))^{5/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}\right)$$

- **Problem 507: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4\,(a+a\,\text{Sec}[c+d x])^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 215 leaves, 6 steps):

$$\frac{a^{5/2}(163 A+200 B+304 C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{64 d}+$$
$$\frac{a^3(299 A+392 B+432 C)\,\text{Sin}[c+d x]}{192 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2(17 A+24 B+16 C)\,\text{Cos}[c+d x]\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{32 d}+$$
$$\frac{a(5 A+8 B)\,\text{Cos}[c+d x]^2(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{24 d}+\frac{A\,\text{Cos}[c+d x]^3(a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 587 leaves):

$$\Big(\text{Cos}[c+d\,x]^4\,\text{Sec}\Big[\tfrac{1}{2}(c+d\,x)\Big]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Big(\Big(-\frac{1}{768}(265\,A+376\,B+432\,C)\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]+\frac{1}{96}(55\,A+64\,B+60\,C)\,\text{Sin}\Big[\frac{3}{2}(c+d\,x)\Big]+\frac{1}{256}(47\,A+40\,B+16\,C)\,\text{Sin}\Big[\frac{5}{2}(c+d\,x)\Big]+$$

$$\frac{1}{96}(5\,A+2\,B)\,\text{Sin}\Big[\frac{7}{2}(c+d\,x)\Big]+\frac{1}{128}\,A\,\text{Sin}\Big[\frac{9}{2}(c+d\,x)\Big]\Big)\Big)\Big/\,(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\frac{1}{64\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\big(4+3\sqrt{2}\big)\,(163\,A+200\,B+304\,C)\,\text{Cos}\Big[\frac{1}{4}(c+d\,x)\Big]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\big(10-7\sqrt{2}\big)\,\text{Cos}\big[\frac{1}{2}(c+d\,x)\big]}{1+\text{Cos}\big[\frac{1}{2}(c+d\,x)\big]}}\;\Big(1-\sqrt{2}+\big(-2+\sqrt{2}\big)\,\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\,\text{Cos}[c+d\,x]^3$$

$$\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\text{Tan}\big[\frac{1}{4}(c+d\,x)\big]}{\sqrt{3-2\sqrt{2}}}\Big],\,17-12\sqrt{2}\Big]+2\,\text{EllipticPi}\Big[-3+2\sqrt{2},\,-\text{ArcSin}\Big[\frac{\text{Tan}\big[\frac{1}{4}(c+d\,x)\big]}{\sqrt{3-2\sqrt{2}}}\Big],\,17-12\sqrt{2}\Big]\Big)$$

$$\sqrt{\Big(-1+\sqrt{2}-\big(-2+\sqrt{2}\big)\,\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\,\text{Sec}\Big[\frac{1}{4}(c+d\,x)\Big]^2}\;\sqrt{\Big(-1-\sqrt{2}+\big(2+\sqrt{2}\big)\,\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\,\text{Sec}\Big[\frac{1}{4}(c+d\,x)\Big]^2}$$

$$\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\sqrt{3-2\sqrt{2}-\text{Tan}\Big[\frac{1}{4}(c+d\,x)\Big]^2}$$

- **Problem 508: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^5\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,dx$$

Optimal (type 3, 261 leaves, 7 steps):

$$\frac{a^{5/2}\,(283\,A+326\,B+400\,C)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\Big]}{128\,d}+\frac{a^3\,(283\,A+326\,B+400\,C)\,\text{Sin}[c+d\,x]}{128\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^3\,(787\,A+950\,B+1040\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{960\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(79\,A+110\,B+80\,C)\,\text{Cos}[c+d\,x]^2\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,d}+$$

$$\frac{a\,(A+2\,B)\,\text{Cos}[c+d\,x]^3\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{8\,d}+\frac{A\,\text{Cos}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 4, 611 leaves):

$$\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(2309\,A+2650\,B+3760\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{7680}+\frac{1}{960}\,(509\,A+550\,B+640\,C)\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+\frac{1}{512}\,(95\,A+94\,B+80\,C)\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]+\right.$$
$$\left.\frac{1}{480}\,(32\,A+25\,B+10\,C)\,\text{Sin}\left[\frac{7}{2}\,(c+d\,x)\right]+\frac{1}{256}\,(5\,A+2\,B)\,\text{Sin}\left[\frac{9}{2}\,(c+d\,x)\right]+\frac{1}{320}\,A\,\text{Sin}\left[\frac{11}{2}\,(c+d\,x)\right]\right)+$$
$$\frac{1}{64\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\left(2+\frac{3}{\sqrt{2}}\right)(283\,A+326\,B+400\,C)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4$$
$$\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Cos}[c+d\,x]^3$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 509: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^6\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 311 leaves, 8 steps):

$$\frac{a^{5/2}\,(1015\,A+1132\,B+1304\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{512\,d}+\frac{a^3\,(1015\,A+1132\,B+1304\,C)\,\text{Sin}[c+d\,x]}{512\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^3\,(1015\,A+1132\,B+1304\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{768\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(545\,A+628\,B+680\,C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{960\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(115\,A+156\,B+120\,C)\,\text{Cos}[c+d\,x]^3\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{480\,d}+$$
$$\frac{a\,(5\,A+12\,B)\,\text{Cos}[c+d\,x]^4\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{60\,d}+\frac{A\,\text{Cos}[c+d\,x]^5\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{6\,d}$$

Result (type 4, 635 leaves) :

$$\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\text{Cos}[c+d\,x]^4\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(7945\,A+9236\,B+10\,600\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{30\,720}+\frac{(935\,A+1018\,B+1100\,C)\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]}{1920}+\frac{(1145\,A+1140\,B+1128\,C)\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]}{6144}+\right.$$
$$\left.\frac{(145\,A+128\,B+100\,C)\,\text{Sin}\left[\frac{7}{2}\,(c+d\,x)\right]}{1920}+\frac{(83\,A+60\,B+24\,C)\,\text{Sin}\left[\frac{9}{2}\,(c+d\,x)\right]}{3072}+\frac{1}{640}\,(5\,A+2\,B)\,\text{Sin}\left[\frac{11}{2}\,(c+d\,x)\right]+\frac{1}{768}\,A\,\text{Sin}\left[\frac{13}{2}\,(c+d\,x)\right]\right)+$$
$$\frac{1}{512\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\left(4+3\,\sqrt{2}\right)\,(1015\,A+1132\,B+1304\,C)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4$$
$$\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\,\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Cos}[c+d\,x]^3$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$
$$\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}\,\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

- **Problem 522: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 120 leaves, 4 steps) :

$$\frac{(A+3\,B-7\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}+\frac{(A-B+C)\,\text{Tan}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,C\,\text{Tan}[c+d\,x]}{a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 307 leaves) :

$$\left(2\,(A+3B-7C)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\sqrt{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(a\,(1+\text{Sec}[c+d\,x])\right)^{3/2}\right)+$$

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left.\left(4\,(A-B+5C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\left(a\,(1+\text{Sec}[c+d\,x])\right)^{3/2}\right)$$

- **Problem 526: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 284 leaves, 9 steps):

$$-\frac{(47A-38B+24C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,a^{3/2}\,d}+\frac{(17A-13B+9C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{(21A-14B+12C)\,\text{Sin}[c+d\,x]}{8\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{(13A-12B+6C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{12\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{(5A-3B+3C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{6\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 831 leaves):

$$\Bigg(\text{Cos}[c+d x]^2 (1+\text{Sec}[c+d x])^{3/2} \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(\Bigg(\sqrt{2}\ (-21 A+14 B-12 C)\ \text{ArcTan}\Big[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d x]}}\Big]\ \text{Cos}[c+d x]^2 \sqrt{-1+\text{Sec}[c+d x]}\ (1+\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]\Bigg)\Bigg/$$

$$\left(d\,(1+\text{Cos}[c+d x]) \sqrt{1-\text{Cos}[c+d x]^2}\ \sqrt{\text{Cos}[c+d x]^2 (-1+\text{Sec}[c+d x])\ (1+\text{Sec}[c+d x])}\right) -$$

$$\Bigg((47 A-38 B+24 C)\ \Bigg(\sqrt{2}\ \text{ArcTan}\Big[\frac{\sqrt{2}}{\sqrt{-1+\text{Sec}[c+d x]}}\Big]+\text{ArcTan}\Big[\frac{-2+\sqrt{1+\text{Sec}[c+d x]}}{\sqrt{-1+\text{Sec}[c+d x]}}\Big]-\text{ArcTan}\Big[\frac{2+\sqrt{1+\text{Sec}[c+d x]}}{\sqrt{-1+\text{Sec}[c+d x]}}\Big]\Bigg)$$

$$\text{Cos}[c+d x]^2 \sqrt{-1+\text{Sec}[c+d x]}\ (1+\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]\Bigg)\Bigg/$$

$$\left(d\,(1+\text{Cos}[c+d x]) \sqrt{1-\text{Cos}[c+d x]^2}\ \sqrt{\text{Cos}[c+d x]^2 (-1+\text{Sec}[c+d x])\ (1+\text{Sec}[c+d x])}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(8\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\ (a\,(1+\text{Sec}[c+d x]))^{3/2}\right)+$$

$$\frac{1}{(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\ (a\,(1+\text{Sec}[c+d x]))^{3/2}}$$

$$\text{Cos}[c+d x]^2 \sqrt{(1+\text{Cos}[c+d x])\ \text{Sec}[c+d x]}$$

$$(1+\text{Sec}[c+d x])^{3/2} \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(-A\,\text{Sin}\left[\frac{c}{2}\right]+B\,\text{Sin}\left[\frac{c}{2}\right]-C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{2 d}+\frac{(25 A-14 B+8 C)\ \text{Cos}[d x]\ \text{Sin}[c]}{4 d}-$$

$$\frac{(11 A-6 B)\ \text{Cos}[2 d x]\ \text{Sin}[2 c]}{12 d}+\frac{A\,\text{Cos}[3 d x]\ \text{Sin}[3 c]}{6 d}+\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(-61 A\,\text{Sin}\left[\frac{d x}{2}\right]+30 B\,\text{Sin}\left[\frac{d x}{2}\right]-12 C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{12 d}+$$

$$\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(-A\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[\frac{d x}{2}\right]-C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{2 d}+\frac{(25 A-14 B+8 C)\ \text{Cos}[c]\ \text{Sin}[d x]}{4 d}-$$

$$\frac{(11 A-6 B)\ \text{Cos}[2 c]\ \text{Sin}[2 d x]}{12 d}+\frac{A\,\text{Cos}[3 c]\ \text{Sin}[3 d x]}{6 d}-\frac{(61 A-30 B+12 C)\ \text{Tan}\left[\frac{c}{2}\right]}{12 d}\Bigg)$$

- **Problem 529: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+a\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 179 leaves, 5 steps) :

$$\frac{(5A+19B-75C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{4 d\,(a+a\,\text{Sec}[c+d x])^{5/2}}-\frac{(3A+5B-13C)\,\text{Tan}[c+d x]}{16 a d\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{(A-B+9C)\,\text{Tan}[c+d x]}{4 a^2 d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 372 leaves):

$$\left((5A+19B-75C)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^4\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\sqrt{\text{Sec}[c+d x]}\,\sqrt{1+\text{Sec}[c+d x]}\right.$$
$$\left.(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)\right)\Big/\left(2 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$
$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Sec}[c+d x]\,(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)\right.$$
$$\left((A-9B+49C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(3A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+5B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-13C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\right.$$
$$\left.\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\left(-A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)$$

- **Problem 530: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]\,(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2)}{(a+a\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 137 leaves, 4 steps):

$$\frac{(3A+5B+19C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{4 d\,(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{(7A+B-9C)\,\text{Tan}[c+d x]}{16 a d\,(a+a\,\text{Sec}[c+d x])^{3/2}}$$

Result (type 3, 371 leaves):

$$\left((3A+5B+19C)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right]\text{Cos}\left[\frac{1}{2}(c+dx)\right]^4\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\sqrt{\text{Sec}[c+dx]}\sqrt{1+\text{Sec}[c+dx]}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Bigg/\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}\,(a\,(1+\text{Sec}[c+dx]))^{5/2}\right)+$$
$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^5\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right.$$
$$\left((7A+B-9C)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\text{Sec}\left[\frac{1}{2}(c+dx)\right]^4\left(A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)+\right.$$
$$\left.\left.\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\left(-11A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+3B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+5C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\right)\Bigg/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a\,(1+\text{Sec}[c+dx]))^{5/2}\right)$$

- **Problem 531: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2}{(a+a\,\text{Sec}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 171 leaves, 7 steps):

$$\frac{2A\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{a^{5/2}d}-\frac{(43A-3B-5C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{16\sqrt{2}\,a^{5/2}d}-\frac{(A-B+C)\,\text{Tan}[c+dx]}{4d\,(a+a\,\text{Sec}[c+dx])^{5/2}}-\frac{(11A-3B-5C)\,\text{Tan}[c+dx]}{16ad\,(a+a\,\text{Sec}[c+dx])^{3/2}}$$

Result (type 3, 418 leaves):

$$\left(\left(\left((-43A+3B+5C)\,\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right]+32\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}}\right]\right)\right.\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]^4\sqrt{\frac{\text{Cos}[c+dx]}{1+\text{Cos}[c+dx]}}\,\sqrt{\text{Sec}[c+dx]}\,\sqrt{1+\text{Sec}[c+dx]}\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2}\,(a\,(1+\text{Sec}[c+dx]))^{5/2}\right)+$$

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^5\text{Sec}[c+dx]\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right.$$

$$\left(-(15A-7B-C)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\text{Sec}\left[\frac{1}{2}(c+dx)\right]^4\left(-A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)+\right.$$

$$\left.\left.\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\left(19A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-11B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+3C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a\,(1+\text{Sec}[c+dx]))^{5/2}\right)$$

- **Problem 532: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+dx]\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 217 leaves, 8 steps):

$$-\frac{(5A-2B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{a^{5/2}\,d}+\frac{(115A-43B+3C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-$$

$$\frac{(A-B+C)\,\text{Sin}[c+dx]}{4d\,(a+a\,\text{Sec}[c+dx])^{5/2}}-\frac{(15A-7B-C)\,\text{Sin}[c+dx]}{16\,a\,d\,(a+a\,\text{Sec}[c+dx])^{3/2}}+\frac{(35A-11B+3C)\,\text{Sin}[c+dx]}{16\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 3, 839 leaves):

$$\Big(\mathrm{Cos}[c+d\,x]^2\,(1+\mathrm{Sec}[c+d\,x])^{5/2}\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\Bigg(\Bigg(\sqrt{2}\,(-35\,A+11\,B-3\,C)\,\mathrm{ArcTan}\Big[\frac{\sqrt{2}}{\sqrt{-1+\mathrm{Sec}[c+d\,x]}}\Big]\,\mathrm{Cos}[c+d\,x]^2\,\sqrt{-1+\mathrm{Sec}[c+d\,x]}\,(1+\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/$$

$$\Big(d\,(1+\mathrm{Cos}[c+d\,x])\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{\mathrm{Cos}[c+d\,x]^2\,(-1+\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])}\Big)-$$

$$\Bigg((80\,A-32\,B)\,\Bigg(\sqrt{2}\,\mathrm{ArcTan}\Big[\frac{\sqrt{2}}{\sqrt{-1+\mathrm{Sec}[c+d\,x]}}\Big]+\mathrm{ArcTan}\Big[\frac{-2+\sqrt{1+\mathrm{Sec}[c+d\,x]}}{\sqrt{-1+\mathrm{Sec}[c+d\,x]}}\Big]-\mathrm{ArcTan}\Big[\frac{2+\sqrt{1+\mathrm{Sec}[c+d\,x]}}{\sqrt{-1+\mathrm{Sec}[c+d\,x]}}\Big]\Bigg)$$

$$\mathrm{Cos}[c+d\,x]^2\,\sqrt{-1+\mathrm{Sec}[c+d\,x]}\,(1+\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/$$

$$\Big(d\,(1+\mathrm{Cos}[c+d\,x])\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{\mathrm{Cos}[c+d\,x]^2\,(-1+\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])}\Big)\Bigg)\Bigg)\Big/$$

$$\Big(16\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}\Big)+$$

$$\frac{1}{(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a\,(1+\mathrm{Sec}[c+d\,x]))^{5/2}}$$

$$\mathrm{Cos}[c+d\,x]^2\,\sqrt{(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}$$

$$(1+\mathrm{Sec}[c+d\,x])^{5/2}\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\frac{\mathrm{Sec}[\frac{c}{2}]\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^2\,\big(-27\,A\,\mathrm{Sin}[\frac{c}{2}]+19\,B\,\mathrm{Sin}[\frac{c}{2}]-11\,C\,\mathrm{Sin}[\frac{c}{2}]\big)}{16\,d}+$$

$$\frac{\mathrm{Sec}[\frac{c}{2}]\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^4\,\big(A\,\mathrm{Sin}[\frac{c}{2}]-B\,\mathrm{Sin}[\frac{c}{2}]+C\,\mathrm{Sin}[\frac{c}{2}]\big)}{8\,d}+\frac{2\,A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{d}+$$

$$\frac{\mathrm{Sec}[\frac{c}{2}]\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^3\,\big(-27\,A\,\mathrm{Sin}[\frac{d\,x}{2}]+19\,B\,\mathrm{Sin}[\frac{d\,x}{2}]-11\,C\,\mathrm{Sin}[\frac{d\,x}{2}]\big)}{16\,d}+\frac{\mathrm{Sec}[\frac{c}{2}]\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^5\,\big(A\,\mathrm{Sin}[\frac{d\,x}{2}]-B\,\mathrm{Sin}[\frac{d\,x}{2}]+C\,\mathrm{Sin}[\frac{d\,x}{2}]\big)}{8\,d}+$$

$$\frac{\mathrm{Sec}[\frac{c}{2}]\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]\,\big(7\,A\,\mathrm{Sin}[\frac{d\,x}{2}]-15\,B\,\mathrm{Sin}[\frac{d\,x}{2}]+7\,C\,\mathrm{Sin}[\frac{d\,x}{2}]\big)}{8\,d}+\frac{2\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}+\frac{(7\,A-15\,B+7\,C)\,\mathrm{Tan}[\frac{c}{2}]}{8\,d}\Bigg)$$

- **Problem 534: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,dx$$

Optimal (type 4, 217 leaves, 9 steps):

$$-\frac{2 a (5 A+3 (B+C)) \sqrt{\cos[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\sec[c+d x]}}{5 d}+$$
$$\frac{2 a (7 A+7 B+5 C) \sqrt{\cos[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\sec[c+d x]}}{21 d}+\frac{2 a (5 A+3 (B+C)) \sqrt{\sec[c+d x]}\, \sin[c+d x]}{5 d}+$$
$$\frac{2 a (7 A+7 B+5 C) \sec[c+d x]^{3/2} \sin[c+d x]}{21 d}+\frac{2 a (B+C) \sec[c+d x]^{5/2} \sin[c+d x]}{5 d}+\frac{2 a C \sec[c+d x]^{7/2} \sin[c+d x]}{7 d}$$

Result (type 5, 997 leaves) :

$$a \left(-\left(2 \sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \cos[c+d x]^2 \csc[c]\right.\right.$$
$$\left.\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)\right) \Big/$$
$$(d (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x]))-\left(6 \sqrt{2} B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \cos[c+d x]^2 \csc[c]\right.$$
$$\left.\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)\right) \Big/$$
$$(5 d (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x]))-\left(6 \sqrt{2} C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \cos[c+d x]^2 \csc[c]\right.$$
$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)$$
$$\left.\left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)\right) \Big/ (5 d (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x]))+$$
$$\frac{4 A \cos[c+d x]^{5/2}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\sec[c+d x]} \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)}{3 d (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])}+$$
$$\frac{4 B \cos[c+d x]^{5/2}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\sec[c+d x]} \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)}{3 d (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])}+$$

$$\frac{20\,C\,\text{Cos}[c+d\,x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\left(\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{4\,(5\,A+3\,B+3\,C)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{5\,d}+\frac{4\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{7\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(5\,C\,\text{Sin}[c]+7\,B\,\text{Sin}[d\,x]+7\,C\,\text{Sin}[d\,x])}{35\,d}+\right.$$

$$\left.\left.\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(21\,B\,\text{Sin}[c]+21\,C\,\text{Sin}[c]+35\,A\,\text{Sin}[d\,x]+35\,B\,\text{Sin}[d\,x]+25\,C\,\text{Sin}[d\,x])}{105\,d}+\frac{4\,(7\,A+7\,B+5\,C)\,\text{Tan}[c]}{21\,d}\right)\right)\Big/$$

$$\left.\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\right)\right)$$

- **Problem 535: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 181 leaves, 8 steps) :

$$-\frac{2\,a\,(5\,A+5\,B+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+$$

$$\frac{2\,a\,(3\,A+B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+$$

$$\frac{2\,a\,(5\,A+5\,B+3\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,(B+C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,C\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 937 leaves) :

$$a\left(-\left(2\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\right.\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg)\Bigg/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]))-\left(2\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg)\Bigg/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]))-\left(6\sqrt{2}\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)$$

$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\ (5\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]))+$$

$$\frac{4\,A\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}+$$

$$\frac{4\,B\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}+$$

$$\frac{4\,C\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}+$$

$$\left(\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left(\frac{4\,(5A+5B+3C)\,\text{Cos}[d x]\,\text{Csc}[c]}{5\,d}+\frac{4\,C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,(3\,C\,\text{Sin}[c]+5\,B\,\text{Sin}[d x]+5\,C\,\text{Sin}[d x])}{15\,d}+\right.$$

$$\left.\left.\left.\frac{4\,(B+C)\,\text{Tan}[c]}{3\,d}\right)\right)\Big/\left((A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{3/2}\right)\right)$$

- **Problem 536: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a\,\text{Sec}[c + d\,x])\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)}{\sqrt{\text{Sec}[c + d\,x]}}\,dx$$

Optimal (type 4, 143 leaves, 7 steps):

$$\frac{2\,a\,(A - B - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{d} + \frac{2\,a\,(3\,A + 3\,B + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,d} + \frac{2\,a\,(B + C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{d} + \frac{2\,a\,C\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{3\,d}$$

Result (type 5, 908 leaves):

$$a\left(\left(\left(2\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\right.\right.\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]))-\left(2\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]))-\left(2\sqrt{2}\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)$$

$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]))+$$

$$\frac{4A\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}+$$

$$\frac{4B\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}+$$

$$\frac{4C\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{3d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}+$$

$$\left(\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{2\,(A-2B-2C+A\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}[c]}{d}+\frac{4A\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\right.\right.$$

$$\left.\left.\left.\frac{4C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{3d}+\frac{4C\,\text{Tan}[c]}{3d}\right)\right)\Big/\left((A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{3/2}\right)\right)$$

Problem 537: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 138 leaves, 7 steps):

$$\frac{2\,a\,(A+B-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{2\,a\,(A+3\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a\,C\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 5, 162 leaves):

$$\frac{1}{3\,d}a\,\sqrt{\text{Sec}[c+d\,x]}\,\left(-6\,i\,A\,\text{Cos}[c+d\,x]-6\,i\,B\,\text{Cos}[c+d\,x]+6\,i\,C\,\text{Cos}[c+d\,x]+2\,(A+3\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+6\,i\,(A+B-C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+6\,C\,\text{Sin}[c+d\,x]+A\,\text{Sin}[2\,(c+d\,x)]\right)$$

Problem 538: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 146 leaves, 7 steps):

$$\frac{2\,a\,(3\,A+5\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{2\,a\,(A+B+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 156 leaves):

$$\frac{1}{30\,d}a\,\sqrt{\text{Sec}[c+d\,x]}\,\left(20\,(A+B+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+12\,i\,(3\,A+5\,(B+C))\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-6\,i\,(3\,A+5\,(B+C))+10\,(A+B)\,\text{Sin}[c+d\,x]+3\,A\,\text{Sin}[2\,(c+d\,x)])\right)$$

Problem 539: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 182 leaves, 8 steps):

$$\frac{2\,a\,(3\,(A+B)+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{2\,a\,(5\,A+7\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+7\,(B+C))\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 180 leaves):

$$\frac{1}{420\,d}\,a\,\sqrt{\text{Sec}[c+d\,x]}\,\left(40\,(5\,A+7\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+168\,\mathrm{i}\,(3\,A+3\,B+5\,C)\,e^{-\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-84\,\mathrm{i}\,(3\,A+3\,B+5\,C)+5\,(23\,A+28\,(B+C))\,\text{Sin}[c+d\,x]+42\,(A+B)\,\text{Sin}[2\,(c+d\,x)]+15\,A\,\text{Sin}[3\,(c+d\,x)])\right)$$

- **Problem 540: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 215 leaves, 9 steps):

$$\frac{2\,a\,(7\,A+9\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+\frac{2\,a\,(5\,(A+B)+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,a\,(7\,A+9\,(B+C))\,\text{Sin}[c+d\,x]}{45\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,(A+B)+7\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 210 leaves):

$$\frac{1}{2520\,d}\,a\,\sqrt{\text{Sec}[c+d\,x]}\,\left(240\,(5\,A+5\,B+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+336\,\mathrm{i}\,(7\,A+9\,(B+C))\,e^{-\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,\mathrm{i}\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-1176\,\mathrm{i}\,A-1512\,\mathrm{i}\,B-1512\,\mathrm{i}\,C+30\,(23\,A+23\,B+28\,C)\,\text{Sin}[c+d\,x]+14\,(19\,A+18\,(B+C))\,\text{Sin}[2\,(c+d\,x)]+90\,A\,\text{Sin}[3\,(c+d\,x)]+90\,B\,\text{Sin}[3\,(c+d\,x)]+35\,A\,\text{Sin}[4\,(c+d\,x)])\right)$$

Problem 541: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d x]^{3/2} (a+a\,\mathrm{Sec}[c+d x])^2 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 291 leaves, 10 steps):

$$-\frac{4 a^2 (12 A+9 B+8 C) \sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\mathrm{Sec}[c+d x]}}{15 d}+\frac{4 a^2 (7 A+6 B+5 C) \sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\mathrm{Sec}[c+d x]}}{21 d}+\frac{4 a^2 (12 A+9 B+8 C) \sqrt{\mathrm{Sec}[c+d x]}\ \mathrm{Sin}[c+d x]}{15 d}+\frac{4 a^2 (7 A+6 B+5 C)\ \mathrm{Sec}[c+d x]^{3/2}\ \mathrm{Sin}[c+d x]}{21 d}+\frac{2 a^2 (21 A+27 B+19 C)\ \mathrm{Sec}[c+d x]^{5/2}\ \mathrm{Sin}[c+d x]}{105 d}+\frac{2 C\,\mathrm{Sec}[c+d x]^{5/2} (a+a\,\mathrm{Sec}[c+d x])^2\ \mathrm{Sin}[c+d x]}{9 d}+\frac{2 (9 B+4 C)\ \mathrm{Sec}[c+d x]^{5/2} \left(a^2+a^2\,\mathrm{Sec}[c+d x]\right) \mathrm{Sin}[c+d x]}{63 d}$$

Result (type 5, 1240 leaves):

$$-\left(4 \sqrt{2}\ A\ e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \mathrm{Cos}[c+d x]^4\ \mathrm{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d x])^2 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/ \left(5 d \left(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]\right)\right)-$$
$$\left(3 \sqrt{2}\ B\ e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \mathrm{Cos}[c+d x]^4\ \mathrm{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d x])^2 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/ \left(5 d \left(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]\right)\right)-$$
$$\left(8 \sqrt{2}\ C\ e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \mathrm{Cos}[c+d x]^4\ \mathrm{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d x])^2 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/ \left(15 d \left(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]\right)\right)+$$
$$\left(2 A \sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d x])^2 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(4\,B\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(7\,d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(10\,C\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(21\,d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\frac{1}{(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{7/2}}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{2\,(12A+9B+8C)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{15\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{9\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(7\,C\,\text{Sin}[c]+9\,B\,\text{Sin}[d\,x]+18\,C\,\text{Sin}[d\,x])}{63\,d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(45\,B\,\text{Sin}[c]+90\,C\,\text{Sin}[c]+63\,A\,\text{Sin}[d\,x]+126\,B\,\text{Sin}[d\,x]+112\,C\,\text{Sin}[d\,x])}{315\,d}+\frac{1}{315\,d}$$

$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(63\,A\,\text{Sin}[c]+126\,B\,\text{Sin}[c]+112\,C\,\text{Sin}[c]+210\,A\,\text{Sin}[d\,x]+180\,B\,\text{Sin}[d\,x]+150\,C\,\text{Sin}[d\,x])+\frac{2\,(7A+6B+5C)\,\text{Tan}[c]}{21\,d}\right)$$

- **Problem 542: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\;(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 255 leaves, 9 steps):

$$-\frac{4\,a^2\,(5A+4B+3C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+$$

$$\frac{4\,a^2\,(14A+7B+6C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+$$

$$\frac{4\,a^2\,(5A+4B+3C)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a^2\,(35A+49B+33C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$

$$\frac{2\,C\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d}+\frac{2\,(7B+4C)\,\text{Sec}[c+d\,x]^{3/2}\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\text{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 1184 leaves):

$$-\left(\sqrt{2}\, A\, e^{-i (2c+dx)} \sqrt{\frac{e^{i (c+dx)}}{1+e^{2i (c+dx)}}}\, \text{Cos}[c+dx]^4\, \text{Csc}[c] \left(1+e^{2i (c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i (c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i (c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right) \Big/ (d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])) -$$

$$\left(4\sqrt{2}\, B\, e^{-i (2c+dx)} \sqrt{\frac{e^{i (c+dx)}}{1+e^{2i (c+dx)}}}\, \text{Cos}[c+dx]^4\, \text{Csc}[c] \left(1+e^{2i (c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i (c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i (c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right) \Big/ (5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])) -$$

$$\left(3\sqrt{2}\, C\, e^{-i (2c+dx)} \sqrt{\frac{e^{i (c+dx)}}{1+e^{2i (c+dx)}}}\, \text{Cos}[c+dx]^4\, \text{Csc}[c] \left(1+e^{2i (c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i (c+dx)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i (c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right) \Big/ (5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])) +$$

$$\left(4A\sqrt{\text{Cos}[c+dx]}\, \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right] \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right) \Big/$$
$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right) +$$

$$\left(2B\sqrt{\text{Cos}[c+dx]}\, \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right] \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right) \Big/$$
$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right) +$$

$$\left(4C\sqrt{\text{Cos}[c+dx]}\, \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right] \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right) \Big/$$
$$\left(7d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right) +$$

$$\left(\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4 (a+a\,\text{Sec}[c+dx])^2 \left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right.$$
$$\left(\frac{2(5A+4B+3C)\,\text{Cos}[dx]\,\text{Csc}[c]}{5d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+dx]^3\,\text{Sin}[dx]}{7d}+\frac{\text{Sec}[c]\,\text{Sec}[c+dx]^2\,(5C\,\text{Sin}[c]+7B\,\text{Sin}[dx]+14C\,\text{Sin}[dx])}{35d}+\right.$$
$$\left.\left.\frac{\text{Sec}[c]\,\text{Sec}[c+dx]\,(21B\,\text{Sin}[c]+42C\,\text{Sin}[c]+35A\,\text{Sin}[dx]+70B\,\text{Sin}[dx]+60C\,\text{Sin}[dx])}{105d}+\frac{(7A+14B+12C)\,\text{Tan}[c]}{21d}\right)\right) \Big/$$
$$\left((A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)$$

■ **Problem 543: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 214 leaves, 8 steps):

$$-\frac{4\,a^2\,(5\,B+4\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+$$
$$\frac{4\,a^2\,(3\,A+2\,B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a^2\,(15\,A+25\,B+17\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{2\,C\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,(5\,B+4\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d}$$

Result (type 5, 942 leaves):

$$-\left(\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)-$$

$$\left(4\sqrt{2}\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(5\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$

$$\left(2A\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\left(4B\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\left(2C\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{(-5A-20B-16C+5A\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}[c]}{10\,d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\right.\right.$$
$$\left.\left.\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(3C\,\text{Sin}[c]+5B\,\text{Sin}[d x]+10C\,\text{Sin}[d x])}{15\,d}+\frac{(B+2C)\,\text{Tan}[c]}{3\,d}\right)\right)\Big/$$
$$\left((A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)$$

Problem 544: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 208 leaves, 8 steps) :

$$\frac{4 a^2 (A-C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\frac{4 a^2 (2 A+3 B+2 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}-\frac{2 a^2 (A-3 B-5 C) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3 d}+\frac{2 A (a+a\,\text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}}-\frac{2 (A-C) \sqrt{\text{Sec}[c+d x]}\left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{3 d}$$

Result (type 5, 233 leaves):

$$\frac{1}{6 d} a^2 e^{-i (2 c+d x)} \text{Sec}[c+d x]^{3/2} \left(-12 i A+12 i C-12 i A \text{Cos}[2 (c+d x)]+12 i C \text{Cos}[2 (c+d x)]+8 (2 A+3 B+2 C) \text{Cos}[c+d x]^{3/2} \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right]+12 i (A-C) e^{-2 i (c+d x)} \left(1+e^{2 i (c+d x)}\right)^{3/2} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+A \text{Sin}[c+d x]+4 C \text{Sin}[c+d x]+6 B \text{Sin}[2 (c+d x)]+12 C \text{Sin}[2 (c+d x)]+A \text{Sin}[3 (c+d x)]\right) (\text{Cos}[2 c+d x]+i \text{Sin}[2 c+d x])$$

- **Problem 545: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{5/2}}\, dx$$

Optimal (type 4, 214 leaves, 8 steps):

$$\frac{4 a^2 (4 A+5 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+\frac{4 a^2 (A+2 B+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}-\frac{2 a^2 (7 A+5 B-15 C) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 d}+\frac{2 A (a+a\,\text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{5 d\, \text{Sec}[c+d x]^{3/2}}+\frac{2 (4 A+5 B) \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{15 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 5, 187 leaves):

$$\frac{1}{30 d} a^2 \sqrt{\text{Sec}[c+d x]} \left(-96 i A \text{Cos}[c+d x]-120 i B \text{Cos}[c+d x]+40 (A+2 B+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right]+24 i (4 A+5 B) e^{-i (c+d x)} \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+3 A \text{Sin}[c+d x]+60 C \text{Sin}[c+d x]+20 A \text{Sin}[2 (c+d x)]+10 B \text{Sin}[2 (c+d x)]+3 A \text{Sin}[3 (c+d x)]\right)$$

Problem 546: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 219 leaves, 8 steps):

$$\frac{4\,a^2\,(3\,A+4\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{4\,a^2\,(6\,A+7\,B+14\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a^2\,(33\,A+49\,B+35\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,(4\,A+7\,B)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d\,\text{Sec}[c+d\,x]^{3/2}}$$

Result (type 5, 189 leaves):

$$\frac{1}{420\,d}a^2\,\sqrt{\text{Sec}[c+d\,x]}\,\left(80\,(6\,A+7\,(B+2\,C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+336\,i\,(3\,A+4\,B+5\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-504\,i\,A-672\,i\,B-840\,i\,C+5\,(51\,A+28\,(2\,B+C))\,\text{Sin}[c+d\,x]+42\,(2\,A+B)\,\text{Sin}[2\,(c+d\,x)]+15\,A\,\text{Sin}[3\,(c+d\,x)])\right)$$

Problem 547: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 255 leaves, 9 steps):

$$\frac{4\,a^2\,(8\,A+9\,B+12\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+\frac{4\,a^2\,(5\,A+6\,B+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a^2\,(19\,A+27\,B+21\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(5\,A+6\,B+7\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{2\,(4\,A+9\,B)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{63\,d\,\text{Sec}[c+d\,x]^{5/2}}$$

Result (type 5, 248 leaves):

$$\frac{1}{2520\,d} a^2 e^{-i(2c+dx)} \sqrt{\mathrm{Sec}[c+dx]} \Big(480\,(5A+6B+7C)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right] + 672\,i\,(8A+9B+12C)\,e^{-i(c+dx)}\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right] + 2\,\mathrm{Cos}[c+dx]\,(-2688\,i\,A-3024\,i\,B-4032\,i\,C+30\,(46A+51B+56C)\,\mathrm{Sin}[c+dx]+14\,(37A+36B+18C)\,\mathrm{Sin}[2(c+dx)] + 180\,A\,\mathrm{Sin}[3(c+dx)]+90\,B\,\mathrm{Sin}[3(c+dx)]+35\,A\,\mathrm{Sin}[4(c+dx)])\Big)\,(\mathrm{Cos}[2c+dx]+i\,\mathrm{Sin}[2c+dx])$$

- **Problem 548: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\mathrm{Sec}[c+dx])^2\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)}{\mathrm{Sec}[c+dx]^{11/2}}\,dx$$

Optimal (type 4, 291 leaves, 10 steps):

$$\frac{4a^2(7A+8B+9C)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{15\,d} + \frac{4a^2(50A+55B+66C)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{231\,d} + \frac{2a^2(89A+121B+99C)\,\mathrm{Sin}[c+dx]}{693\,d\,\mathrm{Sec}[c+dx]^{5/2}} + \frac{4a^2(7A+8B+9C)\,\mathrm{Sin}[c+dx]}{45\,d\,\mathrm{Sec}[c+dx]^{3/2}} + \frac{4a^2(50A+55B+66C)\,\mathrm{Sin}[c+dx]}{231\,d\sqrt{\mathrm{Sec}[c+dx]}} + \frac{2A(a+a\,\mathrm{Sec}[c+dx])^2\,\mathrm{Sin}[c+dx]}{11\,d\,\mathrm{Sec}[c+dx]^{9/2}} + \frac{2(4A+11B)\left(a^2+a^2\,\mathrm{Sec}[c+dx]\right)\mathrm{Sin}[c+dx]}{99\,d\,\mathrm{Sec}[c+dx]^{7/2}}$$

Result (type 5, 1337 leaves):

$$\left(7\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}[c+dx]^4\,\mathrm{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\mathrm{Sec}[c+dx])^2\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/\left(15\,d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\right) +$$

$$\left(8\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}[c+dx]^4\,\mathrm{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\mathrm{Sec}[c+dx])^2\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/\left(15\,d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\right) +$$

$$\left(3\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}[c+dx]^4\,\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\right)+$$

$$\left(100A\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(231d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)+$$

$$\left(10B\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(21d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)+$$

$$\left(4C\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(7d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)+$$

$$\frac{1}{(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4(a+a\,\text{Sec}[c+dx])^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(-\frac{(298A+347B+396C+374A\,\text{Cos}[2c]+421B\,\text{Cos}[2c]+468C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}[c]}{720d}+\frac{(2185A+2288B+2376C)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{7392d}+\right.$$

$$\frac{(86A+79B+72C)\,\text{Cos}[3dx]\,\text{Sin}[3c]}{720d}+\frac{(27A+22B+11C)\,\text{Cos}[4dx]\,\text{Sin}[4c]}{616d}+\frac{(2A+B)\,\text{Cos}[5dx]\,\text{Sin}[5c]}{144d}+$$

$$\frac{A\,\text{Cos}[6dx]\,\text{Sin}[6c]}{352d}+\frac{(374A+421B+468C)\,\text{Cos}[c]\,\text{Sin}[dx]}{360d}+\frac{(2185A+2288B+2376C)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{7392d}+$$

$$\left.\frac{(86A+79B+72C)\,\text{Cos}[3c]\,\text{Sin}[3dx]}{720d}+\frac{(27A+22B+11C)\,\text{Cos}[4c]\,\text{Sin}[4dx]}{616d}+\frac{(2A+B)\,\text{Cos}[5c]\,\text{Sin}[5dx]}{144d}+\frac{A\,\text{Cos}[6c]\,\text{Sin}[6dx]}{352d}\right)$$

- **Problem 549: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+dx]^{3/2}(a+a\,\text{Sec}[c+dx])^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 4, 343 leaves, 11 steps):

$$-\frac{4 a^3 (21 A+17 B+15 C) \sqrt{\text{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{15 d}+$$
$$\frac{4 a^3 (143 A+121 B+105 C) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{231 d}+$$
$$\frac{4 a^3 (21 A+17 B+15 C) \sqrt{\text{Sec}[c+d x]} \text{ Sin}[c+d x]}{15 d}+\frac{4 a^3 (143 A+121 B+105 C) \text{ Sec}[c+d x]^{3/2} \text{ Sin}[c+d x]}{231 d}+$$
$$\frac{4 a^3 (264 A+253 B+210 C) \text{ Sec}[c+d x]^{5/2} \text{ Sin}[c+d x]}{1155 d}+\frac{2 C \text{ Sec}[c+d x]^{5/2} (a+a \text{ Sec}[c+d x])^3 \text{ Sin}[c+d x]}{11 d}+$$
$$\frac{2 (11 B+6 C) \text{ Sec}[c+d x]^{5/2} \left(a^2+a^2 \text{ Sec}[c+d x]\right)^2 \text{ Sin}[c+d x]}{99 a d}+\frac{2 (99 A+143 B+105 C) \text{ Sec}[c+d x]^{5/2} \left(a^3+a^3 \text{ Sec}[c+d x]\right) \text{ Sin}[c+d x]}{693 d}$$

Result (type 5, 1292 leaves) :

$$-\left(7 A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{ Cos}[c+d x]^5 \text{ Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{ Sec}[c+d x])^3 \left(A+B \text{ Sec}[c+d x]+C \text{ Sec}[c+d x]^2\right)\right) \Big/ \left(5 \sqrt{2} d (A+2 C+2 B \text{ Cos}[c+d x]+A \text{ Cos}[2 c+2 d x])\right)-$$
$$\left(17 B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{ Cos}[c+d x]^5 \text{ Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{ Sec}[c+d x])^3 \left(A+B \text{ Sec}[c+d x]+C \text{ Sec}[c+d x]^2\right)\right) \Big/ \left(15 \sqrt{2} d (A+2 C+2 B \text{ Cos}[c+d x]+A \text{ Cos}[2 c+2 d x])\right)-$$
$$\left(C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{ Cos}[c+d x]^5 \text{ Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{ Sec}[c+d x])^3 \left(A+B \text{ Sec}[c+d x]+C \text{ Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2} d (A+2 C+2 B \text{ Cos}[c+d x]+A \text{ Cos}[2 c+2 d x])\right)+$$
$$\left(13 A \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{ Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{ Sec}[c+d x])^3 \left(A+B \text{ Sec}[c+d x]+C \text{ Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(21 d (A+2 C+2 B \text{ Cos}[c+d x]+A \text{ Cos}[2 c+2 d x]) \text{ Sec}[c+d x]^{9/2}\right)+$$

$$\left(11\,B\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$
$$\left(5\,C\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(11\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$
$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{(21\,A+17\,B+15\,C)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{15\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{22\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(9\,C\,\text{Sin}[c]+11\,B\,\text{Sin}[d\,x]+33\,C\,\text{Sin}[d\,x])}{198\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(77\,B\,\text{Sin}[c]+231\,C\,\text{Sin}[c]+99\,A\,\text{Sin}[d\,x]+297\,B\,\text{Sin}[d\,x]+378\,C\,\text{Sin}[d\,x])}{1386\,d}+\frac{1}{6930\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^2$$
$$(495\,A\,\text{Sin}[c]+1485\,B\,\text{Sin}[c]+1890\,C\,\text{Sin}[c]+2079\,A\,\text{Sin}[d\,x]+2618\,B\,\text{Sin}[d\,x]+2310\,C\,\text{Sin}[d\,x])+\frac{1}{6930\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]$$
$$\left.(2079\,A\,\text{Sin}[c]+2618\,B\,\text{Sin}[c]+2310\,C\,\text{Sin}[c]+4290\,A\,\text{Sin}[d\,x]+3630\,B\,\text{Sin}[d\,x]+3150\,C\,\text{Sin}[d\,x])+\frac{(143\,A+121\,B+105\,C)\,\text{Tan}[c]}{231\,d}\right)$$

- **Problem 550: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 307 leaves, 10 steps):

$$-\frac{4\,a^3\,(27\,A+21\,B+17\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+$$
$$\frac{4\,a^3\,(21\,A+13\,B+11\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{4\,a^3\,(27\,A+21\,B+17\,C)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{4\,a^3\,(42\,A+41\,B+32\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d}+$$
$$\frac{2\,(3\,B+2\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{21\,a\,d}+\frac{2\,(63\,A+99\,B+73\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{315\,d}$$

Result (type 5, 1237 leaves):

$$-\left(9\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\;\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]\right)\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg) \Big/ \left(5\sqrt{2}\, d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\right) -$$

$$\Bigg(7 B\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\, \text{Cos}[c+d x]^5\, \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg) \Big/ \left(5\sqrt{2}\, d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\right) -$$

$$\Bigg(17 C\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\, \text{Cos}[c+d x]^5\, \text{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg) \Big/ \left(15\sqrt{2}\, d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\right) +$$

$$\left(A \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\, \text{Sec}[c+d x]^{9/2}\right) +$$

$$\left(13 B \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(21 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\, \text{Sec}[c+d x]^{9/2}\right) +$$

$$\left(11 C \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(21 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\, \text{Sec}[c+d x]^{9/2}\right) +$$

$$\frac{1}{(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\, \text{Sec}[c+d x]^{9/2}}\, \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\frac{(27 A+21 B+17 C)\,\text{Cos}[d x]\,\text{Csc}[c]}{15 d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{18 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(7 C\,\text{Sin}[c]+9 B\,\text{Sin}[d x]+27 C\,\text{Sin}[d x])}{126 d}+$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(45 B\,\text{Sin}[c]+135 C\,\text{Sin}[c]+63 A\,\text{Sin}[d x]+189 B\,\text{Sin}[d x]+238 C\,\text{Sin}[d x])}{630 d}+\frac{1}{630 d}$$

$$\text{Sec}[c]\,\text{Sec}[c+d x]\,(63 A\,\text{Sin}[c]+189 B\,\text{Sin}[c]+238 C\,\text{Sin}[c]+315 A\,\text{Sin}[d x]+390 B\,\text{Sin}[d x]+330 C\,\text{Sin}[d x])+\frac{(21 A+26 B+22 C)\,\text{Tan}[c]}{42 d}\Bigg)$$

- **Problem 551: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a\,\text{Sec}[c + d\,x])^3 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)}{\sqrt{\text{Sec}[c + d\,x]}}\, dx$$

Optimal (type 4, 271 leaves, 9 steps):

$$-\frac{4\,a^3\,(5\,A + 9\,B + 7\,C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\sqrt{\text{Sec}[c + d\,x]}}{5\,d} +$$
$$\frac{4\,a^3\,(35\,A + 21\,B + 13\,C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\sqrt{\text{Sec}[c + d\,x]}}{21\,d} +$$
$$\frac{4\,a^3\,(140\,A + 147\,B + 106\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{105\,d} + \frac{2\,C\,\sqrt{\text{Sec}[c + d\,x]}\,(a + a\,\text{Sec}[c + d\,x])^3\,\text{Sin}[c + d\,x]}{7\,d} +$$
$$\frac{2\,(7\,B + 6\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\left(a^2 + a^2\,\text{Sec}[c + d\,x]\right)^2\,\text{Sin}[c + d\,x]}{35\,a\,d} + \frac{2\,(5\,A + 9\,B + 7\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\left(a^3 + a^3\,\text{Sec}[c + d\,x]\right)\,\text{Sin}[c + d\,x]}{15\,d}$$

Result (type 5, 1202 leaves):

$$-\left(A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2} d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\right) -$$

$$\left(9 B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(5 \sqrt{2} d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\right) -$$

$$\left(7 C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$

$$\left.\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(5 \sqrt{2} d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\right) +$$

$$\left(5 A \sqrt{\operatorname{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(3 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}\right) +$$

$$\left(B \sqrt{\operatorname{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}\right) +$$

$$\left(13 C \sqrt{\operatorname{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(21 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}\right) +$$

$$\left(\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(-\frac{(-25 A-36 B-28 C+5 A \operatorname{Cos}[2 c]) \operatorname{Cos}[d x] \operatorname{Csc}[c]}{20 d}+\right.\right.$$

$$\frac{A \operatorname{Cos}[c] \operatorname{Sin}[d x]}{2 d}+\frac{C \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^3 \operatorname{Sin}[d x]}{14 d}+\frac{\operatorname{Sec}[c] \operatorname{Sec}[c+d x]^2 (5 C \operatorname{Sin}[c]+7 B \operatorname{Sin}[d x]+21 C \operatorname{Sin}[d x])}{70 d}+$$

$$\left.\left.\frac{\operatorname{Sec}[c] \operatorname{Sec}[c+d x] (21 B \operatorname{Sin}[c]+63 C \operatorname{Sin}[c]+35 A \operatorname{Sin}[d x]+105 B \operatorname{Sin}[d x]+130 C \operatorname{Sin}[d x])}{210 d}+\frac{(7 A+21 B+26 C) \operatorname{Tan}[c]}{42 d}\right)\right) \Big/$$

$$\left((A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}\right)$$

- **Problem 552: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a \operatorname{Sec}[c + d x])^3 \left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right)}{\operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 271 leaves, 9 steps):

$$\frac{4 a^3 (5 A - 5 B - 9 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{5 d} + \frac{4 a^3 (5 A + 5 B + 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{3 d} + \frac{4 a^3 (5 A + 20 B + 21 C) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{15 d} + \frac{2 A (a + a \operatorname{Sec}[c + d x])^3 \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Sec}[c + d x]}} - \frac{2 (5 A - 3 C) \sqrt{\operatorname{Sec}[c + d x]} \left(a^2 + a^2 \operatorname{Sec}[c + d x]\right)^2 \operatorname{Sin}[c + d x]}{15 a d} - \frac{2 (5 A - 5 B - 9 C) \sqrt{\operatorname{Sec}[c + d x]} \left(a^3 + a^3 \operatorname{Sec}[c + d x]\right) \operatorname{Sin}[c + d x]}{15 d}$$

Result (type 5, 1190 leaves):

$$\left(A\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \mathrm{Cos}[c+d x]^5\, \mathrm{Csc}[c] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i\,(c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2}\, d\, (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\right) -$$

$$\left(B\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \mathrm{Cos}[c+d x]^5\, \mathrm{Csc}[c] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i\,(c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2}\, d\, (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\right) -$$

$$\left(9\, C\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \mathrm{Cos}[c+d x]^5\, \mathrm{Csc}[c] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i\,(c+d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/ \left(5 \sqrt{2}\, d\, (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\right) +$$

$$\left(5 A \sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(3\, d\, (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\, \mathrm{Sec}[c+d x]^{9/2}\right) +$$

$$\left(5 B \sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(3\, d\, (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\, \mathrm{Sec}[c+d x]^{9/2}\right) +$$

$$\left(C \sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(d\, (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\, \mathrm{Sec}[c+d x]^{9/2}\right) + \left(\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\right.$$

$$\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) \left(-\frac{(5 A-25 B-36 C+15 A\,\mathrm{Cos}[2 c]+5 B\,\mathrm{Cos}[2 c])\,\mathrm{Cos}[d x]\,\mathrm{Csc}[c]}{20 d}+\frac{A\,\mathrm{Cos}[2 d x]\,\mathrm{Sin}[2 c]}{12 d}+\right.$$

$$\frac{(3 A+B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d x]}{2 d}+\frac{C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d x]^2\,\mathrm{Sin}[d x]}{10 d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d x]\,(3 C\,\mathrm{Sin}[c]+5 B\,\mathrm{Sin}[d x]+15 C\,\mathrm{Sin}[d x])}{30 d}+$$

$$\left.\left.\frac{A\,\mathrm{Cos}[2 c]\,\mathrm{Sin}[2 d x]}{12 d}+\frac{(B+3 C)\,\mathrm{Tan}[c]}{6 d}\right)\right) \Big/ \left((A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\,\mathrm{Sec}[c+d x]^{9/2}\right)$$

- **Problem 553: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a\,\text{Sec}[c + d\,x])^3\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)}{\text{Sec}[c + d\,x]^{5/2}}\,dx$$

Optimal (type 4, 270 leaves, 9 steps):

$$\frac{4\,a^3\,(9\,A + 5\,B - 5\,C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{5\,d} + \frac{4\,a^3\,(3\,A + 5\,(B + C))\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,d} - \frac{4\,a^3\,(6\,A - 5\,B - 20\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{15\,d} + \frac{2\,A\,(a + a\,\text{Sec}[c + d\,x])^3\,\text{Sin}[c + d\,x]}{5\,d\,\text{Sec}[c + d\,x]^{3/2}} + \frac{2\,(6\,A + 5\,B)\,\left(a^2 + a^2\,\text{Sec}[c + d\,x]\right)^2\,\text{Sin}[c + d\,x]}{15\,a\,d\,\sqrt{\text{Sec}[c + d\,x]}} - \frac{2\,(9\,A + 5\,B - 5\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\left(a^3 + a^3\,\text{Sec}[c + d\,x]\right)\,\text{Sin}[c + d\,x]}{15\,d}$$

Result (type 5, 1203 leaves):

$$\left(9\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^5\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(5\sqrt{2}\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$

$$\left(B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^5\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(\sqrt{2}\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)-$$

$$\left(C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^5\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(\sqrt{2}\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$

$$\left(A\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}\right)+$$

$$\left(5B\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(3d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}\right)+$$

$$\left(5C\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(3d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}\right)+\left(\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{(71A+20B-100C+73A\,\text{Cos}[2c]+60B\,\text{Cos}[2c]+20C\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}[c]}{80d}+\frac{(3A+B)\,\text{Cos}[2d x]\,\text{Sin}[2c]}{12d}+\frac{A\,\text{Cos}[3d x]\,\text{Sin}[3c]}{40d}+\frac{(73A+60B+20C)\,\text{Cos}[c]\,\text{Sin}[d x]}{40d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{6d}+\frac{(3A+B)\,\text{Cos}[2c]\,\text{Sin}[2d x]}{12d}+\frac{A\,\text{Cos}[3c]\,\text{Sin}[3d x]}{40d}+\frac{C\,\text{Tan}[c]}{6d}\right)\right)\Big/\left((A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{9/2}\right)$$

Problem 554: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 271 leaves, 9 steps):

$$\frac{4\,a^3\,(7\,A+9\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{4\,a^3\,(13\,A+21\,B+35\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}-\frac{4\,a^3\,(41\,A+42\,B-35\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,(6\,A+7\,B)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{35\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,(7\,A+9\,B+5\,C)\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 279 leaves):

$$\frac{1}{420\,d}a^3\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(-2352\,i\,A\,\text{Cos}[c+d\,x]-3024\,i\,B\,\text{Cos}[c+d\,x]-1680\,i\,C\,\text{Cos}[c+d\,x]+80\,(13\,A+21\,B+35\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+336\,i\,(7\,A+9\,B+5\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+126\,A\,\text{Sin}[c+d\,x]+42\,B\,\text{Sin}[c+d\,x]+840\,C\,\text{Sin}[c+d\,x]+550\,A\,\text{Sin}[2\,(c+d\,x)]+420\,B\,\text{Sin}[2\,(c+d\,x)]+140\,C\,\text{Sin}[2\,(c+d\,x)]+126\,A\,\text{Sin}[3\,(c+d\,x)]+42\,B\,\text{Sin}[3\,(c+d\,x)]+15\,A\,\text{Sin}[4\,(c+d\,x)]\right)\,(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x])$$

Problem 555: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 271 leaves, 9 steps):

$$\frac{4\,a^3\,(17\,A+21\,B+27\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+\frac{4\,a^3\,(11\,A+13\,B+21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{4\,a^3\,(32\,A+41\,B+42\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{2\,(2\,A+3\,B)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{21\,a\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,(73\,A+99\,B+63\,C)\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{315\,d\,\text{Sec}[c+d\,x]^{3/2}}$$

Result (type 5, 214 leaves):

$$\frac{1}{2520\, d} a^3 \sqrt{\text{Sec}[c+d\,x]} \left(480\,(11\,A+13\,B+21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+\right.$$
$$672\,i\,(17\,A+21\,B+27\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$2\,\text{Cos}[c+d\,x]\,(-5712\,i\,A-7056\,i\,B-9072\,i\,C+30\,(97\,A+107\,B+84\,C)\,\text{Sin}[c+d\,x]+14\,(73\,A+54\,B+18\,C)\,\text{Sin}[2\,(c+d\,x)]+$$
$$\left.270\,A\,\text{Sin}[3\,(c+d\,x)]+90\,B\,\text{Sin}[3\,(c+d\,x)]+35\,A\,\text{Sin}[4\,(c+d\,x)])\right)$$

Problem 556: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 307 leaves, 10 steps):

$$\frac{4\,a^3\,(15\,A+17\,B+21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+$$
$$\frac{4\,a^3\,(105\,A+121\,B+143\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{231\,d}+$$
$$\frac{4\,a^3\,(210\,A+253\,B+264\,C)\,\text{Sin}[c+d\,x]}{1155\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(105\,A+121\,B+143\,C)\,\text{Sin}[c+d\,x]}{231\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{11\,d\,\text{Sec}[c+d\,x]^{9/2}}+$$
$$\frac{2\,(6\,A+11\,B)\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{99\,a\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{2\,(105\,A+143\,B+99\,C)\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{693\,d\,\text{Sec}[c+d\,x]^{5/2}}$$

Result (type 5, 247 leaves):

$$\frac{1}{55\,440\,d}$$
$$a^3\,\sqrt{\text{Sec}[c+d\,x]}\,\left(960\,(105\,A+121\,B+143\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+14\,784\,i\,(15\,A+17\,B+21\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right.$$
$$\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-110\,880\,i\,A-125\,664\,i\,B-155\,232\,i\,C+$$
$$30\,(1953\,A+2134\,B+2354\,C)\,\text{Sin}[c+d\,x]+308\,(75\,A+73\,B+54\,C)\,\text{Sin}[2\,(c+d\,x)]+8505\,A\,\text{Sin}[3\,(c+d\,x)]+$$
$$\left.5940\,B\,\text{Sin}[3\,(c+d\,x)]+1980\,C\,\text{Sin}[3\,(c+d\,x)]+2310\,A\,\text{Sin}[4\,(c+d\,x)]+770\,B\,\text{Sin}[4\,(c+d\,x)]+315\,A\,\text{Sin}[5\,(c+d\,x)])\right)$$

Problem 557: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{13/2}}\,dx$$

Optimal (type 4, 343 leaves, 11 steps):

$$\frac{4 a^3 (175 A + 195 B + 221 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticE}\left[\frac{1}{2}(c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{195 d} +$$
$$\frac{4 a^3 (95 A + 105 B + 121 C) \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] \sqrt{\text{Sec}[c + d x]}}{231 d} + \frac{20 a^3 (236 A + 273 B + 286 C) \text{Sin}[c + d x]}{9009 d \text{Sec}[c + d x]^{5/2}} +$$
$$\frac{4 a^3 (175 A + 195 B + 221 C) \text{Sin}[c + d x]}{585 d \text{Sec}[c + d x]^{3/2}} + \frac{4 a^3 (95 A + 105 B + 121 C) \text{Sin}[c + d x]}{231 d \sqrt{\text{Sec}[c + d x]}} + \frac{2 A (a + a \text{Sec}[c + d x])^3 \text{Sin}[c + d x]}{13 d \text{Sec}[c + d x]^{11/2}} +$$
$$\frac{2 (6 A + 13 B) \left(a^2 + a^2 \text{Sec}[c + d x]\right)^2 \text{Sin}[c + d x]}{143 a d \text{Sec}[c + d x]^{9/2}} + \frac{2 (145 A + 195 B + 143 C) \left(a^3 + a^3 \text{Sec}[c + d x]\right) \text{Sin}[c + d x]}{1287 d \text{Sec}[c + d x]^{7/2}}$$

Result (type 5, 1386 leaves) :

$$\left(35 A e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \text{Cos}[c + d x]^5 \text{Csc}[c] \left(1 + e^{2 i (c+d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(39 \sqrt{2}\ d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) +$$
$$\left(B e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \text{Cos}[c + d x]^5 \text{Csc}[c] \left(1 + e^{2 i (c+d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(\sqrt{2}\ d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) +$$
$$\left(17 C e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \text{Cos}[c + d x]^5 \text{Csc}[c] \left(1 + e^{2 i (c+d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right.$$
$$\left.\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(15 \sqrt{2}\ d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) +$$
$$\left(95 A \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/$$
$$\left(231 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \text{Sec}[c + d x]^{9/2}\right) +$$
$$\left(5 B \sqrt{\text{Cos}[c + d x]}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 (a + a \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/$$
$$\left(11 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \text{Sec}[c + d x]^{9/2}\right) +$$

$$\left(11\,C\,\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6(a+a\,\text{Sec}[c+d\,x])^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$
$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6(a+a\,\text{Sec}[c+d\,x])^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{1}{149\,760\,d}(59\,375\,A+67\,080\,B+77\,272\,C+75\,025\,A\,\text{Cos}[2\,c]+82\,680\,B\,\text{Cos}[2\,c]+92\,456\,C\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]+\right.$$
$$\frac{(4267\,A+4473\,B+4664\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{14\,784\,d}+\frac{(9005\,A+8580\,B+7852\,C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{74\,880\,d}+$$
$$\frac{(59\,A+49\,B+33\,C)\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{1232\,d}+\frac{(245\,A+156\,B+52\,C)\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{14\,976\,d}+\frac{(3\,A+B)\,\text{Cos}[6\,d\,x]\,\text{Sin}[6\,c]}{704\,d}+$$
$$\frac{A\,\text{Cos}[7\,d\,x]\,\text{Sin}[7\,c]}{1664\,d}+\frac{(75\,025\,A+82\,680\,B+92\,456\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{74\,880\,d}+\frac{(4267\,A+4473\,B+4664\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{14\,784\,d}+$$
$$\frac{(9005\,A+8580\,B+7852\,C)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{74\,880\,d}+\frac{(59\,A+49\,B+33\,C)\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{1232\,d}+$$
$$\left.\frac{(245\,A+156\,B+52\,C)\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{14\,976\,d}+\frac{(3\,A+B)\,\text{Cos}[6\,c]\,\text{Sin}[6\,d\,x]}{704\,d}+\frac{A\,\text{Cos}[7\,c]\,\text{Sin}[7\,d\,x]}{1664\,d}\right)$$

- **Problem 558: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 250 leaves, 9 steps):

$$-\frac{3\,(5\,A-5\,B+7\,C)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,a\,d}-$$
$$\frac{(3\,A-5\,B+5\,C)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a\,d}+\frac{3\,(5\,A-5\,B+7\,C)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{5\,a\,d}-$$
$$\frac{(3\,A-5\,B+5\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}+\frac{(5\,A-5\,B+7\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}-\frac{(A-B+C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 1278 leaves):

$$-\left(3\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x]))+\Bigg(3\,\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\Big[\frac{c}{2}\Big]$$

$$\Big(1+e^{2\,i\,(c+d\,x)}+\big(-1+e^{2\,i\,c}\big)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\Big]\Big)\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\Bigg)\Big/$$

$$(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x]))-$$

$$\Bigg(21\,\sqrt{2}\,C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\Big[\frac{c}{2}\Big]$$

$$\Big(1+e^{2\,i\,(c+d\,x)}+\big(-1+e^{2\,i\,c}\big)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\Big]\Big)\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\Bigg)\Big/$$

$$(5\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x]))-$$

$$\Big(2\,A\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\Big[\frac{c}{2}\Big]\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sin}[c]\Big)\Big/$$

$$\Big(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])\Big)+$$

$$\Big(10\,B\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\Big[\frac{c}{2}\Big]\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sin}[c]\Big)\Big/$$

$$\Big(3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])\Big)-$$

$$\Big(10\,C\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}\Big[\frac{c}{2}\Big]\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,2\Big]\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sin}[c]\Big)\Big/$$

$$\Big(3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])\Big)+\Bigg(\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\frac{6\,(5\,A-5\,B+7\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\big[\frac{c}{2}\big]\,\mathrm{Sec}\big[\frac{c}{2}\big]}{5\,d}-\frac{4\,\mathrm{Sec}\big[\frac{c}{2}\big]\,\mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]\,\big(A\,\mathrm{Sin}\big[\frac{d\,x}{2}\big]-B\,\mathrm{Sin}\big[\frac{d\,x}{2}\big]+C\,\mathrm{Sin}\big[\frac{d\,x}{2}\big]\big)}{d}+\frac{8\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[d\,x]}{5\,d}+$$

$$\frac{8\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(3\,C\,\mathrm{Sin}[c]+5\,B\,\mathrm{Sin}[d\,x]-5\,C\,\mathrm{Sin}[d\,x])}{15\,d}-\frac{4\,(-2\,B+2\,C+3\,A\,\mathrm{Cos}[c]-5\,B\,\mathrm{Cos}[c]+5\,C\,\mathrm{Cos}[c])\,\mathrm{Sec}[c]\,\mathrm{Tan}\big[\frac{c}{2}\big]}{3\,d}\Bigg)\Bigg)\Big/$$

$$\Big((A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])\Big)$$

- **Problem 559: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)}{a+a\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 205 leaves, 8 steps) :

$$\frac{(A-3B+3C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a d}+\frac{(3A-3B+5C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 a d}-\frac{(A-3B+3C)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{a d}+\frac{(3A-3B+5C)\ \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{3 a d}-\frac{(A-B+C)\ \text{Sec}[c+d x]^{5/2}\ \text{Sin}[c+d x]}{d\,(a+a\,\text{Sec}[c+d x])}$$

Result (type 5, 1229 leaves) :

$$\left(\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-\left(3\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+\left(3\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\ \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+$$
$$\left(2A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])\right)-$$
$$\left(2B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\ (a+a\,\text{Sec}[c+dx])\right)+$$
$$\left(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,\,(a+a\,\text{Sec}[c+d\,x])\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(-\frac{2\,(A-3\,B+3\,C)\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\right.$$
$$\left.\left.\frac{8\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{3\,d}+\frac{4\,(2\,C+3\,A\,\text{Cos}[c]-3\,B\,\text{Cos}[c]+5\,C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/$$
$$\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 560: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 162 leaves, 7 steps) :

$$-\frac{(A-B+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d}+\frac{(A+B-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d}+$$
$$\frac{(A-B+3\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{a\,d}-\frac{(A-B+C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 1190 leaves) :

$$-\left(\sqrt{2}\, A\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]\, \text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x]))+\left(\sqrt{2}\, B\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]\, \text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x]))-$$

$$\left(3\sqrt{2}\, C\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]\, \text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x]))+$$

$$\left(2A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) \text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])\right)+$$

$$\left(2B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) \text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])\right)-$$

$$\left(2C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) \text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left.\left(\frac{2\,(A-B+3C)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-\frac{4\,(A-B+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$

$$\left((A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\sqrt{\text{Sec}[c+d x]}\,(a+a\,\text{Sec}[c+d x])\right)$$

Problem 561: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\mathrm{Sec}[c + d\,x] + C\,\mathrm{Sec}[c + d\,x]^2}{\sqrt{\mathrm{Sec}[c + d\,x]}\,\left(a + a\,\mathrm{Sec}[c + d\,x]\right)}\,dx$$

Optimal (type 4, 133 leaves, 6 steps):

$$\frac{(3A - B + C)\sqrt{\mathrm{Cos}[c + d\,x]}\ \mathrm{EllipticE}\left[\frac{1}{2}(c + d\,x), 2\right]\sqrt{\mathrm{Sec}[c + d\,x]}}{a\,d} - \frac{(A - B - C)\sqrt{\mathrm{Cos}[c + d\,x]}\ \mathrm{EllipticF}\left[\frac{1}{2}(c + d\,x), 2\right]\sqrt{\mathrm{Sec}[c + d\,x]}}{a\,d} - \frac{(A - B + C)\sqrt{\mathrm{Sec}[c + d\,x]}\ \mathrm{Sin}[c + d\,x]}{d\,(a + a\,\mathrm{Sec}[c + d\,x])}$$

Result (type 5, 1208 leaves):

$$\left(3\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])\right) - \left(\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])\right) + \left(\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])\right) -$$
$$\left(2A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\mathrm{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\mathrm{Cos}[c+dx]+A\,\mathrm{Cos}[2c+2dx])\sqrt{\mathrm{Sec}[c+dx]}\ (a+a\,\mathrm{Sec}[c+dx])\right) +$$
$$\left(2B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+B\,\mathrm{Sec}[c+dx]+C\,\mathrm{Sec}[c+dx]^2\right)\mathrm{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\cos[c+dx]+A\cos[2c+2dx])\sqrt{\sec[c+dx]}\,(a+a\sec[c+dx])\right)+$$

$$\left(2C\cos\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\cos[c+dx]}\,\csc\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sec\left[\frac{c}{2}\right](A+B\sec[c+dx]+C\sec[c+dx]^2)\sin[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\cos[c+dx]+A\cos[2c+2dx])\sqrt{\sec[c+dx]}\,(a+a\sec[c+dx])\right)+$$

$$\left(\cos\left[\frac{c}{2}+\frac{dx}{2}\right]^2(A+B\sec[c+dx]+C\sec[c+dx]^2)\left(-\frac{2\,(2A-B+C+A\cos[2c])\cos[dx]\csc\left[\frac{c}{2}\right]\sec\left[\frac{c}{2}\right]}{d}+\right.\right.$$

$$\left.\left.\frac{4\sec\left[\frac{c}{2}\right]\sec\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\sin\left[\frac{dx}{2}\right]-B\sin\left[\frac{dx}{2}\right]+C\sin\left[\frac{dx}{2}\right]\right)}{d}+\frac{8A\cos[c]\sin[dx]}{d}+\frac{4\,(A-B+C)\tan\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$

$$\left((A+2C+2B\cos[c+dx]+A\cos[2c+2dx])\sqrt{\sec[c+dx]}\,(a+a\sec[c+dx])\right)$$

- **Problem 562: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\sec[c+dx]+C\sec[c+dx]^2}{\sec[c+dx]^{3/2}\,(a+a\sec[c+dx])}\,dx$$

Optimal (type 4, 174 leaves, 7 steps):

$$-\frac{(3A-3B+C)\sqrt{\cos[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\sec[c+dx]}}{a\,d}+$$

$$\frac{(5A-3B+3C)\sqrt{\cos[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\sec[c+dx]}}{3\,a\,d}+\frac{(5A-3B+3C)\sin[c+dx]}{3\,a\,d\sqrt{\sec[c+dx]}}-\frac{(A-B+C)\sin[c+dx]}{d\sqrt{\sec[c+dx]}\,(a+a\sec[c+dx])}$$

Result (type 5, 1256 leaves):

$$-\left(3\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\cos\left[\frac{c}{2}+\frac{dx}{2}\right]^2\cos[c+dx]\csc\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\sec\left[\frac{c}{2}\right](A+B\sec[c+dx]+C\sec[c+dx]^2)\right)\Big/$$

$$(d\,(A+2C+2B\cos[c+dx]+A\cos[2c+2dx])\,(a+a\sec[c+dx]))+\left(3\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\cos\left[\frac{c}{2}+\frac{dx}{2}\right]^2\cos[c+dx]\csc\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\sec\left[\frac{c}{2}\right](A+B\sec[c+dx]+C\sec[c+dx]^2)\right)\Big/$$

$$(d\,(A+2C+2B\cos[c+dx]+A\cos[2c+2dx])\,(a+a\sec[c+dx]))-$$

$$\left(\sqrt{2}\, C\, e^{-i(2c+dx)} \sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \operatorname{Cos}[c+dx] \operatorname{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right] \left(A+B\operatorname{Sec}[c+dx]+C\operatorname{Sec}[c+dx]^2\right)\right) \Big/$$

$$(d\,(A+2C+2B\operatorname{Cos}[c+dx]+A\operatorname{Cos}[2c+2dx])\,(a+a\operatorname{Sec}[c+dx]))+$$

$$\left(10A\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\operatorname{Cos}[c+dx]}\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\left(A+B\operatorname{Sec}[c+dx]+C\operatorname{Sec}[c+dx]^2\right)\operatorname{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+2B\operatorname{Cos}[c+dx]+A\operatorname{Cos}[2c+2dx])\sqrt{\operatorname{Sec}[c+dx]}\,(a+a\operatorname{Sec}[c+dx])\right)-$$

$$\left(2B\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\operatorname{Cos}[c+dx]}\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\left(A+B\operatorname{Sec}[c+dx]+C\operatorname{Sec}[c+dx]^2\right)\operatorname{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\operatorname{Cos}[c+dx]+A\operatorname{Cos}[2c+2dx])\sqrt{\operatorname{Sec}[c+dx]}\,(a+a\operatorname{Sec}[c+dx])\right)+$$

$$\left(2C\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\operatorname{Cos}[c+dx]}\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\left(A+B\operatorname{Sec}[c+dx]+C\operatorname{Sec}[c+dx]^2\right)\operatorname{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\operatorname{Cos}[c+dx]+A\operatorname{Cos}[2c+2dx])\sqrt{\operatorname{Sec}[c+dx]}\,(a+a\operatorname{Sec}[c+dx])\right)+$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(A+B\operatorname{Sec}[c+dx]+C\operatorname{Sec}[c+dx]^2\right)\left(\frac{2\,(2A-2B+C+A\operatorname{Cos}[2c]-B\operatorname{Cos}[2c])\operatorname{Cos}[dx]\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]}{d}+\frac{4A\operatorname{Cos}[2dx]\operatorname{Sin}[2c]}{3d}-\right.\right.$$

$$\left.\left.\frac{4\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\operatorname{Sin}\left[\frac{dx}{2}\right]-B\operatorname{Sin}\left[\frac{dx}{2}\right]+C\operatorname{Sin}\left[\frac{dx}{2}\right]\right)}{d}-\frac{8\,(A-B)\operatorname{Cos}[c]\operatorname{Sin}[dx]}{d}+\frac{4A\operatorname{Cos}[2c]\operatorname{Sin}[2dx]}{3d}-\frac{4\,(A-B+C)\operatorname{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$

$$\left((A+2C+2B\operatorname{Cos}[c+dx]+A\operatorname{Cos}[2c+2dx])\sqrt{\operatorname{Sec}[c+dx]}\,(a+a\operatorname{Sec}[c+dx])\right)$$

- **Problem 563: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\operatorname{Sec}[c+dx]+C\operatorname{Sec}[c+dx]^2}{\operatorname{Sec}[c+dx]^{5/2}\,(a+a\operatorname{Sec}[c+dx])}\,dx$$

Optimal (type 4, 214 leaves, 8 steps):

$$\frac{3\,(7A-5B+5C)\sqrt{\operatorname{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\operatorname{Sec}[c+dx]}}{5ad}-$$

$$\frac{(5A-5B+3C)\sqrt{\operatorname{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\operatorname{Sec}[c+dx]}}{3ad}+$$

$$\frac{(7A-5B+5C)\operatorname{Sin}[c+dx]}{5ad\operatorname{Sec}[c+dx]^{3/2}}-\frac{(5A-5B+3C)\operatorname{Sin}[c+dx]}{3ad\sqrt{\operatorname{Sec}[c+dx]}}-\frac{(A-B+C)\operatorname{Sin}[c+dx]}{d\operatorname{Sec}[c+dx]^{3/2}\,(a+a\operatorname{Sec}[c+dx])}$$

Result (type 5, 1321 leaves) :

$$\left(21\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$(5\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-\left(3\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+\left(3\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])\right)+$$

$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])\right)-$$

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{(51A-40B+40C+33A\,\text{Cos}[2c]-20B\,\text{Cos}[2c]+20C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{10\,d}-\right.\right.$$

$$\frac{4\,(A-B)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3\,d}+\frac{2A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}+$$

$$\left.\left.\frac{2\,(33\,A-20\,B+20\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{5\,d}-\frac{4\,(A-B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{3\,d}+\frac{2\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{5\,d}+\frac{4\,(A-B+C)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$
$$\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

Problem 564: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 250 leaves, 9 steps) :

$$-\frac{3\,(7\,A-7\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,a\,d}+$$
$$\frac{5\,(9\,A-7\,B+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,a\,d}+\frac{(9\,A-7\,B+7\,C)\,\text{Sin}[c+d\,x]}{7\,a\,d\,\text{Sec}[c+d\,x]^{5/2}}-$$
$$\frac{(7\,A-7\,B+5\,C)\,\text{Sin}[c+d\,x]}{5\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{5\,(9\,A-7\,B+7\,C)\,\text{Sin}[c+d\,x]}{21\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{d\,\text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])}$$

Result (type 5, 1377 leaves) :

$$-\left(21\,\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x]))+\left(21\,\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x]))-$$
$$\left(3\,\sqrt{2}\,C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\Big/$$

$$(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x]))+$$

$$\left(30 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]} \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right)\Big/$$

$$\left(7 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]} (a+a \text{Sec}[c+d x])\right)-$$

$$\left(10 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]} \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right)\Big/$$

$$\left(3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]} (a+a \text{Sec}[c+d x])\right)+$$

$$\left(10 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\text{Cos}[c+d x]} \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right)\Big/$$

$$\left(3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]} (a+a \text{Sec}[c+d x])\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(\frac{(51 A-51 B+40 C+33 A \text{Cos}[2 c]-33 B \text{Cos}[2 c]+20 C \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{10 d}+\right.\right.$$

$$\frac{2 (27 A-14 B+14 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{21 d}-\frac{2 (A-B) \text{Cos}[3 d x] \text{Sin}[3 c]}{5 d}+\frac{A \text{Cos}[4 d x] \text{Sin}[4 c]}{7 d}-$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-\frac{2 (33 A-33 B+20 C) \text{Cos}[c] \text{Sin}[d x]}{5 d}+$$

$$\left.\left.\frac{2 (27 A-14 B+14 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{21 d}-\frac{2 (A-B) \text{Cos}[3 c] \text{Sin}[3 d x]}{5 d}+\frac{A \text{Cos}[4 c] \text{Sin}[4 d x]}{7 d}-\frac{4 (A-B+C) \text{Tan}\left[\frac{c}{2}\right]}{d}\right)\right)\Big/$$

$$\left((A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{\text{Sec}[c+d x]} (a+a \text{Sec}[c+d x])\right)$$

- **Problem 565: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{5/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 4, 251 leaves, 9 steps):

$$\frac{(A-4 B+7 C) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d}+$$

$$\frac{(2 A-5 B+10 C) \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^2 d}-\frac{(A-4 B+7 C) \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{a^2 d}+$$

$$\frac{(2 A-5 B+10 C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a^2 d}-\frac{(A-4 B+7 C) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{3 a^2 d (1+\text{Sec}[c+d x])}-\frac{(A-B+C) \text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{3 d (a+a \text{Sec}[c+d x])^2}$$

Result (type 5, 1311 leaves) :

$$\left(2\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\;\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^2\right)-\left(8\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\;\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^2\right)+\left(14\sqrt{2}\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\;\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^2\right)+$$

$$\left(8\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\;\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^2\right)-$$

$$\left(20\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\;\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^2\right)+$$

$$\left(40\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\;\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a+a\,\text{Sec}[c+d x])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Sec}[c+d x]}\;\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{4\,(A-4B+7C)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\right.\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(2\,A\,\text{Sin}\left[\frac{d x}{2}\right]-5\,B\,\text{Sin}\left[\frac{d x}{2}\right]+8\,C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}+$$

$$\frac{16\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{8\,(2\,C+2\,A\,\mathrm{Cos}[c]-5\,B\,\mathrm{Cos}[c]+10\,C\,\mathrm{Cos}[c])\,\mathrm{Sec}[c]\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{4\,(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)\Bigg)\Big/$$

$$\left((A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)$$

- **Problem 566: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 207 leaves, 8 steps):

$$\frac{(B-4\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a^2\,d}+\frac{(A+2\,B-5\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,a^2\,d}-$$

$$\frac{(B-4\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{a^2\,d}+\frac{(A+2\,B-5\,C)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\mathrm{Sec}[c+d\,x])}-\frac{(A-B+C)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}$$

Result (type 5, 1072 leaves):

$$\left(2\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-\left(8\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(8B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(20C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(\frac{4(-B+4C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\right.\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+2B\,\text{Sin}\left[\frac{dx}{2}\right]-5C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$

$$\left.\left.\frac{8(A+2B-5C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{4(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 567: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 173 leaves, 7 steps) :

$$-\frac{(A-C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}+$$
$$\frac{(2 A+B+2 C)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 a^2 d}+\frac{(A-C)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{a^2 d(1+\text{Sec}[c+d x])}-\frac{(A-B+C)\ \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{3 d(a+a\ \text{Sec}[c+d x])^2}$$

Result (type 5, 1073 leaves) :

$$-\left(2\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\left(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]\right)(a+a\,\text{Sec}[c+dx])^2\right)+\left(2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left.\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\left(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]\right)(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(8A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\left(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]\right)(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(4B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\left(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]\right)(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(8C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\left(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]\right)(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right.$$

$$\left(\frac{4(A-C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(4A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]-2C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\right.$$

$$\left.\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{8(4A-B-2C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/$$

$$\left(\left(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]\right)(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 568: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2}{\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 184 leaves, 7 steps) :

$$\frac{(4A-B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a^2 d}-\frac{(5A-2B-C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3a^2 d}-\frac{(5A-2B-C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{3a^2 d(1+\text{Sec}[c+dx])}-\frac{(A-B+C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{3d(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 5, 1090 leaves) :

$$\left(8\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-\left(2\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)-$$

$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(8\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{4\,(3A-B+A\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\right.\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(7\,A\,\text{Sin}\left[\frac{dx}{2}\right]-4\,B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$

$$\left.\left.\frac{16\,A\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{8\,(7A-4B+C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/$$

$$\left((A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

- **Problem 569: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2}{\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 220 leaves, 8 steps) :

$$-\frac{(7 A-4 B+C) \sqrt{\text{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d}+\frac{(10 A-5 B+2 C) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^2 d}+\frac{(10 A-5 B+2 C) \text{Sin}[c+d x]}{3 a^2 d \sqrt{\text{Sec}[c+d x]}}-\frac{(7 A-4 B+C) \text{Sin}[c+d x]}{3 a^2 d \sqrt{\text{Sec}[c+d x]} (1+\text{Sec}[c+d x])}-\frac{(A-B+C) \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]} (a+a \text{Sec}[c+d x])^2}$$

Result (type 5, 1346 leaves) :

$$-\left(14 \sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^2\right)+\left(8 \sqrt{2} B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^2\right)-\left(2 \sqrt{2} C e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^2\right)+\left(40 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]} \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/ \left(3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^2\right)-\left(20 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]} \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/ \left(3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^2\right)+$$

$$\left(8\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{4\,(5\,A-3\,B+C+2\,A\,\text{Cos}[2\,c]-B\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{8\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{3\,d}+\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(10\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-7\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+4\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-$$
$$\left.\frac{16\,(2\,A-B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{8\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{3\,d}-\frac{8\,(10\,A-7\,B+4\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

- **Problem 570: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 254 leaves, 9 steps):

$$\frac{(56\,A-35\,B+20\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,a^2\,d}-$$
$$\frac{5\,(3\,A-2\,B+C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}+\frac{(56\,A-35\,B+20\,C)\,\text{Sin}[c+d\,x]}{15\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}}-$$
$$\frac{5\,(3\,A-2\,B+C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\sqrt{\text{Sec}[c+d\,x]}}-\frac{(3\,A-2\,B+C)\,\text{Sin}[c+d\,x]}{a^2\,d\,\text{Sec}[c+d\,x]^{3/2}\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 1408 leaves):

$$\left(112\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left.\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)-\left(14\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(d\,(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\,(a+a \text{Sec}[c+d x])^2\right)+\left(8 \sqrt{2}\, C\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(d\,(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\,(a+a \text{Sec}[c+d x])^2\right)-$$

$$\left(20 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/$$

$$\left(d\,(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\,(a+a \text{Sec}[c+d x])^2\right)+$$

$$\left(40 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/$$

$$\left(3 d\,(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\,(a+a \text{Sec}[c+d x])^2\right)-$$

$$\left(20 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/$$

$$\left(3 d\,(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\,(a+a \text{Sec}[c+d x])^2\right)+$$

$$\frac{1}{(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\,(a+a \text{Sec}[c+d x])^2} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\left(-\frac{(151 A-100 B+60 C+73 A \text{Cos}[2 c]-40 B \text{Cos}[2 c]+20 C \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{5 d}-\right.$$

$$\frac{8 (2 A-B) \text{Cos}[2 d x] \text{Sin}[2 c]}{3 d}+\frac{4 A \text{Cos}[3 d x] \text{Sin}[3 c]}{5 d}-\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+$$

$$\frac{8 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(13 A \text{Sin}\left[\frac{d x}{2}\right]-10 B \text{Sin}\left[\frac{d x}{2}\right]+7 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{4 (73 A-40 B+20 C) \text{Cos}[c] \text{Sin}[d x]}{5 d}-$$

$$\left.\frac{8 (2 A-B) \text{Cos}[2 c] \text{Sin}[2 d x]}{3 d}+\frac{4 A \text{Cos}[3 c] \text{Sin}[3 d x]}{5 d}+\frac{8 (13 A-10 B+7 C) \text{Tan}\left[\frac{c}{2}\right]}{3 d}-\frac{4 (A-B+C) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)$$

- **Problem 571: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^{7/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^3}\, dx$$

Optimal (type 4, 308 leaves, 10 steps):

$$\frac{(9A-49B+119C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(3A-13B+33C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(9A-49B+119C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{10a^3d}+\frac{(3A-13B+33C)\text{Sec}[c+dx]^{3/2}\text{Sin}[c+dx]}{6a^3d}-\frac{(A-B+C)\text{Sec}[c+dx]^{9/2}\text{Sin}[c+dx]}{5d(a+a\,\text{Sec}[c+dx])^3}+\frac{(B-2C)\text{Sec}[c+dx]^{7/2}\text{Sin}[c+dx]}{3ad(a+a\,\text{Sec}[c+dx])^2}-\frac{(9A-49B+119C)\text{Sec}[c+dx]^{5/2}\text{Sin}[c+dx]}{30d\left(a^3+a^3\text{Sec}[c+dx]\right)}$$

Result (type 5, 1432 leaves):

$$\left(18\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(98\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(238\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\left(4\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$

$$\left(52\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\left(44\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{4\,(9\,A-49\,B+119\,C)\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}+\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-8\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+13\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$
$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-13\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+29\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{32\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{3\,d}+$$
$$\left.\frac{8\,(4\,C+3\,A\,\text{Cos}[c]-13\,B\,\text{Cos}[c]+33\,C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{8\,(3\,A-8\,B+13\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 572: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 269 leaves, 9 steps):

$$\frac{(A+9\,B-49\,C)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+$$
$$\frac{(A+3\,B-13\,C)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-\frac{(A+9\,B-49\,C)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{10\,a^3\,d}-$$
$$\frac{(A-B+C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{(2\,A+3\,B-8\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{(A+3\,B-13\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 1400 leaves) :

$$\left(2\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(18\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\right.$$

$$\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(98\sqrt{2}\,C\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]$$

$$\left.\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(4B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$

$$\left(52C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\frac{1}{(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$

$$\left(-\frac{4\,(A+9\,B-49\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5\,d}+\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+3\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-13\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(2\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+3\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-8\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,(-A-3\,B+13\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{8\,(2\,A+3\,B-8\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 573: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 231 leaves, 8 steps):

$$-\frac{(A-B-9\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(A+B+3\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{6\,a^3\,d}-\frac{(A-B+C)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^3}+\frac{(4\,A+B-6\,C)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^2}+\frac{(A-B-9\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\mathrm{Sec}[c+d\,x]\right)}$$

Result (type 5, 1395 leaves):

$$-\left(2\,\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\;\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(5\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+\left(2\,\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\;\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(5\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\left(18\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]$$
$$\left.\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\frac{1}{(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\frac{4(A-B-9C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(7A\,\text{Sin}\left[\frac{dx}{2}\right]-2B\,\text{Sin}\left[\frac{dx}{2}\right]-3C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]+3C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$
$$\left.\frac{8(A+B+3C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{8(7A-2B-3C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{4(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 574: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 231 leaves, 8 steps):

$$-\frac{(9A+B-C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(3A+B+C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(A-B+C)\ \text{Sec}[c+dx]^{3/2}\ \text{Sin}[c+dx]}{5d\,(a+a\,\text{Sec}[c+dx])^3}+\frac{(6A-B-4C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{15ad\,(a+a\,\text{Sec}[c+dx])^2}+\frac{(3A+B+C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{6d\left(a^3+a^3\,\text{Sec}[c+dx]\right)}$$

Result (type 5, 1401 leaves) :

$$-\left(18\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(2\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(4B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$
$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{4\,(9\,A+B-C)\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(12\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-7\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$
$$\left.\frac{8\,(9\,A-B-C)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}+\frac{8\,(12\,A-7\,B+2\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 575: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 241 leaves, 8 steps):

$$\frac{(49\,A-9\,B-C)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}-\frac{(13\,A-3\,B-C)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-$$
$$\frac{(A-B+C)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}-\frac{(8\,A-3\,B-2\,C)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}-\frac{(13\,A-3\,B-C)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 1419 leaves):

$$\left(98\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\;\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)-\left(18\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\right.$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3\right)-\left(2 \sqrt{2}\, C\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\right.$$

$$\text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]$$

$$\left.\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3\right)-$$

$$\left(52 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/$$

$$\left(3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3\right)+$$

$$\left(4 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/$$

$$\left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3\right)+$$

$$\left(4 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sin}[c]\right) \Big/$$

$$\left(3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3\right)+$$

$$\frac{1}{(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\left(-\frac{4 (39 A-9 B-C+10 A \text{Cos}[2 c]) \text{Cos}[d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{5 d}+\frac{8 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(23 A \text{Sin}\left[\frac{d x}{2}\right]-9 B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\right.$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}-\frac{8 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(17 A \text{Sin}\left[\frac{d x}{2}\right]-12 B \text{Sin}\left[\frac{d x}{2}\right]+7 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+$$

$$\left.\frac{32 A \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{8 (23 A-9 B+C) \text{Tan}\left[\frac{c}{2}\right]}{3 d}-\frac{8 (17 A-12 B+7 C) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{15 d}+\frac{4 (A-B+C) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)$$

- **Problem 576: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2}{\text{Sec}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 4, 274 leaves, 9 steps):

$$-\frac{(119A-49B+9C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(33A-13B+3C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}+\frac{(33A-13B+3C)\,\text{Sin}[c+dx]}{6a^3d\sqrt{\text{Sec}[c+dx]}}-\frac{(A-B+C)\,\text{Sin}[c+dx]}{5d\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^3}-\frac{(2A-B)\,\text{Sin}[c+dx]}{3ad\sqrt{\text{Sec}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^2}-\frac{(119A-49B+9C)\,\text{Sin}[c+dx]}{30d\sqrt{\text{Sec}[c+dx]}\,\left(a^3+a^3\,\text{Sec}[c+dx]\right)}$$

Result (type 5, 1467 leaves):

$$-\left(238\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(98\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-\left(18\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(5d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+\left(44A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)-$$
$$\left(52\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(3\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}[c]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)+$$
$$\frac{1}{(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\frac{4\,(89A-39B+9C+30A\,\text{Cos}[2c]-10B\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{16A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}-\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(43A\,\text{Sin}\left[\frac{dx}{2}\right]-23B\,\text{Sin}\left[\frac{dx}{2}\right]+9C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$
$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(22A\,\text{Sin}\left[\frac{dx}{2}\right]-17B\,\text{Sin}\left[\frac{dx}{2}\right]+12C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-\frac{32\,(3A-B)\,\text{Cos}[c]\,\text{Sin}[dx]}{d}+\frac{16A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}-$$
$$\left.\frac{8\,(43A-23B+9C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{8\,(22A-17B+12C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

- **Problem 577: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2}{\text{Sec}[c+dx]^{5/2}\,(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 313 leaves, 10 steps):

$$\frac{7\,(33A-17B+7C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}-$$
$$\frac{(63A-33B+13C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}+\frac{7\,(33A-17B+7C)\,\text{Sin}[c+dx]}{30a^3d\,\text{Sec}[c+dx]^{3/2}}-\frac{(63A-33B+13C)\,\text{Sin}[c+dx]}{6a^3d\sqrt{\text{Sec}[c+dx]}}-$$
$$\frac{(A-B+C)\,\text{Sin}[c+dx]}{5d\,\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])^3}-\frac{(12A-7B+2C)\,\text{Sin}[c+dx]}{15ad\,\text{Sec}[c+dx]^{3/2}\,(a+a\,\text{Sec}[c+dx])^2}-\frac{(63A-33B+13C)\,\text{Sin}[c+dx]}{10d\,\text{Sec}[c+dx]^{3/2}\left(a^3+a^3\,\text{Sec}[c+dx]\right)}$$

Result (type 5, 1525 leaves):

$$\left(462\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\right.$$

$$\operatorname{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c+d x]\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\Bigg)\Bigg/$$

$$\left(5 d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3\right)-\Bigg(238\sqrt{2}\,B\,e^{-i (2 c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}$$

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\operatorname{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c+d x]\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\Bigg)\Bigg/$$

$$\left(5 d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3\right)+\Bigg(98\sqrt{2}\,C\,e^{-i (2 c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$\operatorname{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c+d x]$$

$$\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\Bigg)\Bigg/\left(5 d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3\right)-$$

$$\left(84 A\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\operatorname{Cos}[c+d x]}\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c+d x]^{3/2}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3\right)+$$

$$\left(44 B\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\operatorname{Cos}[c+d x]}\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c+d x]^{3/2}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sin}[c]\right)\Big/$$

$$\left(d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3\right)-$$

$$\left(52 C\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\operatorname{Cos}[c+d x]}\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c+d x]^{3/2}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sin}[c]\right)\Big/$$

$$\left(3 d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3\right)+$$

$$\frac{1}{(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x])^3}\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\operatorname{Sec}[c+d x]^{3/2}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)$$

$$\Bigg(-\frac{2\,(329 A-178 B+78 C+133 A\operatorname{Cos}[2 c]-60 B\operatorname{Cos}[2 c]+20 C\operatorname{Cos}[2 c])\operatorname{Cos}[d x]\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]}{5 d}-$$

$$\frac{16\,(3A-B)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}+\frac{8A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}-$$
$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(27A\,\text{Sin}\left[\frac{dx}{2}\right]-22B\,\text{Sin}\left[\frac{dx}{2}\right]+17C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(69A\,\text{Sin}\left[\frac{dx}{2}\right]-43B\,\text{Sin}\left[\frac{dx}{2}\right]+23C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$
$$\frac{8\,(133A-60B+20C)\,\text{Cos}[c]\,\text{Sin}[dx]}{5d}-\frac{16\,(3A-B)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}+\frac{8A\,\text{Cos}[3c]\,\text{Sin}[3dx]}{5d}+$$
$$\left.\frac{8\,(69A-43B+23C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{8\,(27A-22B+17C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

Problem 578: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+dx]^{5/2}\sqrt{a+a\,\text{Sec}[c+dx]}\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\,dx$$

Optimal (type 3, 227 leaves, 6 steps):

$$\frac{\sqrt{a}\,(48A+40B+35C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{64d}+\frac{a\,(48A+40B+35C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{64d\sqrt{a+a\,\text{Sec}[c+dx]}}+$$
$$\frac{a\,(48A+40B+35C)\,\text{Sec}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{96d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a\,(8B+C)\,\text{Sec}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{24d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{C\,\text{Sec}[c+dx]^{7/2}\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{4d}$$

Result (type 3, 2038 leaves):

$$-\left(\left(\frac{1}{256}+\frac{i}{256}\right)\left((-1+i)+\sqrt{2}\right)\left((144+48i)A+48\sqrt{2}A+(120+40i)B+40\sqrt{2}B+(105+35i)C+35\sqrt{2}C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a\,(1+\text{Sec}[c+dx])}$$
$$\left.\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{5/2}\right)-$$
$$\left(\left(\frac{1}{256}-\frac{i}{256}\right)\left((1+i)+\sqrt{2}\right)\left((-144+48i)A+48\sqrt{2}A-(120-40i)B+40\sqrt{2}B-(105-35i)C+35\sqrt{2}C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a\,(1+\text{Sec}[c+dx])}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Big)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\Big(\Big(96\,A+48\,i\,\sqrt{2}\,A+80\,B+40\,i\,\sqrt{2}\,B+70\,C+35\,i\,\sqrt{2}\,C\Big)\,\text{Log}\Big[\sqrt{2}+2\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Big)\Big/\left(128\,\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Big(\Big(\frac{1}{512}-\frac{i}{512}\Big)\left((-1+i)+\sqrt{2}\right)\left((144+48\,i)\,A+48\,\sqrt{2}\,A+(120+40\,i)\,B+40\,\sqrt{2}\,B+(105+35\,i)\,C+35\,\sqrt{2}\,C\right)$$

$$\text{Log}\Big[2-\sqrt{2}\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Big)\Big/$$

$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\Big(\Big(\frac{1}{512}+\frac{i}{512}\Big)\left((1+i)+\sqrt{2}\right)\left((-144+48\,i)\,A+48\,\sqrt{2}\,A-(120-40\,i)\,B+40\,\sqrt{2}\,B-(105-35\,i)\,C+35\,\sqrt{2}\,C\right)$$

$$\text{Log}\Big[2+\sqrt{2}\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Big)\Big/$$

$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\frac{(8\,B+7\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{48\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$

$$\frac{(48\,A+40\,B+35\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{64\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$

$$\frac{(-8\,B-7\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{48\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$

$$\frac{(-48\,A-40\,B-35\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{64\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$

$$\Big(\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(16\,A\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]+8\,B\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]+11\,C\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\Big)\Big/$$

$$\Big(32\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\Big(\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)^2\Big)+$$

$$\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(16 A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+8 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+11 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(32 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$
$$\frac{C\sqrt{a(1+\text{Sec}[c+d x])}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{8 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$
$$\frac{C\sqrt{a(1+\text{Sec}[c+d x])}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{8 d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}$$

- **Problem 579: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 179 leaves, 5 steps):

$$\frac{\sqrt{a}\,(8A+6B+5C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{8 d}+\frac{a\,(8A+6B+5C)\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{8 d\sqrt{a+a\,\text{Sec}[c+d x]}}+$$
$$\frac{a\,(6B+C)\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{12 d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{C\,\text{Sec}[c+d x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 3, 1772 leaves):

$$-\left(\left(\frac{1}{32}+\frac{i}{32}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8i)A+8\sqrt{2}A+(18+6i)B+6\sqrt{2}B+(15+5i)C+5\sqrt{2}C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a(1+\text{Sec}[c+d x])}$$
$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\right)-$$
$$\left(\left(\frac{1}{32}-\frac{i}{32}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)A+8\sqrt{2}A-(18-6i)B+6\sqrt{2}B-(15-5i)C+5\sqrt{2}C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(\left(16\,A+8\,i\sqrt{2}\,A+12\,B+6\,i\sqrt{2}\,B+10\,C+5\,i\sqrt{2}\,C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right.$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(16\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8\,i)\,A+8\sqrt{2}\,A+(18+6\,i)\,B+6\sqrt{2}\,B+(15+5\,i)\,C+5\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8\,i)\,A+8\sqrt{2}\,A-(18-6\,i)\,B+6\sqrt{2}\,B-(15-5\,i)\,C+5\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{6\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(8\,A+6\,B+5\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{8\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}-$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{6\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(-8\,A-6\,B-5\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{8\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$

$$\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(2\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$

$$\left(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2\right)+$$

$$\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\text{Sec}[c+d x])} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(2 B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+C \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(4 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{5/2} \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)$$

- **Problem 580: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{\text{Sec}[c+d x]} \sqrt{a+a \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 131 leaves, 4 steps):

$$\frac{\sqrt{a} (8 A+4 B+3 C) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{4 d}+\frac{a (4 B+C) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{4 d \sqrt{a+a \text{Sec}[c+d x]}}+\frac{C \text{Sec}[c+d x]^{3/2} \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{2 d}$$

Result (type 3, 1490 leaves):

$$-\left(\left(\frac{1}{16}+\frac{i}{16}\right) \left((-1+i)+\sqrt{2}\right) \left((24+8 i) A+8 \sqrt{2} A+(12+4 i) B+4 \sqrt{2} B+(9+3 i) C+3 \sqrt{2} C\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\text{Sec}[c+d x])} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{5/2}\right) -$$

$$\left(\left(\frac{1}{16}-\frac{i}{16}\right) \left((1+i)+\sqrt{2}\right) \left((-24+8 i) A+8 \sqrt{2} A-(12-4 i) B+4 \sqrt{2} B-(9-3 i) C+3 \sqrt{2} C\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\text{Sec}[c+d x])} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2} \left(i+\sqrt{2}\right) d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{5/2}\right) +$$

$$\left(\left(16 A+8 i \sqrt{2} A+8 B+4 i \sqrt{2} B+6 C+3 i \sqrt{2} C\right) \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a(1+\text{Sec}[c+d x])} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(8 \left(i+\sqrt{2}\right) d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \text{Sec}[c+d x]^{5/2}\right) -$$

$$\left(\left(\frac{1}{32}-\frac{i}{32}\right) \left((-1+i)+\sqrt{2}\right) \left((24+8 i) A+8 \sqrt{2} A+(12+4 i) B+4 \sqrt{2} B+(9+3 i) C+3 \sqrt{2} C\right)\right.$$

$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Big/$$
$$\left(\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\right)+$$
$$\left(\left(\frac{1}{32}+\frac{\mathrm{i}}{32}\right)\left((1+\mathrm{i})+\sqrt{2}\right)\left((-24+8\,\mathrm{i})A+8\sqrt{2}\,A-(12-4\,\mathrm{i})B+4\sqrt{2}\,B-(9-3\,\mathrm{i})C+3\sqrt{2}\,C\right)\right.$$
$$\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Big/$$
$$\left(\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\right)+$$
$$\frac{(4B+3C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{4d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\frac{(-4B-3C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{4d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\frac{C\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{2d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{C\sqrt{a\,(1+\text{Sec}[c+d x])}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{2d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}$$

- **Problem 581: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d x]}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 119 leaves, 4 steps):

$$\frac{\sqrt{a}\,(2B+C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{a\,(2A-C)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{C\sqrt{\text{Sec}[c+d x]}\,\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d}$$

Result (type 3, 627 leaves):

$$\frac{1}{d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\,\text{Sec}[c+d\,x]^{5/2}}\left(\frac{1}{16}+\frac{i}{16}\right)\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{1}{i+\sqrt{2}}2\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\,\left((1+i)+\sqrt{2}\right)\,(2B+C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\frac{1}{i+\sqrt{2}}2\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\,\left((3+i)+\sqrt{2}\right)\,(2B+C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{(4+4\,i)\,\left(-2\,i+\sqrt{2}\right)\,(2B+C)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}$$

$$i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\,\left((3+i)+\sqrt{2}\right)\,(2B+C)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$\frac{1}{i+\sqrt{2}}\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\,\left((1+i)+\sqrt{2}\right)\,(2B+C)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$\left.\frac{(8-8\,i)\,C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}+(32-32\,i)\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{(8-8\,i)\,C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}\right)$$

- **Problem 582: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 120 leaves, 4 steps):

$$\frac{2\sqrt{a}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{2a\,(A+3B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2A\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 347 leaves):

$$\frac{1}{12\,d\,\sqrt{\text{Sec}[c+d\,x]}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-6\,i\,\sqrt{2}\,C\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-6\,i\,\sqrt{2}\,C\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+\right.$$
$$6\,\sqrt{2}\,C\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-3\,\sqrt{2}\,C\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\left.3\,\sqrt{2}\,C\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+12\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+24\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,A\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)$$

- **Problem 586: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 283 leaves, 7 steps):

$$\frac{a^{3/2}\,(176\,A+150\,B+133\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{128\,d}+\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(80\,A+90\,B+67\,C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a\,(10\,B+3\,C)\,\text{Sec}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d}+\frac{C\,\text{Sec}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 2352 leaves):

$$-\left(\left(\frac{1}{1024}+\frac{i}{1024}\right)\,\left((-1+i)+\sqrt{2}\right)\,\left((528+176\,i)\,A+176\,\sqrt{2}\,A+(450+150\,i)\,B+150\,\sqrt{2}\,B+(399+133\,i)\,C+133\,\sqrt{2}\,C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)-$$
$$\left(\left(\frac{1}{1024}-\frac{i}{1024}\right)\,\left((1+i)+\sqrt{2}\right)\,\left((-528+176\,i)\,A+176\,\sqrt{2}\,A-(450-150\,i)\,B+150\,\sqrt{2}\,B-(399-133\,i)\,C+133\,\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\Bigg(\left(352A+176\,i\sqrt{2}\,A+300B+150\,i\sqrt{2}\,B+266C+133\,i\sqrt{2}\,C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg)\Bigg/\left(512\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{2048}-\frac{i}{2048}\right)\left((-1+i)+\sqrt{2}\right)\left((528+176\,i)A+176\sqrt{2}\,A+(450+150\,i)B+150\sqrt{2}\,B+(399+133\,i)C+133\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Bigg/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\left(\left(\frac{1}{2048}+\frac{i}{2048}\right)\left((1+i)+\sqrt{2}\right)\left((-528+176\,i)A+176\sqrt{2}\,A-(450-150\,i)B+150\sqrt{2}\,B-(399-133\,i)C+133\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Bigg/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{40\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5}+$$

$$\frac{(16A+30B+29C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{192\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(176A+150B+133C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{256\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{40\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5}+$$

$$\frac{(-16A-30B-29C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3(a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{192\,d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-176 A - 150 B - 133 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{256 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4\right)+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(32 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4\right)+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(48 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+38 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+37 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(128 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(48 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+38 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+37 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(128 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)$$

- **Problem 587: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Sec}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 233 leaves, 6 steps) :

$$\frac{a^{3/2} (112 A+88 B+75 C) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{64 d}+$$
$$\frac{a^2 (112 A+88 B+75 C) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{64 d \sqrt{a+a \operatorname{Sec}[c+d x]}}+\frac{a^2 (48 A+56 B+39 C) \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{96 d \sqrt{a+a \operatorname{Sec}[c+d x]}}+$$
$$\frac{a (8 B+3 C) \operatorname{Sec}[c+d x]^{5/2} \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{24 d}+\frac{C \operatorname{Sec}[c+d x]^{5/2} (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{4 d}$$

Result (type 3, 2084 leaves) :

$$-\left(\left(\frac{1}{512}+\frac{i}{512}\right)\left((-1+i)+\sqrt{2}\right)\left((336+112\,i)\,A+112\sqrt{2}\,A+(264+88\,i)\,B+88\sqrt{2}\,B+(225+75\,i)\,C+75\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{512}-\frac{i}{512}\right)\left((1+i)+\sqrt{2}\right)\left((-336+112\,i)\,A+112\sqrt{2}\,A-(264-88\,i)\,B+88\sqrt{2}\,B-(225-75\,i)\,C+75\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(\left(224\,A+112\,i\sqrt{2}\,A+176\,B+88\,i\sqrt{2}\,B+150\,C+75\,i\sqrt{2}\,C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right.$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(256\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{1024}-\frac{i}{1024}\right)\left((-1+i)+\sqrt{2}\right)\left((336+112\,i)\,A+112\sqrt{2}\,A+(264+88\,i)\,B+88\sqrt{2}\,B+(225+75\,i)\,C+75\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(\left(\frac{1}{1024}+\frac{i}{1024}\right)\left((1+i)+\sqrt{2}\right)\left((-336+112\,i)\,A+112\sqrt{2}\,A-(264-88\,i)\,B+88\sqrt{2}\,B-(225-75\,i)\,C+75\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\frac{(8\,B+15\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{96\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(112 A+88 B+75 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{128 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{(-8 B-15 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{96 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-112 A-88 B-75 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{128 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(16 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+24 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+19 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(64 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(16 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+24 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+19 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(64 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\frac{C \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{16 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$

$$\frac{C \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{16 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}$$

- **Problem 588: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \sqrt{\operatorname{Sec}[c+d x]} \, (a+a \operatorname{Sec}[c+d x])^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 181 leaves, 5 steps):

$$\frac{a^{3/2} (24 A+14 B+11 C) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{8 d}+\frac{a^2 (24 A+30 B+19 C) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{24 d \sqrt{a+a \operatorname{Sec}[c+d x]}}+$$

$$\frac{a (2 B+C) \operatorname{Sec}[c+d x]^{3/2} \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d}+\frac{C \operatorname{Sec}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{3 d}$$

Result (type 3, 1796 leaves):

$$-\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((72+24 i) A+24 \sqrt{2} A+(42+14 i) B+14 \sqrt{2} B+(33+11 i) C+11 \sqrt{2} C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-72+24 i) A+24 \sqrt{2} A-(42-14 i) B+14 \sqrt{2} B-(33-11 i) C+11 \sqrt{2} C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\left(\left(48 A+24 i \sqrt{2} A+28 B+14 i \sqrt{2} B+22 C+11 i \sqrt{2} C\right) \text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/ \left(32\left(i+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{128}-\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)\left((72+24 i) A+24 \sqrt{2} A+(42+14 i) B+14 \sqrt{2} B+(33+11 i) C+11 \sqrt{2} C\right)\right.$$
$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\left(\left(\frac{1}{128}+\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-72+24 i) A+24 \sqrt{2} A-(42-14 i) B+14 \sqrt{2} B-(33-11 i) C+11 \sqrt{2} C\right)\right.$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a(1+\text{Sec}[c+d x]))^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{12 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(8 A+14 B+11 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{16 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$

$$\frac{C \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{12 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-8 A-14 B-11 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{16 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(8 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(8 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{7/2} \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)$$

- **Problem 589: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a \operatorname{Sec}[c+d x])^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\sqrt{\operatorname{Sec}[c+d x]}} \, dx$$

Optimal (type 3, 183 leaves, 5 steps):

$$\frac{a^{3/2} (8 A+12 B+7 C) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{4 d}+\frac{a^2 (8 A-4 B-5 C) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d \sqrt{a+a \operatorname{Sec}[c+d x]}}+$$

$$\frac{a (4 B+3 C) \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d}+\frac{C \sqrt{\operatorname{Sec}[c+d x]} (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{2 d}$$

Result (type 3, 1627 leaves):

$$-\left(\left(\frac{1}{32}+\frac{i}{32}\right) \left((-1+i)+\sqrt{2}\right) \left((24+8 i) A+8 \sqrt{2} A+(36+12 i) B+12 \sqrt{2} B+(21+7 i) C+7 \sqrt{2} C\right)\right.$$

$$\operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 (a (1+\operatorname{Sec}[c+d x]))^{3/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{32}-\frac{i}{32}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8\,i)\,A+8\,\sqrt{2}\,A-(36-12\,i)\,B+12\,\sqrt{2}\,B-(21-7\,i)\,C+7\,\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(\left(16\,A+8\,i\,\sqrt{2}\,A+24\,B+12\,i\,\sqrt{2}\,B+14\,C+7\,i\,\sqrt{2}\,C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right.$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(16\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8\,i)\,A+8\,\sqrt{2}\,A+(36+12\,i)\,B+12\,\sqrt{2}\,B+(21+7\,i)\,C+7\,\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8\,i)\,A+8\,\sqrt{2}\,A-(36-12\,i)\,B+12\,\sqrt{2}\,B-(21-7\,i)\,C+7\,\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\frac{(4\,B+7\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{8\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$

$$\frac{(-4\,B-7\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{8\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$

$$\frac{2\,A\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}}+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 (a(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 (a(1+\text{Sec}[c+d\,x]))^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}$$

- **Problem 590: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 177 leaves, 5 steps):

$$\frac{a^{3/2}(2\,B+3\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{d}+\frac{a^2(8\,A+6\,B-3\,C)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}-$$

$$\frac{a(2\,A-3\,C)\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1406 leaves):

$$-\left(\left(\frac{1}{8}+\frac{i}{8}\right)\left((-1+i)+\sqrt{2}\right)\left((6+2i)B+2\sqrt{2}B+(9+3i)C+3\sqrt{2}C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)-$$

$$\left(\left(\frac{1}{8}-\frac{i}{8}\right)\left((1+i)+\sqrt{2}\right)\left((-6+2i)B+2\sqrt{2}B-(9-3i)C+3\sqrt{2}C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$

$$\left.\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)+$$

$$\left(\left(4B+2i\sqrt{2}B+6C+3i\sqrt{2}C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(4\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)-$$

$$\left(\left(\frac{1}{16}-\frac{i}{16}\right)\left((-1+i)+\sqrt{2}\right)\left((6+2i)B+2\sqrt{2}B+(9+3i)C+3\sqrt{2}C\right)\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3\right.$$

$$\left.(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)+$$

$$\left(\left(\frac{1}{16}+\frac{i}{16}\right)\left((1+i)+\sqrt{2}\right)\left((-6+2i)B+2\sqrt{2}B-(9-3i)C+3\sqrt{2}C\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3\right.$$

$$\left.(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+$$

$$\frac{A\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{3}{2}(c+dx)\right]}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}}+$$

$$\left((3A+2B)\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2(a(1+\text{Sec}[c+dx]))^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{7/2}\right)$$

Problem 591: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 172 leaves, 5 steps):

$$\frac{2\,a^{3/2}\,C\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,(12\,A+20\,B+15\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+$$
$$\frac{2\,a\,(3\,A+5\,B)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}$$

Result (type 3, 387 leaves):

$$\frac{1}{60\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}\,a\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}$$
$$\left(-30\,i\,\sqrt{2}\,C\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-30\,i\,\sqrt{2}\,C\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+\right.$$
$$30\,\sqrt{2}\,C\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-15\,\sqrt{2}\,C\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$15\,\sqrt{2}\,C\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+120\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+180\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$\left.120\,C\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+30\,A\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+20\,B\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+6\,A\,\mathrm{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]\right)$$

Problem 595: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 333 leaves, 8 steps):

$$\frac{a^{5/2}\,(1304\,A+1132\,B+1015\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{512\,d}+\frac{a^3\,(1304\,A+1132\,B+1015\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{512\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^3\,(1304\,A+1132\,B+1015\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{768\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(680\,A+628\,B+545\,C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{960\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^2\,(120\,A+156\,B+115\,C)\,\text{Sec}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{480\,d}+$$

$$\frac{a\,(12\,B+5\,C)\,\text{Sec}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{60\,d}+\frac{C\,\text{Sec}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{6\,d}$$

Result (type 3, 1361 leaves) :

$$-\left(\left(\frac{1}{8192}+\frac{i}{8192}\right)\left((-1+i)+\sqrt{2}\right)\left((3912+1304\,i)\,A+1304\,\sqrt{2}\,A+(3396+1132\,i)\,B+1132\,\sqrt{2}\,B+(3045+1015\,i)\,C+1015\,\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$

$$\left(\left(\frac{1}{8192}-\frac{i}{8192}\right)\left((1+i)+\sqrt{2}\right)\left((-3912+1304\,i)\,A+1304\,\sqrt{2}\,A-(3396-1132\,i)\,B+1132\,\sqrt{2}\,B-(3045-1015\,i)\,C+1015\,\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\left(\left(2608\,A+1304\,i\,\sqrt{2}\,A+2264\,B+1132\,i\,\sqrt{2}\,B+2030\,C+1015\,i\,\sqrt{2}\,C\right)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right.$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(4096\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$

$$\left(\left(\frac{1}{16\,384}-\frac{i}{16\,384}\right)\left((-1+i)+\sqrt{2}\right)\left((3912+1304\,i)\,A+1304\,\sqrt{2}\,A+(3396+1132\,i)\,B+1132\,\sqrt{2}\,B+(3045+1015\,i)\,C+1015\,\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)+$$

$$\left(\left(\frac{1}{16384}+\frac{i}{16384}\right)\left((1+i)+\sqrt{2}\right)\left((-3912+1304\,i)\,A+1304\sqrt{2}\,A-(3396-1132\,i)\,B+1132\sqrt{2}\,B-(3045-1015\,i)\,C+1015\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a\,(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)+$$

$$\frac{1}{491520\,d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5\text{Sec}[c+dx]^{3/2}(a\,(1+\text{Sec}[c+dx]))^{5/2}$$

$$\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-96720\,A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-78120\,B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-47250\,C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+\right.$$

$$164240\,A\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]+167944\,B\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]+184490\,C\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]-7560\,A\,\text{Sin}\left[\frac{5}{2}(c+dx)\right]+13980\,B\,\text{Sin}\left[\frac{5}{2}(c+dx)\right]+$$

$$28275\,C\,\text{Sin}\left[\frac{5}{2}(c+dx)\right]+101160\,A\,\text{Sin}\left[\frac{7}{2}(c+dx)\right]+98484\,B\,\text{Sin}\left[\frac{7}{2}(c+dx)\right]+88305\,C\,\text{Sin}\left[\frac{7}{2}(c+dx)\right]+6520\,A\,\text{Sin}\left[\frac{9}{2}(c+dx)\right]+$$

$$\left.5660\,B\,\text{Sin}\left[\frac{9}{2}(c+dx)\right]+5075\,C\,\text{Sin}\left[\frac{9}{2}(c+dx)\right]+19560\,A\,\text{Sin}\left[\frac{11}{2}(c+dx)\right]+16980\,B\,\text{Sin}\left[\frac{11}{2}(c+dx)\right]+15225\,C\,\text{Sin}\left[\frac{11}{2}(c+dx)\right]\right)$$

- **Problem 596: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+dx]^{3/2}(a+a\,\text{Sec}[c+dx])^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 281 leaves, 7 steps):

$$\frac{a^{5/2}(400A+326B+283C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{128\,d}+\frac{a^3(400A+326B+283C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{128\,d\sqrt{a+a\,\text{Sec}[c+dx]}}+$$

$$\frac{a^3(1040A+950B+787C)\,\text{Sec}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{960\,d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a^2(80A+110B+79C)\,\text{Sec}[c+dx]^{5/2}\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{240\,d}+$$

$$\frac{a\,(2B+C)\,\text{Sec}[c+dx]^{5/2}(a+a\,\text{Sec}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{8\,d}+\frac{C\,\text{Sec}[c+dx]^{5/2}(a+a\,\text{Sec}[c+dx])^{5/2}\,\text{Sin}[c+dx]}{5\,d}$$

Result (type 3, 2352 leaves):

$$-\left(\left(\frac{1}{2048}+\frac{i}{2048}\right)\left((-1+i)+\sqrt{2}\right)\left((1200+400\,i)\,A+400\sqrt{2}\,A+(978+326\,i)\,B+326\sqrt{2}\,B+(849+283\,i)\,C+283\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a\,(1+\text{Sec}[c+dx]))^{5/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$

$$\left(\left(\frac{1}{2048}-\frac{i}{2048}\right)\left((1+i)+\sqrt{2}\right)\left((-1200+400\,i)\,A+400\,\sqrt{2}\,A-(978-326\,i)\,B+326\,\sqrt{2}\,B-(849-283\,i)\,C+283\,\sqrt{2}\,C\right)\right.$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\left(\left(800\,A+400\,i\,\sqrt{2}\,A+652\,B+326\,i\,\sqrt{2}\,B+566\,C+283\,i\,\sqrt{2}\,C\right)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right.$$

$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(1024\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$

$$\left(\left(\frac{1}{4096}-\frac{i}{4096}\right)\left((-1+i)+\sqrt{2}\right)\left((1200+400\,i)\,A+400\,\sqrt{2}\,A+(978+326\,i)\,B+326\,\sqrt{2}\,B+(849+283\,i)\,C+283\,\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\left(\left(\frac{1}{4096}+\frac{i}{4096}\right)\left((1+i)+\sqrt{2}\right)\left((-1200+400\,i)\,A+400\,\sqrt{2}\,A-(978-326\,i)\,B+326\,\sqrt{2}\,B-(849-283\,i)\,C+283\,\sqrt{2}\,C\right)\right.$$

$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{80\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5}+$$

$$\frac{(16\,A+46\,B+59\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{384\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$

$$\frac{(400\,A+326\,B+283\,C)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{512\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-$$

$$\frac{C\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)}{80\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5}+$$

$$\frac{(-16A-46B-59C)\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)}{384\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-400A-326B-283C)\,\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)}{512\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\left(\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\left(2B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+5C\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(64\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4\right)+$$

$$\left(\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\left(2B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+5C\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(64\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4\right)+$$

$$\left(\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(80A\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+86B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+75C\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(256\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left(\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\mathrm{Sec}[c+d x]))^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(80A\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+86B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+75C\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(256\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\,\mathrm{Sec}[c+d x]^{9/2}\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)$$

- **Problem 597: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{\mathrm{Sec}[c+d x]}\,(a+a\,\mathrm{Sec}[c+d x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 233 leaves, 6 steps) :

$$\frac{a^{5/2}\,(304\,A+200\,B+163\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{64\,d}+\frac{a^3\,(432\,A+392\,B+299\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(16\,A+24\,B+17\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d}+\frac{a\,(8\,B+5\,C)\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{C\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 2084 leaves) :

$$-\left(\left(\frac{1}{1024}+\frac{i}{1024}\right)\left((-1+i)+\sqrt{2}\right)\left((912+304\,i)\,A+304\,\sqrt{2}\,A+(600+200\,i)\,B+200\,\sqrt{2}\,B+(489+163\,i)\,C+163\,\sqrt{2}\,C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$
$$\left(\left(\frac{1}{1024}-\frac{i}{1024}\right)\left((1+i)+\sqrt{2}\right)\left((-912+304\,i)\,A+304\,\sqrt{2}\,A-(600-200\,i)\,B+200\,\sqrt{2}\,B-(489-163\,i)\,C+163\,\sqrt{2}\,C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$
$$\left(\left(608\,A+304\,i\,\sqrt{2}\,A+400\,B+200\,i\,\sqrt{2}\,B+326\,C+163\,i\,\sqrt{2}\,C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(512\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$
$$\left(\left(\frac{1}{2048}-\frac{i}{2048}\right)\left((-1+i)+\sqrt{2}\right)\left((912+304\,i)\,A+304\,\sqrt{2}\,A+(600+200\,i)\,B+200\,\sqrt{2}\,B+(489+163\,i)\,C+163\,\sqrt{2}\,C\right)\right.$$
$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$
$$\left(\left(\frac{1}{2048}+\frac{i}{2048}\right)\left((1+i)+\sqrt{2}\right)\left((-912+304\,i)\,A+304\,\sqrt{2}\,A-(600-200\,i)\,B+200\,\sqrt{2}\,B-(489-163\,i)\,C+163\,\sqrt{2}\,C\right)\right.$$

$$\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Big)\Big/$$

$$\left(\sqrt{2}\left(\text{i}+\sqrt{2}\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\frac{(8\,B+23\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{192\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(176\,A+200\,B+163\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{256\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$

$$\frac{(-8\,B-23\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{192\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(-176\,A-200\,B-163\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{256\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$

$$\Big(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(16\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+43\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big)\Big/$$

$$\left(128\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2\right)+$$

$$\Big(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(16\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+43\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big)\Big/$$

$$\left(128\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{32\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{32\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}$$

- **Problem 598: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a + a\,\text{Sec}[c + d\,x])^{5/2}\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)}{\sqrt{\text{Sec}[c + d\,x]}}\,dx$$

Optimal (type 3, 233 leaves, 6 steps):

$$\frac{a^{5/2}\,(40\,A + 38\,B + 25\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{8\,d} + \frac{a^3\,(24\,A - 54\,B - 49\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{24\,d\,\sqrt{a + a\,\text{Sec}[c + d\,x]}} +$$
$$\frac{a^2\,(24\,A + 42\,B + 31\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\sqrt{a + a\,\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{24\,d} +$$
$$\frac{a\,(6\,B + 5\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,(a + a\,\text{Sec}[c + d\,x])^{3/2}\,\text{Sin}[c + d\,x]}{12\,d} + \frac{C\,\sqrt{\text{Sec}[c + d\,x]}\,(a + a\,\text{Sec}[c + d\,x])^{5/2}\,\text{Sin}[c + d\,x]}{3\,d}$$

Result (type 3, 1894 leaves):

$$-\Bigg(\left(\frac{1}{128} + \frac{i}{128}\right)\left((-1 + i) + \sqrt{2}\right)\left((120 + 40\,i)\,A + 40\,\sqrt{2}\,A + (114 + 38\,i)\,B + 38\,\sqrt{2}\,B + (75 + 25\,i)\,C + 25\,\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{4}\,(c + d\,x)\right] - \sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c + d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c + d\,x)\right] + \sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{4}\,(c + d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c + d\,x)\right]^5\,(a\,(1 + \text{Sec}[c + d\,x]))^{5/2}$$
$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\Bigg)\Big/\left(\sqrt{2}\,\left(i + \sqrt{2}\right)\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\text{Sec}[c + d\,x]^{9/2}\right) -$$
$$\Bigg(\left(\frac{1}{128} - \frac{i}{128}\right)\left((1 + i) + \sqrt{2}\right)\left((-120 + 40\,i)\,A + 40\,\sqrt{2}\,A - (114 - 38\,i)\,B + 38\,\sqrt{2}\,B - (75 - 25\,i)\,C + 25\,\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c + d\,x)\right] + \text{Sin}\left[\frac{1}{4}\,(c + d\,x)\right] - \sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c + d\,x)\right]}{\text{Cos}\left[\frac{1}{4}\,(c + d\,x)\right] + \sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{4}\,(c + d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c + d\,x)\right]^5\,(a\,(1 + \text{Sec}[c + d\,x]))^{5/2}$$
$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\Bigg)\Big/\left(\sqrt{2}\,\left(i + \sqrt{2}\right)\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\text{Sec}[c + d\,x]^{9/2}\right) +$$
$$\Bigg(\left(80\,A + 40\,i\,\sqrt{2}\,A + 76\,B + 38\,i\,\sqrt{2}\,B + 50\,C + 25\,i\,\sqrt{2}\,C\right)\,\text{Log}\left[\sqrt{2} + 2\,\text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c + d\,x)\right]^5\,(a\,(1 + \text{Sec}[c + d\,x]))^{5/2}$$
$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\Bigg)\Big/\left(64\,\left(i + \sqrt{2}\right)\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\text{Sec}[c + d\,x]^{9/2}\right) -$$
$$\Bigg(\left(\frac{1}{256} - \frac{i}{256}\right)\left((-1 + i) + \sqrt{2}\right)\left((120 + 40\,i)\,A + 40\,\sqrt{2}\,A + (114 + 38\,i)\,B + 38\,\sqrt{2}\,B + (75 + 25\,i)\,C + 25\,\sqrt{2}\,C\right)$$

$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Big)\Big/$$
$$\left(\sqrt{2}\left(\mathbb{i}+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\right)+$$
$$\Bigg(\left(\frac{1}{256}+\frac{\mathbb{i}}{256}\right)\left((1+\mathbb{i})+\sqrt{2}\right)\left((-120+40\,\mathbb{i}) A+40\sqrt{2}\,A-(114-38\,\mathbb{i}) B+38\sqrt{2}\,B-(75-25\,\mathbb{i}) C+25\sqrt{2}\,C\right)$$
$$\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg)\Big/$$
$$\left(\sqrt{2}\left(\mathbb{i}+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\right)+$$
$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{24 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{(8 A+22 B+25 C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{32 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$
$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{24 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{(-8 A-22 B-25 C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{32 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(2 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+5 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(16 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$
$$\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(2 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+5 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(16 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$
$$\frac{A\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}}$$

- **Problem 599: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 3, 233 leaves, 6 steps) :

$$\frac{a^{5/2}\,(8\,A+20\,B+19\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,d}+\frac{a^3\,(56\,A+12\,B-27\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{a^2\,(8\,A-12\,B-21\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d}-\frac{a\,(4\,A-3\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{6\,d}+\frac{2\,A\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1736 leaves) :

$$-\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8\,i)\,A+8\,\sqrt{2}\,A+(60+20\,i)\,B+20\,\sqrt{2}\,B+(57+19\,i)\,C+19\,\sqrt{2}\,C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$
$$\left(\left(\frac{1}{64}-\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8\,i)\,A+8\,\sqrt{2}\,A-(60-20\,i)\,B+20\,\sqrt{2}\,B-(57-19\,i)\,C+19\,\sqrt{2}\,C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$
$$\left(\left(16\,A+8\,i\,\sqrt{2}\,A+40\,B+20\,i\,\sqrt{2}\,B+38\,C+19\,i\,\sqrt{2}\,C\right)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(32\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)-$$
$$\left(\left(\frac{1}{128}-\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8\,i)\,A+8\,\sqrt{2}\,A+(60+20\,i)\,B+20\,\sqrt{2}\,B+(57+19\,i)\,C+19\,\sqrt{2}\,C\right)\right.$$
$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(\sqrt{2}\,\left(i+\sqrt{2}\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\left(\left(\frac{1}{128}+\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8 i) A+8\sqrt{2} A-(60-20 i) B+20\sqrt{2} B-(57-19 i) C+19\sqrt{2} C\right)\right.$$
$$\left.\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\right)+$$
$$\frac{(4 B+11 C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{16 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\frac{(-4 B-11 C)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{16 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\frac{A\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}\left[\frac{3}{2}(c+d x)\right]}{6 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}}+$$
$$\left((5 A+2 B)\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$
$$\left(2 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\right)+$$
$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{8 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a(1+\text{Sec}[c+d x]))^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{8 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,\text{Sec}[c+d x]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}$$

- **Problem 600: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^{5/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{5/2}}\,dx$$

Optimal (type 3, 223 leaves, 6 steps):

$$\frac{a^{5/2}(2 B+5 C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{d}+\frac{a^3(64 A+70 B+15 C)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{15 d\sqrt{a+a\,\text{Sec}[c+d x]}}-$$
$$\frac{a^2(16 A+10 B-15 C)\sqrt{\text{Sec}[c+d x]}\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{15 d}+$$
$$\frac{2 a(A+B)(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{3 d\sqrt{\text{Sec}[c+d x]}}+\frac{2 A(a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{5 d\,\text{Sec}[c+d x]^{3/2}}$$

Result (type 3, 1519 leaves):

$$-\Bigg(\Bigg(\left(\frac{1}{16}+\frac{i}{16}\right)\left((-1+i)+\sqrt{2}\right)\left((6+2i)B+2\sqrt{2}B+(15+5i)C+5\sqrt{2}C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5 (a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\Bigg)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)-$$

$$\Bigg(\left(\frac{1}{16}-\frac{i}{16}\right)\left((1+i)+\sqrt{2}\right)\left((-6+2i)B+2\sqrt{2}B-(15-5i)C+5\sqrt{2}C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]$$

$$\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5 (a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\Bigg)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)+$$

$$\left(\left(4B+2i\sqrt{2}B+10C+5i\sqrt{2}C\right)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(8\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)-$$

$$\Bigg(\left(\frac{1}{32}-\frac{i}{32}\right)\left((-1+i)+\sqrt{2}\right)\left((6+2i)B+2\sqrt{2}B+(15+5i)C+5\sqrt{2}C\right)\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5$$

$$(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\Bigg)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)+$$

$$\Bigg(\left(\frac{1}{32}+\frac{i}{32}\right)\left((1+i)+\sqrt{2}\right)\left((-6+2i)B+2\sqrt{2}B-(15-5i)C+5\sqrt{2}C\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5$$

$$(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\Bigg)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)+$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-$$

$$\frac{C\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+$$

$$\left((5A+2B)\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{3}{2}(c+dx)\right]\right)\Big/$$

$$\left(12d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}\right)+$$

$$\frac{A\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5(a(1+\text{Sec}[c+dx]))^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{5}{2}(c+dx)\right]}{20d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{9/2}}+$$

$$\left((5 A+5 B+2 C) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Big/ \left(2 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \operatorname{Sec}[c+d x]^{9/2}\right)$$

Problem 601: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a \operatorname{Sec}[c+d x])^{5/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{7/2}} \, dx$$

Optimal (type 3, 222 leaves, 6 steps):

$$\frac{2 a^{5/2} C \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{d}+\frac{2 a^3 (160 A+224 B+245 C) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{105 d \sqrt{a+a \operatorname{Sec}[c+d x]}}+$$
$$\frac{2 a^2 (40 A+56 B+35 C) \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{105 d \sqrt{\operatorname{Sec}[c+d x]}}+\frac{2 a (5 A+7 B) (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{35 d \operatorname{Sec}[c+d x]^{3/2}}+\frac{2 A (a+a \operatorname{Sec}[c+d x])^{5/2} \operatorname{Sin}[c+d x]}{7 d \operatorname{Sec}[c+d x]^{5/2}}$$

Result (type 3, 428 leaves):

$$\frac{1}{420 d \sqrt{\operatorname{Sec}[c+d x]}} a^2 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right] \sqrt{a (1+\operatorname{Sec}[c+d x])}$$
$$\left(-210 i \sqrt{2} C \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right) \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-210 i \sqrt{2} C \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right) \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+\right.$$
$$210 \sqrt{2} C \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-105 \sqrt{2} C \operatorname{Log}\left[2-\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-$$
$$105 \sqrt{2} C \operatorname{Log}\left[2+\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+1575 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+2100 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+2100 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+$$
$$\left.385 A \operatorname{Sin}\left[\frac{3}{2}(c+d x)\right]+350 B \operatorname{Sin}\left[\frac{3}{2}(c+d x)\right]+140 C \operatorname{Sin}\left[\frac{3}{2}(c+d x)\right]+105 A \operatorname{Sin}\left[\frac{5}{2}(c+d x)\right]+42 B \operatorname{Sin}\left[\frac{5}{2}(c+d x)\right]+15 A \operatorname{Sin}\left[\frac{7}{2}(c+d x)\right]\right)$$

Problem 605: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x]^{5/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\sqrt{a+a \operatorname{Sec}[c+d x]}} \, dx$$

Optimal (type 3, 241 leaves, 8 steps):

$$-\frac{(8A-14B+9C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{8\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{\sqrt{a}\,d}+$$

$$\frac{(8A-2B+7C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{8d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{(6B-C)\,\text{Sec}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{12d\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{C\,\text{Sec}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{3d\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 3, 2012 leaves):

$$-\left(\left(\frac{1}{16}-\frac{i}{16}\right)\left((1+i)-i\sqrt{2}\right)\left((24+8i)A+8\sqrt{2}A-(42+14i)B-14\sqrt{2}B+(27+9i)C+9\sqrt{2}C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)+$$

$$\left(\left(\frac{1}{16}-\frac{i}{16}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)A+8\sqrt{2}A+(42-14i)B-14\sqrt{2}B-(27-9i)C+9\sqrt{2}C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)-$$

$$\left(4\,(A-B+C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)+$$

$$\left(4\,(A-B+C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)+$$

$$\left(\left(-16A-8i\sqrt{2}A+28B+14i\sqrt{2}B-18C-9i\sqrt{2}C\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(8\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)+$$

$$\left(\left(\frac{1}{32}+\frac{i}{32}\right)\left((1+i)-i\sqrt{2}\right)\left((24+8i)A+8\sqrt{2}A-(42+14i)B-14\sqrt{2}B+(27+9i)C+9\sqrt{2}C\right)\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)-$$

$$\left(\left(\frac{1}{32}+\frac{i}{32}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)A+8\sqrt{2}A+(42-14i)B-14\sqrt{2}B-(27-9i)C+9\sqrt{2}C\right)\right.$$
$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)+$$
$$\left(C\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3\right)+$$
$$\left((8A-2B+7C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)-$$
$$\left(C\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3\right)+$$
$$\left((-8A+2B-7C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(4d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(2B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/$$
$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2\right)+$$
$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(2B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/$$
$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2\right)$$

- **Problem 606: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^{3/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{\sqrt{a+a\,\text{Sec}[c+dx]}}\,dx$$

Optimal (type 3, 195 leaves, 7 steps):

$$\frac{(8A-4B+7C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{\sqrt{a}\,d}+$$

$$\frac{(4B-C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 1732 leaves) :

$$-\left(\left(\frac{1}{8}+\frac{i}{8}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8i)\,A+8\sqrt{2}\,A-(12+4i)\,B-4\sqrt{2}\,B+(21+7i)\,C+7\sqrt{2}\,C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)-$$

$$\left(\left(\frac{1}{8}-\frac{i}{8}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)\,A+8\sqrt{2}\,A+(12-4i)\,B-4\sqrt{2}\,B-(21-7i)\,C+7\sqrt{2}\,C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)+$$

$$\left(4\,(A-B+C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)-$$

$$\left(4\,(A-B+C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)+$$

$$\left(\left(16A+8i\sqrt{2}\,A-8B-4i\sqrt{2}\,B+14C+7i\sqrt{2}\,C\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)-$$

$$\left(\left(\frac{1}{16}-\frac{i}{16}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8i)\,A+8\sqrt{2}\,A-(12+4i)\,B-4\sqrt{2}\,B+(21+7i)\,C+7\sqrt{2}\,C\right)\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right)+$$

$$\left(\left(\frac{1}{16}+\frac{i}{16}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)A+8\sqrt{2}A+(12-4i)B-4\sqrt{2}B-(21-7i)C+7\sqrt{2}C\right)\right.$$
$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\right)+$$
$$\left((4B-C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)+$$
$$\left(C\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2\right)+$$
$$\left(C\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\Big/$$
$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2\right)+$$
$$\left((-4B+C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(2d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,\text{Sec}[c+dx]^{3/2}\sqrt{a\,(1+\text{Sec}[c+dx])}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)$$

- **Problem 607: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+dx]}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{\sqrt{a+a\,\text{Sec}[c+dx]}}\,dx$$

Optimal (type 3, 141 leaves, 6 steps):

$$\frac{(2B-C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}\right]}{\sqrt{a}\,d}+\frac{C\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{d\,\sqrt{a+a\,\text{Sec}[c+dx]}}$$

Result (type 3, 644 leaves):

$$\left(\left(\frac{1}{8}+\frac{i}{8}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left(\frac{2\,i\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2B-C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]}{i+\sqrt{2}}-\right.$$

$$\frac{2\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2B-C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]}{i+\sqrt{2}}-$$

$$(16-16 i)(A-B+C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+(16-16 i)(A-B+C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+$$

$$\frac{(4+4 i)\left(-2 i+\sqrt{2}\right)(2B-C)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}$$

$$i\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2B-C)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$

$$\frac{\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2B-C)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{i+\sqrt{2}}+$$

$$\left.\left.\frac{(8-8 i)\,C}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}-\frac{(8-8 i)\,C}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2(c+d x)])\,\text{Sec}[c+d x]^{3/2}\sqrt{a(1+\text{Sec}[c+d x])}\right)$$

- **Problem 608: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2}{\sqrt{\text{Sec}[c+d x]}\sqrt{a+a\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 138 leaves, 6 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{2\,A\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 477 leaves) :

$$\frac{1}{2 d \sqrt{a (1+\text{Sec}[c+d x])}} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \sqrt{\text{Sec}[c+d x]} \left(-2 i \sqrt{2} C \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(-1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]-2 i \sqrt{2} C \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\left(1+\sqrt{2}\right) \text{Sin}\left[\frac{1}{4} (c+d x)\right]}{\left(-1+\sqrt{2}\right) \text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]}\right]+4 A \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]-4 B \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]+4 C \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]-\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]-4 A \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]+4 B \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]-4 C \text{Log}\left[\text{Cos}\left[\frac{1}{4} (c+d x)\right]+\text{Sin}\left[\frac{1}{4} (c+d x)\right]\right]+2 \sqrt{2} C \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\sqrt{2} C \text{Log}\left[2-\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\sqrt{2} C \text{Log}\left[2+\sqrt{2} \text{Cos}\left[\frac{1}{2} (c+d x)\right]-\sqrt{2} \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+8 A \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

- **Problem 612: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Sec}[c+d x]} \left(a A+(A b+a B) \text{Sec}[c+d x]+b B \text{Sec}[c+d x]^2\right)}{\sqrt{a+a \text{Sec}[c+d x]}} \, dx$$

Optimal (type 3, 152 leaves, 6 steps) :

$$\frac{(2 A b+2 a B-b B) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right]}{\sqrt{a} d}+\frac{\sqrt{2} (a-b) (A-B) \text{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \text{Sec}[c+d x]}}\right]}{\sqrt{a} d}+\frac{b B \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{d \sqrt{a+a \text{Sec}[c+d x]}}$$

Result (type 3, 638 leaves) :

$$\frac{1}{d\sqrt{a\,(1+\text{Sec}[c+d\,x])}}$$

$$\left(\frac{1}{16}+\frac{i}{16}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\left(\frac{2\,i\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2\,A\,b+2\,a\,B-b\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]}{i+\sqrt{2}}-\right.$$

$$\frac{2\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2\,A\,b+2\,a\,B-b\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]}{i+\sqrt{2}}-$$

$$(16-16\,i)\,(a-b)\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+(16-16\,i)\,(a-b)\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+$$

$$\frac{(4+4\,i)\left(-2\,i+\sqrt{2}\right)(2\,A\,b+2\,a\,B-b\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}$$

$$i\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(2\,A\,b+2\,a\,B-b\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$

$$\frac{1}{i+\sqrt{2}}\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(2\,A\,b+2\,a\,B-b\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$

$$\left.\frac{(8-8\,i)\,b\,B}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}-\frac{(8-8\,i)\,b\,B}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}\right)$$

- **Problem 613: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 260 leaves, 8 steps):

$$\frac{(8\,A-12\,B+19\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{4\,a^{3/2}\,d}-\frac{(5\,A-9\,B+13\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-$$

$$\frac{(A-B+C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}-\frac{(2\,A-6\,B+7\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,a\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{(A-B+2\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,a\,d\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 1996 leaves):

$$-\left(\left(\frac{1}{4}+\frac{i}{4}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8i)A+8\sqrt{2}A-(36+12i)B-12\sqrt{2}B+(57+19i)C+19\sqrt{2}C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)-$$

$$\left(\left(\frac{1}{4}-\frac{i}{4}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)A+8\sqrt{2}A+(36-12i)B-12\sqrt{2}B-(57-19i)C+19\sqrt{2}C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(2\,(5A-9B+13C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)-$$

$$\left(2\,(5A-9B+13C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(\left(16A+8i\sqrt{2}A-24B-12i\sqrt{2}B+38C+19i\sqrt{2}C\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(2\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)-$$

$$\left(\left(\frac{1}{8}-\frac{i}{8}\right)\left((-1+i)+\sqrt{2}\right)\left((24+8i)A+8\sqrt{2}A-(36+12i)B-12\sqrt{2}B+(57+19i)C+19\sqrt{2}C\right)\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(\left(\frac{1}{8}+\frac{i}{8}\right)\left((1+i)+\sqrt{2}\right)\left((-24+8i)A+8\sqrt{2}A+(36-12i)B-12\sqrt{2}B-(57-19i)C+19\sqrt{2}C\right)\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a\,(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left((-A+B-C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\sqrt{\text{Sec}[c+d x]}\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$

$$\left((A-B+C)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\sqrt{\text{Sec}[c+d x]}\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$

$$\left((4B-5C)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\sqrt{\text{Sec}[c+d x]}\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$

$$\left(2C\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\sqrt{\text{Sec}[c+d x]}\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left(2C\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\sqrt{\text{Sec}[c+d x]}\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left((-4B+5C)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\sqrt{\text{Sec}[c+d x]}\,(a\,(1+\text{Sec}[c+d x]))^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)$$

- **Problem 614: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d x]^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+a\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 3, 202 leaves, 7 steps):

$$\frac{(2B-3C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{a^{3/2}\,d}+\frac{(A-5B+9C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-$$

$$\frac{(A-B+C)\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{2d\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{(A-B+3C)\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{2a d\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 1669 leaves):

$$-\left((1-i)\left((1+i)-i\sqrt{2}\right)\left((-6-2i)B-2\sqrt{2}B+(9+3i)C+3\sqrt{2}C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left((1-i)\left((1+i)+\sqrt{2}\right)\left((6-2i)B-2\sqrt{2}B-(9-3i)C+3\sqrt{2}C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)-$$

$$\left(2(A-5B+9C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(2(A-5B+9C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(2\left(4B+2i\sqrt{2}B-6C-3i\sqrt{2}C\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left(\left(\frac{1}{2}+\frac{i}{2}\right)\left((1+i)-i\sqrt{2}\right)\left((-6-2i)B-2\sqrt{2}B+(9+3i)C+3\sqrt{2}C\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right.$$

$$\left.\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)-$$

$$\left(\left(\frac{1}{2}+\frac{i}{2}\right)\left((1+i)+\sqrt{2}\right)\left((6-2i)B-2\sqrt{2}B-(9-3i)C+3\sqrt{2}C\right)\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right.$$

$$\left.\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\right)+$$

$$\left((A-B+C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$

$$\left(d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{\text{Sec}[c+dx]}\,(a(1+\text{Sec}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right)^2\right)+$$

$$\left((-A+B-C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}\,\left(a\,(1+\text{Sec}[c+d\,x])\right)^{3/2}\left(\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right)^2\right)+$$
$$\left(4\,C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}\,\left(a\,(1+\text{Sec}[c+d\,x])\right)^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)-$$
$$\left(4\,C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}\,\left(a\,(1+\text{Sec}[c+d\,x])\right)^{3/2}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)$$

- **Problem 615: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 149 leaves, 6 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{3/2}\,d}+\frac{(3\,A+B-5\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 1259 leaves):

$$-\left(2\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right) C \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) -$$

$$\left(2\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right) C \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) -$$

$$\left(2 (3 A+B-5 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) +$$

$$\left(2 (3 A+B-5 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) +$$

$$\frac{4 \sqrt{2} C \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}} +$$

$$\left(i\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right) C \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Log}\left[2-\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) +$$

$$\left(i\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right) C \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Log}\left[2+\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2}\right) +$$

$$\left((-A+B-C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right) +$$

$$\left((A-B+C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{\operatorname{Sec}[c+d x]} (a (1+\operatorname{Sec}[c+d x]))^{3/2} \left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)$$

Problem 616: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 161 leaves, 4 steps):

$$-\frac{(7\,A-3\,B-C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{(5\,A-B+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 578 leaves):

$$\left(2\,(7\,A-3\,B-C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)-$$
$$\left(2\,(7\,A-3\,B-C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)+$$
$$\left((A-B+C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2\right)+$$
$$\left((-A+B-C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2\right)+$$
$$\frac{16\,A\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}}$$

Problem 619: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 254 leaves, 8 steps):

$$\frac{(2B-5C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{a^{5/2}\,d}+\frac{(3A-43B+115C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-$$

$$\frac{(A-B+C)\,\text{Sec}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{4 d\,(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{(A+7B-15C)\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{16 a d\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{(3A-11B+35C)\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{16 a^2 d\,\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 1923 leaves):

$$-\left((1-i)\sqrt{2}\left((1+i)-i\sqrt{2}\right)\left((-6-2i)B-2\sqrt{2}\,B+(15+5i)C+5\sqrt{2}\,C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left((1-i)\sqrt{2}\left((1+i)+\sqrt{2}\right)\left((6-2i)B-2\sqrt{2}\,B-(15-5i)C+5\sqrt{2}\,C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left((-3A+43B-115C)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(2d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left((3A-43B+115C)\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(2d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left(4\left(4B+2i\sqrt{2}\,B-10C-5i\sqrt{2}\,C\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left((1+i)\left((1+i)-i\sqrt{2}\right)\left((-6-2i)B-2\sqrt{2}\,B+(15+5i)C+5\sqrt{2}\,C\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$

$$\left.\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)-$$

$$\left((1+i)\left((1+i)+\sqrt{2}\right)\left((6-2i)B-2\sqrt{2}\,B-(15-5i)C+5\sqrt{2}\,C\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right.$$

$$\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\Big/\left(\sqrt{2}\,\left(\mathrm{i}+\sqrt{2}\right)\,d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\right)+$$

$$\left((A-B+C)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\,\left(\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^4\right)+$$

$$\left((3\,A-11\,B+19\,C)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\,\left(\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2\right)+$$

$$\left((-A+B-C)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\,\left(\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^4\right)+$$

$$\left((-3\,A+11\,B-19\,C)\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\,\left(\mathrm{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2\right)+$$

$$\left(8\,C\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)-$$

$$\left(8\,C\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(d\,\left(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a\,\left(1+\mathrm{Sec}[c+d\,x]\right)\right)^{5/2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

- **Problem 620: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\left(a+a\,\mathrm{Sec}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 201 leaves, 7 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(5\,A+3\,B-43\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}+\frac{(5\,A+3\,B-11\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 1521 leaves) :

$$-\left(4\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)C\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)-$$
$$\left(4\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)C\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\right.$$
$$\left.\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left((-5\,A-3\,B+43\,C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left((5\,A+3\,B-43\,C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left(8\sqrt{2}\,C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left(2\,i\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\sqrt{\text{Sec}[c+d\,x]}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left(2\,i\left((-1+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\sqrt{\text{Sec}[c+d\,x]}\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left((-A+B-C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^4\right)+$$

$$\left((5\,A+3\,B-11\,C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2\right)+$$

$$\left((A-B+C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^4\right)+$$

$$\left((-5\,A-3\,B+11\,C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2\right)$$

- **Problem 622: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 211 leaves, 5 steps):

$$-\frac{(75\,A-19\,B-5\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-$$

$$\frac{(13\,A-5\,B-3\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{(49\,A-9\,B+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 836 leaves):

$$\left((75 A-19 B-5 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(2 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$
$$\left((-75 A+19 B+5 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(2 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$
$$\left((-A+B-C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4\right)+$$
$$\left((21 A-13 B+5 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$
$$\left((A-B+C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4\right)+$$
$$\left((-21 A+13 B-5 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$
$$\frac{32 A \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}}$$

- **Problem 623: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2}{\operatorname{Sec}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 261 leaves, 6 steps):

$$\frac{(163 A-75 B+19 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-\frac{(A-B+C) \operatorname{Sin}[c+d x]}{4 d \sqrt{\operatorname{Sec}[c+d x]} (a+a \operatorname{Sec}[c+d x])^{5/2}}-$$
$$\frac{(17 A-9 B+C) \operatorname{Sin}[c+d x]}{16 a d \sqrt{\operatorname{Sec}[c+d x]} (a+a \operatorname{Sec}[c+d x])^{3/2}}+\frac{(95 A-39 B+15 C) \operatorname{Sin}[c+d x]}{48 a^2 d \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+a \operatorname{Sec}[c+d x]}}-\frac{(299 A-147 B+27 C) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{48 a^2 d \sqrt{a+a \operatorname{Sec}[c+d x]}}$$

Result (type 3, 943 leaves):

$$\left((-163 A+75 B-19 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$$
$$\left(2 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$
$$\left((163 A-75 B+19 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$$
$$\left(2 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$
$$\left((A-B+C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$$
$$\left(4 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4\right)+$$
$$\left((-29 A+21 B-13 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$$
$$\left(4 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$
$$\left((-A+B-C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$$
$$\left(4 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4\right)+$$
$$\left((29 A-21 B+13 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) /$$
$$\left(4 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}\left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)-$$
$$\frac{16(5 A-2 B) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}}+$$
$$\frac{16 A \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{3}{2}(c+d x)\right]}{3 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a(1+\operatorname{Sec}[c+d x]))^{5/2}}$$

- **Problem 624: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2}{\operatorname{Sec}[c+d x]^{5/2}(a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 313 leaves, 7 steps) :

$$-\frac{(283\,A-163\,B+75\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{(21\,A-13\,B+5\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+$$

$$\frac{(157\,A-85\,B+45\,C)\,\text{Sin}[c+d\,x]}{80\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{(787\,A-475\,B+195\,C)\,\text{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{(2671\,A-1495\,B+735\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 1053 leaves) :

$$\left((283 A - 163 B + 75 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(2 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$
$$\left((-283 A + 163 B - 75 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right] \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(2 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\right)+$$
$$\left((-A + B - C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4\right)+$$
$$\left((37 A - 29 B + 21 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$
$$\left((A - B + C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4\right)+$$
$$\left((-37 A + 29 B - 21 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2} \left(\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2\right)+$$
$$\frac{16 (10 A - 5 B + 2 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}}-$$
$$\frac{8 (5 A - 2 B) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{3}{2}(c+d x)\right]}{3 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}}+$$
$$\frac{8 A \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{5}{2}(c+d x)\right]}{5 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a (1+\operatorname{Sec}[c+d x]))^{5/2}}$$

- **Problem 625: Result more than twice size of optimal antiderivative.**

$$\int (a + a \operatorname{Sec}[c+d x])^{2/3} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 6, 446 leaves, 10 steps) :

$$\frac{3\,C\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{5\,d}+\frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[\frac{7}{6},\frac{1}{2},1,\frac{13}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{7\,d\,\sqrt{1-\text{Sec}[c+d\,x]}}+$$

$$\frac{3\,(5\,B+2\,C)\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{10\,d\,(1+\text{Sec}[c+d\,x])}-$$

$$\left(3^{3/4}\,(5\,B+2\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\text{Sec}[c+d\,x])^{2/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(10\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7349 leaves) : Display of huge result suppressed!

Problem 626: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 6, 390 leaves, 9 steps) :

$$\frac{3\,C\,\text{Tan}[c+d\,x]}{2\,d\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}+\frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[\frac{1}{6},\frac{1}{2},1,\frac{7}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\,\text{Tan}[c+d\,x]}{d\,\sqrt{1-\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}-$$

$$\left(3^{3/4}\,(2\,B-C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(2\times 2^{1/3}\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7485 leaves) : Display of huge result suppressed!

Problem 627: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2}{(a + a\,\text{Sec}[c + d\,x])^{4/3}}\,dx$$

Optimal (type 6, 402 leaves, 9 steps):

$$-\frac{3\,(A - B + C)\,\text{Tan}[c + d\,x]}{5\,d\,(a + a\,\text{Sec}[c + d\,x])^{4/3}} + \frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[\frac{1}{6}, \frac{1}{2}, 1, \frac{7}{6}, \frac{1}{2}\,(1 + \text{Sec}[c + d\,x]), 1 + \text{Sec}[c + d\,x]\right]\,\text{Tan}[c + d\,x]}{a\,d\,\sqrt{1 - \text{Sec}[c + d\,x]}\,(a + a\,\text{Sec}[c + d\,x])^{1/3}} +$$

$$\left(3^{3/4}\,(A - B - 4\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3} - \left(1 - \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}}{2^{1/3} - \left(1 + \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}}\right], \frac{1}{4}\,\left(2 + \sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3} - (1 + \text{Sec}[c + d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3} + 2^{1/3}\,(1 + \text{Sec}[c + d\,x])^{1/3} + (1 + \text{Sec}[c + d\,x])^{2/3}}{\left(2^{1/3} - \left(1 + \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}\right)^2}}\,\text{Tan}[c + d\,x]\right) \Bigg/$$

$$\left(5 \times 2^{1/3}\,a\,d\,(1 - \text{Sec}[c + d\,x])\,(a + a\,\text{Sec}[c + d\,x])^{1/3}\,\sqrt{-\frac{(1 + \text{Sec}[c + d\,x])^{1/3}\,\left(2^{1/3} - (1 + \text{Sec}[c + d\,x])^{1/3}\right)}{\left(2^{1/3} - \left(1 + \sqrt{3}\right)\,(1 + \text{Sec}[c + d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7586 leaves): Display of huge result suppressed!

Problem 628: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2}{(a + a\,\text{Sec}[c + d\,x])^{7/3}}\,dx$$

Optimal (type 6, 466 leaves, 10 steps):

$$-\frac{3\,(A-B+C)\,\text{Tan}[c+d\,x]}{11\,d\,(a+a\,\text{Sec}[c+d\,x])^{7/3}}-\frac{3\,(4\,A-4\,B-7\,C)\,\text{Tan}[c+d\,x]}{55\,a^2\,d\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}-$$

$$\frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[-\frac{5}{6},\frac{1}{2},1,\frac{1}{6},\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right]\text{Tan}[c+d\,x]}{5\,a^2\,d\,\sqrt{1-\text{Sec}[c+d\,x]}\,(1+\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}}+$$

$$\left(3^{3/4}\,(4\,A-4\,B-7\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(55\times 2^{1/3}\,a^2\,d\,(1-\text{Sec}[c+d\,x])\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 7682 leaves) : Display of huge result suppressed !

- **Problem 629: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^{4/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 6, 839 leaves, 12 steps) :

$$\frac{3\,a\,(7\,B+4\,C)\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{28\,d}+\frac{1}{11\,d\,\sqrt{1-\mathrm{Sec}[c+d\,x]}}$$

$$3\,\sqrt{2}\,a\,A\,\mathrm{AppellF1}\left[\frac{11}{6},\,\frac{1}{2},\,1,\,\frac{17}{6},\,\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),\,1+\mathrm{Sec}[c+d\,x]\right]\,(1+\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]+$$

$$\frac{3\,C\,(a+a\,\mathrm{Sec}[c+d\,x])^{4/3}\,\mathrm{Tan}[c+d\,x]}{7\,d}-\frac{15\,\left(1+\sqrt{3}\right)\,a\,(7\,B+4\,C)\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{28\,d\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\,\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(15\times 3^{1/4}\,a\,(7\,B+4\,C)\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\,\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(14\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\,\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(5\times 3^{3/4}\,\left(1-\sqrt{3}\right)\,a\,(7\,B+4\,C)\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\,\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(28\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\,\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 5459 leaves) : Display of huge result suppressed !

- **Problem 630: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 786 leaves, 11 steps) :

$$\frac{3\,C\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{4\,d}+\frac{3\,\sqrt{2}\,A\,\mathrm{AppellF1}\left[\frac{5}{6},\frac{1}{2},1,\frac{11}{6},\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),1+\mathrm{Sec}[c+d\,x]\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{5\,d\,\sqrt{1-\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{3\left(1+\sqrt{3}\right)\,(4\,B+C)\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{4\,d\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 3^{1/4}\,(4\,B+C)\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\;\mathrm{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(2\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)\,(4\,B+C)\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\,(a+a\,\mathrm{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\;\mathrm{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(4\times 2^{2/3}\,d\,(1-\mathrm{Sec}[c+d\,x])\,(1+\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 5345 leaves): Display of huge result suppressed!

- **Problem 631: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 6, 803 leaves, 11 steps):

$$-\frac{3\,(A-B+C)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Sec}[c+d\,x])^{2/3}}+\frac{3\,\sqrt{2}\,A\,\text{AppellF1}\left[\frac{5}{6},\,\frac{1}{2},\,1,\,\frac{11}{6},\,\frac{1}{2}\,(1+\text{Sec}[c+d\,x]),\,1+\text{Sec}[c+d\,x]\right]\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{5\,a\,d\,\sqrt{1-\text{Sec}[c+d\,x]}}-$$

$$\frac{3\,\left(1+\sqrt{3}\right)\,(A-B+2\,C)\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{a\,d\,(1+\text{Sec}[c+d\,x])^{2/3}\,\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 2^{1/3}\,3^{1/4}\,(A-B+2\,C)\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\,\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(a+a\,\text{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(a\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\,\left(1-\sqrt{3}\right)\,(A-B+2\,C)\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}}\right],\,\frac{1}{4}\,\left(2+\sqrt{3}\right)\right]\,(a+a\,\text{Sec}[c+d\,x])^{1/3}\right.$$

$$\left.\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)\,\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\text{Sec}[c+d\,x])^{1/3}+(1+\text{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\,\text{Tan}[c+d\,x]\right)\Bigg/$$

$$\left(2^{2/3}\,a\,d\,(1-\text{Sec}[c+d\,x])\,(1+\text{Sec}[c+d\,x])^{2/3}\,\sqrt{-\frac{(1+\text{Sec}[c+d\,x])^{1/3}\,\left(2^{1/3}-(1+\text{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\text{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 5389 leaves) : Display of huge result suppressed!

- **Problem 632: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Sec}[c+d\,x])^{5/3}}\,dx$$

Optimal (type 6, 856 leaves, 12 steps) :

$$-\frac{3\,(A-B+C)\,\mathrm{Tan}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/3}}-\frac{3\,(2\,A-2\,B-5\,C)\,\mathrm{Tan}[c+d\,x]}{7\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}-\frac{3\,\sqrt{2}\,A\,\mathrm{AppellF1}\left[-\frac{1}{6},\frac{1}{2},1,\frac{5}{6},\frac{1}{2}\,(1+\mathrm{Sec}[c+d\,x]),1+\mathrm{Sec}[c+d\,x]\right]\,\mathrm{Tan}[c+d\,x]}{a\,d\,\sqrt{1-\mathrm{Sec}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}}-$$

$$\frac{3\left(1+\sqrt{3}\right)\,(2\,A-2\,B-5\,C)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\,\mathrm{Tan}[c+d\,x]}{7\,a\,d\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}+$$

$$\left(3\times 2^{1/3}\,3^{1/4}\,(2\,A-2\,B-5\,C)\,\mathrm{EllipticE}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(7\,a\,d\,(1-\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)+$$

$$\left(3^{3/4}\left(1-\sqrt{3}\right)\,(2\,A-2\,B-5\,C)\,\mathrm{EllipticF}\left[\mathrm{ArcCos}\left[\frac{2^{1/3}-\left(1-\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}{2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right.$$

$$\left.(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)\sqrt{\frac{2^{2/3}+2^{1/3}\,(1+\mathrm{Sec}[c+d\,x])^{1/3}+(1+\mathrm{Sec}[c+d\,x])^{2/3}}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\,\mathrm{Tan}[c+d\,x]\right)\Big/$$

$$\left(7\times 2^{2/3}\,a\,d\,(1-\mathrm{Sec}[c+d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^{2/3}\sqrt{-\frac{(1+\mathrm{Sec}[c+d\,x])^{1/3}\left(2^{1/3}-(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)}{\left(2^{1/3}-\left(1+\sqrt{3}\right)\,(1+\mathrm{Sec}[c+d\,x])^{1/3}\right)^2}}\right)$$

Result (type 6, 5507 leaves) : Display of huge result suppressed!

- **Problem 633: Unable to integrate problem.**

$$\int \mathrm{Sec}[c+d\,x]^m\,(a+a\,\mathrm{Sec}[c+d\,x])^n\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 259 leaves, 8 steps) :

$$\frac{C\,\text{Sec}[c+d\,x]^{1+m}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(1+m+n)}+\frac{1}{d\,(1+m+n)}$$
$$2^{\frac{3}{2}+n}\,(C\,n+B\,(1+m+n))\,\text{AppellF1}\left[\frac{1}{2},1-m,-\frac{1}{2}-n,\frac{3}{2},1-\text{Sec}[c+d\,x],\frac{1}{2}\,(1-\text{Sec}[c+d\,x])\right]$$
$$(1+\text{Sec}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]+\frac{1}{d\,(1+m+n)}2^{\frac{1}{2}+n}\,(C\,(m-n)+A\,(1+m+n)-B\,(1+m+n))$$
$$\text{AppellF1}\left[\frac{1}{2},1-m,\frac{1}{2}-n,\frac{3}{2},1-\text{Sec}[c+d\,x],\frac{1}{2}\,(1-\text{Sec}[c+d\,x])\right]\,(1+\text{Sec}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]$$

Result (type 8, 43 leaves):

$$\int \text{Sec}[c+d\,x]^m\,(a+a\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

- **Problem 634: Unable to integrate problem.**

$$\int \text{Sec}[c+d\,x]^{-1-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 258 leaves, 8 steps):

$$\frac{A\,\text{Sec}[c+d\,x]^{-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]}{d\,(1+n)}+$$
$$\left((A\,n+B\,(1+n)-C\,(1+n))\,\text{Hypergeometric2F1}\left[\frac{1}{2}-n,-n,1-n,-\frac{2\,\text{Sec}[c+d\,x]}{1-\text{Sec}[c+d\,x]}\right]\,\text{Sec}[c+d\,x]^{1-n}\right.$$
$$\left.\left(\frac{1+\text{Sec}[c+d\,x]}{1-\text{Sec}[c+d\,x]}\right)^{\frac{1}{2}-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Sin}[c+d\,x]\right)\Big/\,(d\,n\,(1+n)\,(1+\text{Sec}[c+d\,x]))+\frac{1}{d}$$
$$2^{\frac{3}{2}+n}\,C\,\text{AppellF1}\left[\frac{1}{2},1+n,-\frac{1}{2}-n,\frac{3}{2},1-\text{Sec}[c+d\,x],\frac{1}{2}\,(1-\text{Sec}[c+d\,x])\right]\,(1+\text{Sec}[c+d\,x])^{-\frac{1}{2}-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\text{Tan}[c+d\,x]$$

Result (type 8, 47 leaves):

$$\int \text{Sec}[c+d\,x]^{-1-n}\,(a+a\,\text{Sec}[c+d\,x])^n\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

- **Problem 636: Result more than twice size of optimal antiderivative.**

$$\int (a+a\,\text{Sec}[c+d\,x])^m\,\left(B-C+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 171 leaves, 8 steps):

$$\left(\sqrt{2}\ (B-C)\ \text{AppellF1}\left[\frac{3}{2}+m,\frac{1}{2},1,\frac{5}{2}+m,\frac{1}{2}\ (1+\text{Sec}[c+d\,x]),1+\text{Sec}[c+d\,x]\right](1+\text{Sec}[c+d\,x])\ (a+a\,\text{Sec}[c+d\,x])^m\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(d\ (3+2\,m)\ \sqrt{1-\text{Sec}[c+d\,x]}\right)+\frac{1}{d}$$
$$2^{\frac{3}{2}+m}\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{1}{2}-m,\frac{3}{2},\frac{1}{2}\ (1-\text{Sec}[c+d\,x])\right](1+\text{Sec}[c+d\,x])^{-\frac{1}{2}-m}\ (a+a\,\text{Sec}[c+d\,x])^m\,\text{Tan}[c+d\,x]$$

Result (type 6, 2582 leaves):

$$\left(2^{1+m}\,\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]\text{Cos}[c+d\,x]\ \left(\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^m\ (1+\text{Sec}[c+d\,x])^{-1-m}\ (a\ (1+\text{Sec}[c+d\,x]))^{1+m}\ (B-C+C\,\text{Sec}[c+d\,x])\right.$$
$$\left(2\,C\,\text{Sec}[c+d\,x]^2\ (1+\text{Sec}[c+d\,x])^m+\text{Sec}[c+d\,x]\ (2\,B\ (1+\text{Sec}[c+d\,x])^m-2\,C\ (1+\text{Sec}[c+d\,x])^m)\right)\text{Sin}\left[\frac{1}{2}\ (c+d\,x)\right]$$
$$\left(\left((B-C)\ \text{Hypergeometric2F1}\left[\frac{1}{2},1+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]+2\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},2+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\right)\right.$$
$$\left(\text{Cos}[c+d\,x]\ \text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)^m+\left(3\ (B-C)\ \text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]-\right.\right.$$
$$\left.\left.\left.\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)\right)\right)\Big/$$
$$\left(a\,d\ (C+B\,\text{Cos}[c+d\,x]-C\,\text{Cos}[c+d\,x])\ \left(2^m\,\text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\ \left(\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^m\right.\right.$$
$$\left(\left((B-C)\ \text{Hypergeometric2F1}\left[\frac{1}{2},1+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]+2\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},2+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\right)\right.$$
$$\left(\text{Cos}[c+d\,x]\ \text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)^m+\left(3\ (B-C)\ \text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]-\right.\right.$$
$$\left.\left.\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)\right)+$$
$$2^{1+m}\left(\text{Cos}\left[\frac{1}{2}\ (c+d\,x)\right]^2\,\text{Sec}[c+d\,x]\right)^m\,\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]\left(m\left((B-C)\ \text{Hypergeometric2F1}\left[\frac{1}{2},1+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]+\right.\right.$$
$$\left.2\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},2+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right]\right)\left(\text{Cos}[c+d\,x]\ \text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)^{-1+m}$$
$$\left(-\text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\,\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\ \text{Sec}\left[\frac{1}{2}\ (c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]\right)-$$

$$\left(3\,(B-C)\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.\right.$$

$$\left.\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)+$$

$$\left(3\,(B-C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\frac{1}{3}\,\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$\left.\left.\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.\right.$$

$$\left.\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-$$

$$\left(3\,(B-C)\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\right.\right.\right.\right.$$

$$\left.\left.\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\left(-\frac{1}{3}\,\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$

$$2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\left(-\frac{6}{5}\,\text{AppellF1}\left[\frac{5}{2},m,3,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\frac{3}{5}\,m\,\text{AppellF1}\left[\frac{5}{2},1+m,2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$m\left(-\frac{3}{5}\,\text{AppellF1}\left[\frac{5}{2},1+m,2,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$\left.\left.\left.\left.\frac{3}{5}\,(1+m)\,\text{AppellF1}\left[\frac{5}{2},2+m,1,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-2\left(\text{AppellF1}\left[\frac{3}{2},m,2,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]-\right.\right.$$

$$\left.\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2+\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^m$$

$$\left(C\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},2+m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right]+\left(1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{-2-m}\right)+\right.$$

$\frac{1}{2} (B - C) \operatorname{Csc}\left[\frac{1}{2}(c + d x)\right] \operatorname{Sec}\left[\frac{1}{2}(c + d x)\right] \left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, 1 + m, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right] + \left(1 - \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right)^{-1-m}\right)\Bigg)\Bigg) +$

$2^{1+m}\, m \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right]^2 \operatorname{Sec}[c + d x]\right)^{-1+m} \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right] \Bigg(\Bigg((B - C)\,\text{Hypergeometric2F1}\left[\frac{1}{2}, 1 + m, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right] +$

$2\, C\, \text{Hypergeometric2F1}\left[\frac{1}{2}, 2 + m, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right]\Bigg) \left(\operatorname{Cos}[c + d x] \operatorname{Sec}\left[\frac{1}{2}(c + d x)\right]^2\right)^m +$

$\Bigg(3 (B - C)\, \text{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right] \operatorname{Cos}\left[\frac{1}{2}(c + d x)\right]^2\Bigg) \Big/$

$\Bigg(3\, \text{AppellF1}\left[\frac{1}{2}, m, 1, \frac{3}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right] - 2 \Bigg(\text{AppellF1}\left[\frac{3}{2}, m, 2, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right] -$

$m\, \text{AppellF1}\left[\frac{3}{2}, 1 + m, 1, \frac{5}{2}, \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\right]\Bigg) \operatorname{Tan}\left[\frac{1}{2}(c + d x)\right]^2\Bigg)\Bigg)$

$\Bigg(-\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] \operatorname{Sec}[c + d x] \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Cos}\left[\frac{1}{2}(c + d x)\right]^2 \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]\Bigg)\Bigg)\Bigg)$

- **Problem 637: Result more than twice size of optimal antiderivative.**

$\int \operatorname{Sec}[c + d x]^3 (a + b \operatorname{Sec}[c + d x]) \left(A + C \operatorname{Sec}[c + d x]^2\right) dx$

Optimal (type 3, 140 leaves, 7 steps):

$\frac{a (4 A + 3 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{8 d} + \frac{b (5 A + 4 C) \operatorname{Tan}[c + d x]}{5 d} + \frac{a (4 A + 3 C) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{8 d} + \frac{a C \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{4 d} + \frac{b C \operatorname{Sec}[c + d x]^4 \operatorname{Tan}[c + d x]}{5 d} + \frac{b (5 A + 4 C) \operatorname{Tan}[c + d x]^3}{15 d}$

Result (type 3, 426 leaves):

$-\frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right]}{2 d} - \frac{3 a C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right]}{8 d} +$
$\frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right]}{2 d} + \frac{3 a C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right]}{8 d} + \frac{a C}{16 d \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^4} +$
$\frac{a A}{4 d \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^2} + \frac{3 a C}{16 d \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^2} - \frac{a C}{16 d \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^4} -$
$\frac{a A}{4 d \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^2} - \frac{3 a C}{16 d \left(\operatorname{Cos}\left[\frac{1}{2}(c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c + d x)\right]\right)^2} + \frac{2 A b \operatorname{Tan}[c + d x]}{3 d} +$
$\frac{8 b C \operatorname{Tan}[c + d x]}{15 d} + \frac{A b \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{3 d} + \frac{4 b C \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{15 d} + \frac{b C \operatorname{Sec}[c + d x]^4 \operatorname{Tan}[c + d x]}{5 d}$

Problem 638: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^2 (a+b \text{Sec}[c+d x]) \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 117 leaves, 7 steps):

$$\frac{b (4 A+3 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{a (3 A+2 C) \text{Tan}[c+d x]}{3 d}+\frac{b (4 A+3 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{a C \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}+\frac{b C \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 377 leaves):

$$-\frac{A b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}-\frac{3 b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{8 d}+\frac{A b \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+\frac{3 b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{8 d}+\frac{b C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{A b}{4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{3 b C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{b C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}-\frac{A b}{4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{3 b C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{a A \text{Tan}[c+d x]}{d}+\frac{2 a C \text{Tan}[c+d x]}{3 d}+\frac{a C \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}$$

Problem 640: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{Sec}[c+d x]) \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 58 leaves, 5 steps):

$$a A x+\frac{b (2 A+C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{a C \text{Tan}[c+d x]}{d}+\frac{b C \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 218 leaves):

$$a A x-\frac{A b \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{A b \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}-\frac{b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+\frac{b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+\frac{b C}{4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{b C}{4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{a C \text{Tan}[c+d x]}{d}$$

Problem 641: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]\,(a+b\,\text{Sec}[c+d x])\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 42 leaves, 5 steps):

$$A b x+\frac{a C\,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{a A\,\text{Sin}[c+d x]}{d}+\frac{b C\,\text{Tan}[c+d x]}{d}$$

Result (type 3, 112 leaves):

$$A b x-\frac{a C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a A\,\text{Cos}[d x]\,\text{Sin}[c]}{d}+\frac{a A\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\frac{b C\,\text{Tan}[c+d x]}{d}$$

Problem 642: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^2\,(a+b\,\text{Sec}[c+d x])\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 58 leaves, 5 steps):

$$\frac{1}{2}a\,(A+2C)\,x+\frac{b C\,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{A b\,\text{Sin}[c+d x]}{d}+\frac{a A\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2 d}$$

Result (type 3, 131 leaves):

$$a C x+\frac{a A\,(c+d x)}{2 d}-\frac{b C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{A b\,\text{Cos}[d x]\,\text{Sin}[c]}{d}+\frac{A b\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\frac{a A\,\text{Sin}[2\,(c+d x)]}{4 d}$$

Problem 647: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]\,(a+b\,\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 170 leaves, 7 steps):

$$\frac{\left(4 a^2\,(2 A+C)+b^2\,(4 A+3 C)\right)\text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{a\left(12 A b^2-a^2 C+8 b^2 C\right)\text{Tan}[c+d x]}{6 b d}-\frac{\left(2 a^2 C-3 b^2\,(4 A+3 C)\right)\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{24 d}-\frac{a C\,(a+b\,\text{Sec}[c+d x])^2\,\text{Tan}[c+d x]}{12 b d}+\frac{C\,(a+b\,\text{Sec}[c+d x])^3\,\text{Tan}[c+d x]}{4 b d}$$

Result (type 3, 1123 leaves):

$$\left(\left(-8 a^2 A-4 A b^2-4 a^2 C-3 b^2 C\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x])\right)+$$

$$\left(\left(8 a^2 A+4 A b^2+4 a^2 C+3 b^2 C\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x])\right)+$$

$$\frac{b^2 C \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{\left(12 A b^2+12 a^2 C+8 a b C+9 b^2 C\right) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{24 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{2 a b C \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-$$

$$\frac{b^2 C \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{2 a b C \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{\left(-12 A b^2-12 a^2 C-8 a b C-9 b^2 C\right) \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)}{24 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\left(4 \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(3 a A b \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 a b C \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/ \left(3 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)+$$

$$\left(4 \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(3 a A b \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 a b C \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/ \left(3 d (b+a \text{Cos}[c+d x])^2 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)$$

- **Problem 648: Result more than twice size of optimal antiderivative.**

$$\int (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 103 leaves, 6 steps) :

$$a^2 A x+\frac{a b (2 A+C) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{\left(3 A b^2+2 \left(a^2+b^2\right) C\right) \text{Tan}[c+d x]}{3 d}+\frac{a b C \text{Sec}[c+d x] \text{Tan}[c+d x]}{3 d}+\frac{C (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 242 leaves) :

$$\frac{1}{12 d} \text{Sec}[c+d x]^3 \left(9 a \text{Cos}[c+d x] \left(a A (c+d x)-b (2 A+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b (2 A+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+\right.$$
$$3 a \text{Cos}[3 (c+d x)] \left(a A (c+d x)-b (2 A+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b (2 A+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+$$
$$\left.2 \left(3 A b^2+3 a^2 C+4 b^2 C+6 a b C \text{Cos}[c+d x]+\left(3 A b^2+3 a^2 C+2 b^2 C\right) \text{Cos}[2 (c+d x)]\right) \text{Sin}[c+d x]\right)$$

Problem 649: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 109 leaves, 6 steps) :

$$2 a A b x+\frac{\left(2 A b^2+\left(2 a^2+b^2\right) C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+$$
$$\frac{A (a+b \text{Sec}[c+d x])^2 \text{Sin}[c+d x]}{d}-\frac{2 a b (A-C) \text{Tan}[c+d x]}{d}-\frac{b^2 (2 A-C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 352 leaves) :

$$\frac{1}{4 d} \text{Sec}[c+d x]^2 \left(4 a A b c+4 a A b d x-2 A b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-2 a^2 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$
$$b^2 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+2 A b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$
$$2 a^2 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b^2 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$
$$\text{Cos}[2 (c+d x)] \left(4 a A b (c+d x)-\left(2 A b^2+\left(2 a^2+b^2\right) C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\right.$$
$$\left.\left.\left(2 A b^2+2 a^2 C+b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+\left(a^2 A+2 b^2 C\right) \text{Sin}[c+d x]+4 a b C \text{Sin}[2 (c+d x)]+a^2 A \text{Sin}[3 (c+d x)]\right)$$

Problem 656: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 167 leaves, 7 steps) :

$$a^3 A x + \frac{b \left(12 a^2 (2 A + C) + b^2 (4 A + 3 C)\right) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{a \left(6 A b^2 + \left(a^2 + 4 b^2\right) C\right) \text{Tan}[c + d x]}{2 d} +$$
$$\frac{b \left(2 a^2 C + b^2 (4 A + 3 C)\right) \text{Sec}[c + d x] \text{Tan}[c + d x]}{8 d} + \frac{a C (a + b \text{Sec}[c + d x])^2 \text{Tan}[c + d x]}{4 d} + \frac{C (a + b \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{4 d}$$

Result (type 3, 1241 leaves) :

$$\frac{2 a^3 A (c+d x) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 (A+C \text{Sec}[c+d x]^2)}{d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x])}+$$

$$\left(\left(-24 a^2 A b-4 A b^3-12 a^2 b C-3 b^3 C\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x])\right)+$$

$$\left(\left(24 a^2 A b+4 A b^3+12 a^2 b C+3 b^3 C\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x])\right)+$$

$$\frac{b^3 C \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{\left(4 A b^3+12 a^2 b C+4 a b^2 C+3 b^3 C\right) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{a b^2 C \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-$$

$$\frac{b^3 C \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{a b^2 C \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{\left(-4 A b^3-12 a^2 b C-4 a b^2 C-3 b^3 C\right) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\left(2 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \left(3 a A b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+a^3 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 a b^2 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)+$$

$$\left(2 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \left(3 a A b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+a^3 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 a b^2 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(d (b+a \text{Cos}[c+d x])^3 (A+2 C+A \text{Cos}[2 c+2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)$$

- **Problem 665: Result more than twice size of optimal antiderivative.**

$$\int (a+b \text{Sec}[c+d x])^4 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 227 leaves, 8 steps):

$$a^4 A x+\frac{a b \left(4 a^2 (2 A+C)+b^2 (4 A+3 C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{\left(6 a^4 C+2 b^4 (5 A+4 C)+a^2 b^2 (85 A+56 C)\right) \text{Tan}[c+d x]}{15 d}+\frac{a b \left(40 A b^2+6 a^2 C+29 b^2 C\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{30 d}+\frac{\left(3 a^2 C+b^2 (5 A+4 C)\right) (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{15 d}+\frac{a C (a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{5 d}+\frac{C (a+b \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{5 d}$$

Result (type 3, 503 leaves):

$$\frac{1}{120 d (A+2 C+A \text{Cos}[2 (c+d x)])}\left(C+A \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^5 \Bigg(150 a^4 A (c+d x) \text{Cos}[c+d x]+75 a^4 A (c+d x) \text{Cos}[3 (c+d x)]+15 a^4 A c \text{Cos}[5 (c+d x)]+15 a^4 A d x \text{Cos}[5 (c+d x)]-120 a b \left(4 a^2 (2 A+C)+b^2 (4 A+3 C)\right) \text{Cos}[c+d x]^5 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+180 a^2 A b^2 \text{Sin}[c+d x]+40 A b^4 \text{Sin}[c+d x]+30 a^4 C \text{Sin}[c+d x]+240 a^2 b^2 C \text{Sin}[c+d x]+80 b^4 C \text{Sin}[c+d x]+120 a A b^3 \text{Sin}[2 (c+d x)]+120 a^3 b C \text{Sin}[2 (c+d x)]+210 a b^3 C \text{Sin}[2 (c+d x)]+270 a^2 A b^2 \text{Sin}[3 (c+d x)]+50 A b^4 \text{Sin}[3 (c+d x)]+45 a^4 C \text{Sin}[3 (c+d x)]+300 a^2 b^2 C \text{Sin}[3 (c+d x)]+40 b^4 C \text{Sin}[3 (c+d x)]+60 a A b^3 \text{Sin}[4 (c+d x)]+60 a^3 b C \text{Sin}[4 (c+d x)]+45 a b^3 C \text{Sin}[4 (c+d x)]+90 a^2 A b^2 \text{Sin}[5 (c+d x)]+10 A b^4 \text{Sin}[5 (c+d x)]+15 a^4 C \text{Sin}[5 (c+d x)]+60 a^2 b^2 C \text{Sin}[5 (c+d x)]+8 b^4 C \text{Sin}[5 (c+d x)]\Bigg)$$

Problem 666: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^4 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 229 leaves, 8 steps):

$$4 a^3 A b x+\frac{\left(8 a^4 C+24 a^2 b^2 (2 A+C)+b^4 (4 A+3 C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{A (a+b \text{Sec}[c+d x])^4 \text{Sin}[c+d x]}{d}-\frac{a b \left(a^2 (12 A-19 C)-8 b^2 (3 A+2 C)\right) \text{Tan}[c+d x]}{6 d}-\frac{b^2 \left(a^2 (24 A-26 C)-3 b^2 (4 A+3 C)\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{24 d}-\frac{a b (12 A-7 C) (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{12 d}-\frac{b (4 A-C) (a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 1357 leaves):

$$\frac{8 a^3 A b (c+d x) \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x])}+$$

$$\left(\left(-48 a^2 A b^2-4 A b^4-8 a^4 C-24 a^2 b^2 C-3 b^4 C\right) \operatorname{Cos}[c+d x]^6 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x])\right)+$$

$$\left(\left(48 a^2 A b^2+4 A b^4+8 a^4 C+24 a^2 b^2 C+3 b^4 C\right) \operatorname{Cos}[c+d x]^6 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(4 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x])\right)+$$

$$\frac{b^4 C \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{8 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{\left(12 A b^4+72 a^2 b^2 C+16 a b^3 C+9 b^4 C\right) \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{24 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{4 a b^3 C \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-$$

$$\frac{b^4 C \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{8 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{4 a b^3 C \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{\left(-12 A b^4-72 a^2 b^2 C-16 a b^3 C-9 b^4 C\right) \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right)}{24 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\left(8 \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \left(3 a A b^3 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a^3 b C \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]+2 a b^3 C \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(3 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)+$$

$$\left(8 \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \left(3 a A b^3 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a^3 b C \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]+2 a b^3 C \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/$$
$$\left(3 d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)+$$

$$\frac{2 a^4 A \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Sec}[c+d x])^4 \left(A+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[c+d x]}{d (b+a \operatorname{Cos}[c+d x])^4 (A+2 C+A \operatorname{Cos}[2 c+2 d x])}$$

Problem 667: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^2 \,(a+b\,\text{Sec}[c+d x])^4\,\left(A+C\,\text{Sec}[c+d x]^2\right)\,dx$$

Optimal (type 3, 219 leaves, 8 steps):

$$\frac{1}{2} a^2 \left(12 A b^2+a^2 (A+2 C)\right) x+\frac{2 a b \left(2 A b^2+\left(2 a^2+b^2\right) C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{2 A b\,(a+b\,\text{Sec}[c+d x])^3\,\text{Sin}[c+d x]}{d}+\frac{A\,\text{Cos}[c+d x]\,(a+b\,\text{Sec}[c+d x])^4\,\text{Sin}[c+d x]}{2 d}-\frac{b^2 \left(a^2 (39 A-34 C)-2 b^2 (3 A+2 C)\right) \text{Tan}[c+d x]}{6 d}-\frac{a b^3 (9 A-4 C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{3 d}-\frac{b^2 (15 A-2 C)\,(a+b\,\text{Sec}[c+d x])^2\,\text{Tan}[c+d x]}{6 d}$$

Result (type 3, 864 leaves):

$$\frac{a^2 \left(a^2 A+12 A b^2+2 a^2 C\right) (c+d x)\,\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4}{2 d\,(b+a\,\text{Cos}[c+d x])^4}-$$
$$\frac{2 \left(2 a A b^3+2 a^3 b C+a b^3 C\right) \text{Cos}[c+d x]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right](a+b\,\text{Sec}[c+d x])^4}{d\,(b+a\,\text{Cos}[c+d x])^4}+$$
$$\frac{2 \left(2 a A b^3+2 a^3 b C+a b^3 C\right) \text{Cos}[c+d x]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right](a+b\,\text{Sec}[c+d x])^4}{d\,(b+a\,\text{Cos}[c+d x])^4}+$$
$$\frac{\left(12 a b^3 C+b^4 C\right) \text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4}{12 d\,(b+a\,\text{Cos}[c+d x])^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{b^4 C\,\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d\,(b+a\,\text{Cos}[c+d x])^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{b^4 C\,\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d\,(b+a\,\text{Cos}[c+d x])^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{\left(-12 a b^3 C-b^4 C\right) \text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4}{12 d\,(b+a\,\text{Cos}[c+d x])^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\left(\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4\left(3 A b^4\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+18 a^2 b^2 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+2 b^4 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(3 d\,(b+a\,\text{Cos}[c+d x])^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4\left(3 A b^4\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+18 a^2 b^2 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+2 b^4 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(3 d\,(b+a\,\text{Cos}[c+d x])^4\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\frac{4 a^3 A b\,\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4\,\text{Sin}[c+d x]}{d\,(b+a\,\text{Cos}[c+d x])^4}+\frac{a^4 A\,\text{Cos}[c+d x]^4\,(a+b\,\text{Sec}[c+d x])^4\,\text{Sin}[2 (c+d x)]}{4 d\,(b+a\,\text{Cos}[c+d x])^4}$$

Problem 673: Result more than twice size of optimal antiderivative.

$$\int (a + b \operatorname{Sec}[c + d x])^3 \left(a^2 - b^2 \operatorname{Sec}[c + d x]^2\right) dx$$

Optimal (type 3, 158 leaves, 8 steps):

$$a^5 x + \frac{b \left(24 a^4 - 8 a^2 b^2 - 3 b^4\right) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{8 d} + \frac{a b^2 \left(5 a^2 - 4 b^2\right) \operatorname{Tan}[c + d x]}{2 d} + \frac{b^3 \left(2 a^2 - 3 b^2\right) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{8 d} - \frac{a b^2 (a + b \operatorname{Sec}[c + d x])^2 \operatorname{Tan}[c + d x]}{4 d} - \frac{b^2 (a + b \operatorname{Sec}[c + d x])^3 \operatorname{Tan}[c + d x]}{4 d}$$

Result (type 3, 1299 leaves):

$$\frac{2 a^5 (c+d x) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)}{d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right)}+$$

$$\left(\left(-24 a^4 b+8 a^2 b^3+3 b^5\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right)\right)+$$

$$\left(\left(24 a^4 b-8 a^2 b^3-3 b^5\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)\right) \Big/ \left(4 d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right)\right)-$$

$$\frac{b^5 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$

$$\frac{\left(-8 a^2 b^3-4 a b^4-3 b^5\right) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-$$

$$\frac{a b^4 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{b^5 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}-$$

$$\frac{a b^4 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{\left(8 a^2 b^3+4 a b^4+3 b^5\right) \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right)}{8 d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-$$

$$\left(4 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right) \left(-a^3 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+a b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/ \left(d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)-$$

$$\left(4 \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^3 \left(a^2-b^2 \text{Sec}[c+d x]^2\right) \left(-a^3 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+a b^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) \Big/ \left(d (b+a \text{Cos}[c+d x])^3 \left(a^2-2 b^2+a^2 \text{Cos}[2 c+2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right)$$

- **Problem 675: Result more than twice size of optimal antiderivative.**

$$\int (a+b \text{Sec}[c+d x]) \left(a^2-b^2 \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 75 leaves, 6 steps) :

$$a^3 x+\frac{b\left(2 a^2-b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{a b^2 \text{Tan}[c+d x]}{2 d}-\frac{b^2 (a+b \text{Sec}[c+d x]) \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 230 leaves) :

$$a^3 x-\frac{a^2 b \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a^2 b \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+$$
$$\frac{b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}-\frac{b^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}-$$
$$\frac{b^3}{4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{b^3}{4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{a b^2 \text{Tan}[c+d x]}{d}$$

- **Problem 676: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 186 leaves, 8 steps) :

$$-\frac{a \left(2 A b^2+\left(2 a^2+b^2\right) C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 b^4 d}+\frac{2 a^2 \left(A b^2+a^2 C\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\, b^4 \sqrt{a+b}\, d}+$$
$$\frac{\left(3 a^2 C+b^2 (3 A+2 C)\right) \text{Tan}[c+d x]}{3 b^3 d}-\frac{a C \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b^2 d}+\frac{C \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 b d}$$

Result (type 3, 657 leaves) :

$$\frac{1}{6\,b^4\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,(c+d\,x)])\,(a+b\,\mathrm{Sec}[c+d\,x])}\mathrm{Cos}[c+d\,x]\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(6\,a\,\left(2\,A\,b^2+\left(2\,a^2+b^2\right)C\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-6\,a\,\left(2\,A\,b^2+\left(2\,a^2+b^2\right)C\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\right.$$

$$\frac{24\,i\,a^2\,\left(A\,b^2+a^2\,C\right)\mathrm{ArcTan}\left[\frac{(i\,\mathrm{Cos}[c]+\mathrm{Sin}[c])\left(a\,\mathrm{Sin}[c]+(-b+a\,\mathrm{Cos}[c])\,\mathrm{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\mathrm{Cos}[c]-i\,\mathrm{Sin}[c])^2}}\right](\mathrm{Cos}[c]-i\,\mathrm{Sin}[c])}{\sqrt{a^2-b^2}\,\sqrt{(\mathrm{Cos}[c]-i\,\mathrm{Sin}[c])^2}}+$$

$$\frac{2\,b^3\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+\frac{b^2\,C\,\left((-3\,a+b)\,\mathrm{Cos}\left[\frac{c}{2}\right]+(3\,a+b)\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$

$$\frac{4\,b\,\left(3\,A\,b^2+3\,a^2\,C+2\,b^2\,C\right)\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+\frac{2\,b^3\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\left.\frac{b^2\,C\,\left((3\,a-b)\,\mathrm{Cos}\left[\frac{c}{2}\right]+(3\,a+b)\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{4\,b\,\left(3\,A\,b^2+3\,a^2\,C+2\,b^2\,C\right)\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}\right)$$

- **Problem 677: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[c+d\,x]^2\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a+b\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 137 leaves, 7 steps):

$$\frac{\left(2\,a^2\,C+b^2\,(2\,A+C)\right)\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,b^3\,d}-\frac{2\,a\,\left(A\,b^2+a^2\,C\right)\mathrm{ArcTanh}\left[\frac{\sqrt{a-b}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\,b^3\,\sqrt{a+b}\,d}-\frac{a\,C\,\mathrm{Tan}[c+d\,x]}{b^2\,d}+\frac{C\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,b\,d}$$

Result (type 3, 428 leaves):

$$\frac{1}{2\,b^3\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,(a+b\,\text{Sec}[c+d\,x])}\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-2\,\left(2\,A\,b^2+\left(2\,a^2+b^2\right)\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,\left(2\,A\,b^2+\left(2\,a^2+b^2\right)\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.$$

$$\frac{8\,a\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[c]+\text{Sin}[c])\,\left(a\,\text{Sin}[c]+(-b+a\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}}\right]\,(i\,\text{Cos}[c]+\text{Sin}[c])}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}}+$$

$$\frac{b^2\,C}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{4\,a\,b\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-$$

$$\left.\frac{b^2\,C}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{4\,a\,b\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

- **Problem 678: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 95 leaves, 6 steps):

$$-\frac{a\,C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{b^2\,d}+\frac{2\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\,b^2\,\sqrt{a+b}\,d}+\frac{C\,\text{Tan}[c+d\,x]}{b\,d}$$

Result (type 3, 331 leaves):

$$\frac{1}{b^2\, d\, (A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,(a+b\,\text{Sec}[c+d\,x])}$$

$$2\,\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\right.$$

$$a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\frac{2\,i\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[c]+\text{Sin}[c])\,\left(a\,\text{Sin}[c]+(-b+a\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}}\right]\,(\text{Cos}[c]-i\,\text{Sin}[c])}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}}+$$

$$\left.\frac{b\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+\frac{b\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

- **Problem 679: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 88 leaves, 6 steps):

$$\frac{A\,x}{a}+\frac{C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{b\,d}-\frac{2\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a\,\sqrt{a-b}\,b\,\sqrt{a+b}\,d}$$

Result (type 3, 239 leaves):

$$\left(2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\right.$$

$$\left(\sqrt{a^2-b^2}\,\left(A\,b\,d\,x-a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}+\right.$$

$$\left.\left.2\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[c]+\text{Sin}[c])\,\left(a\,\text{Sin}[c]+(-b+a\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}}\right]\,(i\,\text{Cos}[c]+\text{Sin}[c])\right)\right)\Big/$$

$$\left(a\,b\,\sqrt{a^2-b^2}\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,\sqrt{(\text{Cos}[c]-i\,\text{Sin}[c])^2}\right)$$

Problem 685: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 153 leaves, 7 steps):

$$-\frac{2 a C \text{ArcTanh}[\text{Sin}[c+d x]]}{b^3 d}-\frac{2 \left(A b^4-2 a^4 C+3 a^2 b^2 C\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{3/2} b^3 (a+b)^{3/2} d}+\frac{C \text{Tan}[c+d x]}{b^2 d}+\frac{a \left(A b^2+a^2 C\right) \text{Tan}[c+d x]}{b^2 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 336 leaves):

$$\frac{1}{b^3 d (A+2 C+A \text{Cos}[2 (c+d x)]) (a+b \text{Sec}[c+d x])^2} 2 (b+a \text{Cos}[c+d x]) \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{2 \left(A b^4-2 a^4 C+3 a^2 b^2 C\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right] (b+a \text{Cos}[c+d x])}{\left(a^2-b^2\right)^{3/2}}+\right.$$

$$2 a C (b+a \text{Cos}[c+d x]) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-2 a C (b+a \text{Cos}[c+d x]) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$

$$\left.\frac{b C (b+a \text{Cos}[c+d x]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}+\frac{b C (b+a \text{Cos}[c+d x]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}+\frac{a b \left(A b^2+a^2 C\right) \text{Sin}[c+d x]}{(a-b) (a+b)}\right)$$

Problem 686: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 135 leaves, 6 steps):

$$\frac{C \text{ArcTanh}[\text{Sin}[c+d x]]}{b^2 d}+\frac{2 a \left(A b^2-a^2 C+2 b^2 C\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{3/2} b^2 (a+b)^{3/2} d}-\frac{\left(A b^2+a^2 C\right) \text{Tan}[c+d x]}{b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 331 leaves):

$$\frac{1}{b^2 d (A + 2 C + A \operatorname{Cos}[2 (c + d x)]) (a + b \operatorname{Sec}[c + d x])^2} 2 (b + a \operatorname{Cos}[c + d x]) \left(A + C \operatorname{Sec}[c + d x]^2\right)$$
$$\left(-C (b + a \operatorname{Cos}[c + d x]) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + C (b + a \operatorname{Cos}[c + d x]) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \right.$$
$$\left(2 a \left(-A b^2 + \left(a^2 - 2 b^2\right) C\right) \operatorname{ArcTan}\left[\frac{(i \operatorname{Cos}[c] + \operatorname{Sin}[c]) \left(a \operatorname{Sin}[c] + (-b + a \operatorname{Cos}[c]) \operatorname{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{a^2 - b^2} \sqrt{(\operatorname{Cos}[c] - i \operatorname{Sin}[c])^2}}\right] (b + a \operatorname{Cos}[c + d x]) (i \operatorname{Cos}[c] + \operatorname{Sin}[c])\right) \Big/$$
$$\left.\left(\left(a^2 - b^2\right)^{3/2} \sqrt{(\operatorname{Cos}[c] - i \operatorname{Sin}[c])^2}\right) + \frac{b \left(A b^2 + a^2 C\right) (b \operatorname{Sin}[c] - a \operatorname{Sin}[d x])}{a (a - b) (a + b) \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right)}\right)$$

- **Problem 687: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A + C \operatorname{Sec}[c + d x]^2}{(a + b \operatorname{Sec}[c + d x])^2} \, dx$$

Optimal (type 3, 125 leaves, 5 steps):

$$\frac{A x}{a^2} - \frac{2 b \left(2 a^2 A - A b^2 + a^2 C\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^2 (a - b)^{3/2} (a + b)^{3/2} d} + \frac{\left(A b^2 + a^2 C\right) \operatorname{Tan}[c + d x]}{a \left(a^2 - b^2\right) d (a + b \operatorname{Sec}[c + d x])}$$

Result (type 3, 270 leaves):

$$\left(2 (b + a \operatorname{Cos}[c + d x]) \left(A + C \operatorname{Sec}[c + d x]^2\right)\right.$$
$$\left(A x (b + a \operatorname{Cos}[c + d x]) + \left(2 b \left(-A b^2 + a^2 (2 A + C)\right) \operatorname{ArcTan}\left[\frac{(i \operatorname{Cos}[c] + \operatorname{Sin}[c]) \left(a \operatorname{Sin}[c] + (-b + a \operatorname{Cos}[c]) \operatorname{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{a^2 - b^2} \sqrt{(\operatorname{Cos}[c] - i \operatorname{Sin}[c])^2}}\right]\right.\right.$$
$$\left.(b + a \operatorname{Cos}[c + d x]) (i \operatorname{Cos}[c] + \operatorname{Sin}[c])\right) \Big/ \left(\left(a^2 - b^2\right)^{3/2} d \sqrt{(\operatorname{Cos}[c] - i \operatorname{Sin}[c])^2}\right) +$$
$$\left.\left.\frac{\left(A b^2 + a^2 C\right) (-b \operatorname{Sin}[c] + a \operatorname{Sin}[d x])}{(a - b) (a + b) d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right)}\right)\right) \Big/ \left(a^2 (A + 2 C + A \operatorname{Cos}[2 (c + d x)]) (a + b \operatorname{Sec}[c + d x])^2\right)$$

- **Problem 691: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c + d x]^4 \left(A + C \operatorname{Sec}[c + d x]^2\right)}{(a + b \operatorname{Sec}[c + d x])^3} \, dx$$

Optimal (type 3, 381 leaves, 9 steps) :

$$\frac{\left(2\,A\,b^2+\left(12\,a^2+b^2\right)\,C\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,b^5\,d}-\frac{a\,\left(6\,A\,b^6+a^4\,b^2\,(2\,A-29\,C)-5\,a^2\,b^4\,(A-4\,C)+12\,a^6\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{5/2}\,b^5\,(a+b)^{5/2}\,d}-$$

$$\frac{a\,\left(a^2\,b^2\,(2\,A-21\,C)-b^4\,(5\,A-6\,C)+12\,a^4\,C\right)\,\text{Tan}[c+d\,x]}{2\,b^4\,\left(a^2-b^2\right)^2\,d}+\frac{\left(a^2\,b^2\,(A-10\,C)-b^4\,(4\,A-C)+6\,a^4\,C\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,b^3\,\left(a^2-b^2\right)^2\,d}-$$

$$\frac{\left(A\,b^2+a^2\,C\right)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{\left(3\,A\,b^4-4\,a^4\,C+7\,a^2\,b^2\,C\right)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{2\,b^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 1028 leaves) :

$$\left(2 a \left(2 a^4 A b^2-5 a^2 A b^4+6 A b^6+12 a^6 C-29 a^4 b^2 C+20 a^2 b^4 C\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right] (b+a \text{Cos}[c+d x])^3 \right.$$
$$\left. \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(b^5 \sqrt{a^2-b^2} \left(-a^2+b^2\right)^2 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)+$$
$$\left(\left(-2 A b^2-12 a^2 C-b^2 C\right) (b+a \text{Cos}[c+d x])^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(b^5 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)+$$
$$\left(\left(2 A b^2+12 a^2 C+b^2 C\right) (b+a \text{Cos}[c+d x])^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(b^5 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)+$$
$$\frac{C (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{2 b^3 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-$$
$$\frac{6 a C (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{b^4 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}-$$
$$\frac{C (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{2 b^3 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-$$
$$\frac{6 a C (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{b^4 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3 \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+$$
$$\frac{(b+a \text{Cos}[c+d x]) \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right) \left(a^2 A b^2 \text{Sin}[c+d x]+a^4 C \text{Sin}[c+d x]\right)}{b^3 (-a+b) (a+b) d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3}+$$
$$\left((b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right) \left(-2 a^4 A b^2 \text{Sin}[c+d x]+5 a^2 A b^4 \text{Sin}[c+d x]-6 a^6 C \text{Sin}[c+d x]+9 a^4 b^2 C \text{Sin}[c+d x]\right)\right) \Big/$$
$$\left(b^4 (-a+b)^2 (a+b)^2 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)$$

- **Problem 693: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 212 leaves, 7 steps) :

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{b^3\,d}-\frac{a\left(3\,A\,b^4+\left(2\,a^4-5\,a^2\,b^2+6\,b^4\right)C\right)\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{5/2}\,b^3\,(a+b)^{5/2}\,d}+$$
$$\frac{a\left(A\,b^2+a^2\,C\right)\text{Tan}[c+d\,x]}{2\,b^2\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{\left(2\,A\,b^4-3\,a^4\,C+a^2\,b^2\,(A+6\,C)\right)\text{Tan}[c+d\,x]}{2\,b^2\left(a^2-b^2\right)^2 d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 895 leaves) :

$$-\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{b^3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3}+$$
$$\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{b^3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3}+$$
$$\Bigg(\left(3\,A\,b^4+2\,a^4\,C-5\,a^2\,b^2\,C+6\,b^4\,C\right)(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,i\,a\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]$$
$$\text{Cos}[c]\Bigg)\Big/\left(b^3\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)+$$
$$\Bigg(2\,a\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]$$
$$\text{Sin}[c]\Bigg)\Big/\left(b^3\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)\Bigg)\Bigg)\Big/$$
$$\left(\left(-a^2+b^2\right)^2(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\right)+\frac{1}{2\,a\,b^2\left(-a^2+b^2\right)^2 d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3}$$
$$(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-2\,a^4\,A\,b^2\,\text{Sin}[c]-5\,a^2\,A\,b^4\,\text{Sin}[c]-2\,A\,b^6\,\text{Sin}[c]+2\,a^6\,C\,\text{Sin}[c]-a^4\,b^2\,C\,\text{Sin}[c]-10\,a^2\,b^4\,C\,\text{Sin}[c]+\right.$$
$$5\,a^3\,A\,b^3\,\text{Sin}[d\,x]+4\,a\,A\,b^5\,\text{Sin}[d\,x]-7\,a^5\,b\,C\,\text{Sin}[d\,x]+16\,a^3\,b^3\,C\,\text{Sin}[d\,x]-3\,a^3\,A\,b^3\,\text{Sin}[2\,c+d\,x]+a^5\,b\,C\,\text{Sin}[2\,c+d\,x]-$$
$$\left.4\,a^3\,b^3\,C\,\text{Sin}[2\,c+d\,x]+2\,a^4\,A\,b^2\,\text{Sin}[c+2\,d\,x]+a^2\,A\,b^4\,\text{Sin}[c+2\,d\,x]-2\,a^6\,C\,\text{Sin}[c+2\,d\,x]+5\,a^4\,b^2\,C\,\text{Sin}[c+2\,d\,x]\right)$$

- **Problem 694: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 177 leaves, 6 steps) :

$$\frac{\left(a^2\,(2\,A+C)+b^2\,(A+2\,C)\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{5/2}\,(a+b)^{5/2}\,d}-\frac{\left(A\,b^2+a^2\,C\right)\,\text{Tan}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}-\frac{a\,\left(3\,A\,b^2-a^2\,C+4\,b^2\,C\right)\,\text{Tan}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 342 leaves) :

$$\Bigg((b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\left(4\,\mathrm{i}\,\left(a^2\,(2\,A+C)+b^2\,(A+2\,C)\right)\,\text{ArcTan}\left[\frac{(\mathrm{i}\,\text{Cos}[c]+\text{Sin}[c])\,\left(a\,\text{Sin}[c]+(-b+a\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{a^2-b^2}\,\sqrt{(\text{Cos}[c]-\mathrm{i}\,\text{Sin}[c])^2}}\right]\right.\right.$$
$$\left.(b+a\,\text{Cos}[c+d\,x])^2\,(\text{Cos}[c]-\mathrm{i}\,\text{Sin}[c])\right)\Big/\left(\left(a^2-b^2\right)^{5/2}\,\sqrt{(\text{Cos}[c]-\mathrm{i}\,\text{Sin}[c])^2}\right)+1\Big/\left(a^3-a\,b^2\right)^2\,\Big(a\,\text{Sec}[c]$$
$$\Big(\left(2\,A\,b^4+a^4\,C-a^2\,b^2\,(11\,A+10\,C)\right)\,\text{Sin}[d\,x]+\left(-2\,A\,b^4+a^4\,C+a^2\,b^2\,(5\,A+2\,C)\right)\,\text{Sin}[2\,c+d\,x]+a\,b\,\left(A\,b^2-a^2\,(4\,A+3\,C)\right)\,\text{Sin}[c+2\,d\,x]\Big)+$$
$$\left.\left.b\,\left(a^2+2\,b^2\right)\,\left(-A\,b^2+a^2\,(4\,A+3\,C)\right)\,\text{Tan}[c]\Big)\right)\right)\Bigg/\left(2\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,(a+b\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 695: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 202 leaves, 6 steps) :

$$\frac{A\,x}{a^3}+\frac{b\,\left(5\,a^2\,A\,b^2-2\,A\,b^4-3\,a^4\,(2\,A+C)\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^3\,(a-b)^{5/2}\,(a+b)^{5/2}\,d}+$$
$$\frac{\left(A\,b^2+a^2\,C\right)\,\text{Tan}[c+d\,x]}{2\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}-\frac{\left(2\,A\,b^4-a^4\,C-a^2\,b^2\,(5\,A+2\,C)\right)\,\text{Tan}[c+d\,x]}{2\,a^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 926 leaves) :

$$\left(\left(6 a^4 A-5 a^2 A b^2+2 A b^4+3 a^4 C\right) (b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x] \left(A+C \operatorname{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\left(2 i b \operatorname{ArcTan}\left[\operatorname{Sec}\left[\frac{d x}{2}\right]\left(\frac{\operatorname{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-i \operatorname{Sin}[2 c]}}-\frac{i \operatorname{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-i \operatorname{Sin}[2 c]}}\right)\left(-i b \operatorname{Sin}\left[\frac{d x}{2}\right]+i a \operatorname{Sin}\left[c+\frac{d x}{2}\right]\right)\right]\right.\right.\right.$$

$$\left.\operatorname{Cos}[c]\right) \Big/ \left(a^3 \sqrt{a^2-b^2}\, d \sqrt{\operatorname{Cos}[2 c]-i \operatorname{Sin}[2 c]}\right)+$$

$$\left(2 b \operatorname{ArcTan}\left[\operatorname{Sec}\left[\frac{d x}{2}\right]\left(\frac{\operatorname{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-i \operatorname{Sin}[2 c]}}-\frac{i \operatorname{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-i \operatorname{Sin}[2 c]}}\right)\left(-i b \operatorname{Sin}\left[\frac{d x}{2}\right]+i a \operatorname{Sin}\left[c+\frac{d x}{2}\right]\right)\right]\right.$$

$$\left.\left.\left.\operatorname{Sin}[c]\right) \Big/ \left(a^3 \sqrt{a^2-b^2}\, d \sqrt{\operatorname{Cos}[2 c]-i \operatorname{Sin}[2 c]}\right)\right)\right) \Big/$$

$$\left.\left(\left(-a^2+b^2\right)^2 (A+2 C+A \operatorname{Cos}[2 c+2 d x]) (a+b \operatorname{Sec}[c+d x])^3\right)+\frac{1}{2 a^3 \left(a^2-b^2\right)^2 d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) (a+b \operatorname{Sec}[c+d x])^3}\right.$$

$$(b+a \operatorname{Cos}[c+d x]) \operatorname{Sec}[c]$$
$$\operatorname{Sec}[c+d x] \left(A+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(2 a^6 A d x \operatorname{Cos}[c]-6 a^2 A b^4 d x \operatorname{Cos}[c]+4 A b^6 d x \operatorname{Cos}[c]+4 a^5 A b d x \operatorname{Cos}[d x]-8 a^3 A b^3 d x \operatorname{Cos}[d x]+4 a A b^5 d x \operatorname{Cos}[d x]+\right.$$
$$4 a^5 A b d x \operatorname{Cos}[2 c+d x]-8 a^3 A b^3 d x \operatorname{Cos}[2 c+d x]+4 a A b^5 d x \operatorname{Cos}[2 c+d x]+a^6 A d x \operatorname{Cos}[c+2 d x]-$$
$$2 a^4 A b^2 d x \operatorname{Cos}[c+2 d x]+a^2 A b^4 d x \operatorname{Cos}[c+2 d x]+a^6 A d x \operatorname{Cos}[3 c+2 d x]-2 a^4 A b^2 d x \operatorname{Cos}[3 c+2 d x]+$$
$$a^2 A b^4 d x \operatorname{Cos}[3 c+2 d x]-6 a^4 A b^2 \operatorname{Sin}[c]-9 a^2 A b^4 \operatorname{Sin}[c]+6 A b^6 \operatorname{Sin}[c]-2 a^6 C \operatorname{Sin}[c]-5 a^4 b^2 C \operatorname{Sin}[c]-2 a^2 b^4 C \operatorname{Sin}[c]+$$
$$17 a^3 A b^3 \operatorname{Sin}[d x]-8 a A b^5 \operatorname{Sin}[d x]+5 a^5 b C \operatorname{Sin}[d x]+4 a^3 b^3 C \operatorname{Sin}[d x]-7 a^3 A b^3 \operatorname{Sin}[2 c+d x]+4 a A b^5 \operatorname{Sin}[2 c+d x]-$$
$$\left.3 a^5 b C \operatorname{Sin}[2 c+d x]+6 a^4 A b^2 \operatorname{Sin}[c+2 d x]-3 a^2 A b^4 \operatorname{Sin}[c+2 d x]+2 a^6 C \operatorname{Sin}[c+2 d x]+a^4 b^2 C \operatorname{Sin}[c+2 d x]\right)$$

- **Problem 696: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c+d x] \left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^3}\, dx$$

Optimal (type 3, 266 leaves, 7 steps):

$$-\frac{3 A b x}{a^4}-\frac{\left(15 a^2 A b^4-6 A b^6-2 a^6 C-a^4 b^2 (12 A+C)\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^4 (a-b)^{5/2} (a+b)^{5/2} d}-$$
$$\frac{\left(11 a^2 A b^2-6 A b^4-a^4 (2 A-3 C)\right) \operatorname{Sin}[c+d x]}{2 a^3 \left(a^2-b^2\right)^2 d}+\frac{\left(A b^2+a^2 C\right) \operatorname{Sin}[c+d x]}{2 a \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^2}-\frac{\left(3 A b^4-2 a^4 C-a^2 b^2 (6 A+C)\right) \operatorname{Sin}[c+d x]}{2 a^2 \left(a^2-b^2\right)^2 d (a+b \operatorname{Sec}[c+d x])}$$

Result (type 3, 1186 leaves):

$$\frac{1}{\left(-a^2+b^2\right)^2 (A+2C+A\,Cos[2c+2dx])\,(a+b\,Sec[c+dx])^3}\left(12a^4Ab^2-15a^2Ab^4+6Ab^6+2a^6C+a^4b^2C\right)(b+a\,Cos[c+dx])^3\,Sec[c+dx]\,\left(A+C\,Sec[c+dx]^2\right)$$

$$\left(-\left(2\,i\,ArcTan\left[Sec\left[\frac{dx}{2}\right]\left(\frac{Cos[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2c]-i\,Sin[2c]}}-\frac{i\,Sin[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2c]-i\,Sin[2c]}}\right)\left(-i\,b\,Sin\left[\frac{dx}{2}\right]+i\,a\,Sin\left[c+\frac{dx}{2}\right]\right)\right]Cos[c]\right)\Big/\left(a^4\sqrt{a^2-b^2}\,d\,\sqrt{Cos[2c]-i\,Sin[2c]}\right)-\left(2\,ArcTan\left[Sec\left[\frac{dx}{2}\right]\left(\frac{Cos[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2c]-i\,Sin[2c]}}-\frac{i\,Sin[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2c]-i\,Sin[2c]}}\right)\left(-i\,b\,Sin\left[\frac{dx}{2}\right]+i\,a\,Sin\left[c+\frac{dx}{2}\right]\right)\right]Sin[c]\right)\Big/\left(a^4\sqrt{a^2-b^2}\,d\,\sqrt{Cos[2c]-i\,Sin[2c]}\right)\right)+$$

$$\frac{1}{4a^4\left(a^2-b^2\right)^2 d\,(A+2C+A\,Cos[2c+2dx])\,(a+b\,Sec[c+dx])^3}(b+a\,Cos[c+dx])\,Sec[c]\,Sec[c+dx]\,\left(A+C\,Sec[c+dx]^2\right)$$

$$(-12a^6Abdx\,Cos[c]+36a^2Ab^5dx\,Cos[c]-24Ab^7dx\,Cos[c]-24a^5Ab^2dx\,Cos[dx]+48a^3Ab^4dx\,Cos[dx]-24aAb^6dx\,Cos[dx]-$$
$$24a^5Ab^2dx\,Cos[2c+dx]+48a^3Ab^4dx\,Cos[2c+dx]-24aAb^6dx\,Cos[2c+dx]-6a^6Abdx\,Cos[c+2dx]+$$
$$12a^4Ab^3dx\,Cos[c+2dx]-6a^2Ab^5dx\,Cos[c+2dx]-6a^6Abdx\,Cos[3c+2dx]+12a^4Ab^3dx\,Cos[3c+2dx]-$$
$$6a^2Ab^5dx\,Cos[3c+2dx]+16a^4Ab^3\,Sin[c]+22a^2Ab^5\,Sin[c]-20Ab^7\,Sin[c]+8a^6bC\,Sin[c]+14a^4b^3C\,Sin[c]-$$
$$4a^2b^5C\,Sin[c]+a^7A\,Sin[dx]+2a^5Ab^2\,Sin[dx]-53a^3Ab^4\,Sin[dx]+32aAb^6\,Sin[dx]-22a^5b^2C\,Sin[dx]+4a^3b^4C\,Sin[dx]+$$
$$a^7A\,Sin[2c+dx]+2a^5Ab^2\,Sin[2c+dx]+11a^3Ab^4\,Sin[2c+dx]-8aAb^6\,Sin[2c+dx]+10a^5b^2C\,Sin[2c+dx]-$$
$$4a^3b^4C\,Sin[2c+dx]+4a^6Ab\,Sin[c+2dx]-24a^4Ab^3\,Sin[c+2dx]+14a^2Ab^5\,Sin[c+2dx]-8a^6bC\,Sin[c+2dx]+$$
$$2a^4b^3C\,Sin[c+2dx]+4a^6Ab\,Sin[3c+2dx]-8a^4Ab^3\,Sin[3c+2dx]+4a^2Ab^5\,Sin[3c+2dx]+a^7A\,Sin[2c+3dx]-$$
$$2a^5Ab^2\,Sin[2c+3dx]+a^3Ab^4\,Sin[2c+3dx]+a^7A\,Sin[4c+3dx]-2a^5Ab^2\,Sin[4c+3dx]+a^3Ab^4\,Sin[4c+3dx])$$

- **Problem 698: Result more than twice size of optimal antiderivative.**

$$\int\frac{Sec[c+dx]^4\left(A+C\,Sec[c+dx]^2\right)}{(a+b\,Sec[c+dx])^4}\,dx$$

Optimal (type 3, 378 leaves, 9 steps) :

$$-\frac{4\,a\,C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{b^5\,d}-\frac{\left(2\,A\,b^8-8\,a^8\,C+28\,a^6\,b^2\,C-35\,a^4\,b^4\,C+a^2\,b^6\,(3\,A+20\,C)\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{7/2}\,b^5\,(a+b)^{7/2}\,d}-$$
$$\frac{\left(5\,A\,b^4-\left(12\,a^4-23\,a^2\,b^2+6\,b^4\right)\,C\right)\,\text{Tan}[c+d\,x]}{6\,b^4\,\left(a^2-b^2\right)^2\,d}-\frac{\left(A\,b^2+a^2\,C\right)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^3}+$$
$$\frac{\left(3\,A\,b^4-4\,a^4\,C+a^2\,b^2\,(2\,A+9\,C)\right)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{6\,b^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{a\,\left(2\,A\,b^6+4\,a^6\,C-11\,a^4\,b^2\,C+3\,a^2\,b^4\,(A+4\,C)\right)\,\text{Tan}[c+d\,x]}{2\,b^4\,\left(a^2-b^2\right)^3\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 874 leaves):

$$-\left(2\,\left(3\,a^2\,A\,b^6+2\,A\,b^8-8\,a^8\,C+28\,a^6\,b^2\,C-35\,a^4\,b^4\,C+20\,a^2\,b^6\,C\right)\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]\,(b+a\,\text{Cos}[c+d\,x])^4\right.$$
$$\left.\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(b^5\,\sqrt{a^2-b^2}\,\left(-a^2+b^2\right)^3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\frac{8\,a\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{b^5\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}-$$
$$\frac{8\,a\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{b^5\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}+$$
$$\frac{1}{24\,b^4\,\left(-a^2+b^2\right)^3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}$$
$$(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-6\,a^4\,A\,b^5\,\text{Sin}[c+d\,x]-54\,a^2\,A\,b^7\,\text{Sin}[c+d\,x]-120\,a^8\,b\,C\,\text{Sin}[c+d\,x]+\right.$$
$$294\,a^6\,b^3\,C\,\text{Sin}[c+d\,x]-174\,a^4\,b^5\,C\,\text{Sin}[c+d\,x]-108\,a^2\,b^7\,C\,\text{Sin}[c+d\,x]+48\,b^9\,C\,\text{Sin}[c+d\,x]-16\,a^5\,A\,b^4\,\text{Sin}[2\,(c+d\,x)]-$$
$$2\,a^3\,A\,b^6\,\text{Sin}[2\,(c+d\,x)]-72\,a\,A\,b^8\,\text{Sin}[2\,(c+d\,x)]-48\,a^9\,C\,\text{Sin}[2\,(c+d\,x)]-40\,a^7\,b^2\,C\,\text{Sin}[2\,(c+d\,x)]+370\,a^5\,b^4\,C\,\text{Sin}[2\,(c+d\,x)]-$$
$$444\,a^3\,b^6\,C\,\text{Sin}[2\,(c+d\,x)]+72\,a\,b^8\,C\,\text{Sin}[2\,(c+d\,x)]-6\,a^4\,A\,b^5\,\text{Sin}[3\,(c+d\,x)]-54\,a^2\,A\,b^7\,\text{Sin}[3\,(c+d\,x)]-120\,a^8\,b\,C\,\text{Sin}[3\,(c+d\,x)]+$$
$$342\,a^6\,b^3\,C\,\text{Sin}[3\,(c+d\,x)]-318\,a^4\,b^5\,C\,\text{Sin}[3\,(c+d\,x)]+36\,a^2\,b^7\,C\,\text{Sin}[3\,(c+d\,x)]-4\,a^5\,A\,b^4\,\text{Sin}[4\,(c+d\,x)]-$$
$$\left.11\,a^3\,A\,b^6\,\text{Sin}[4\,(c+d\,x)]-24\,a^9\,C\,\text{Sin}[4\,(c+d\,x)]+68\,a^7\,b^2\,C\,\text{Sin}[4\,(c+d\,x)]-65\,a^5\,b^4\,C\,\text{Sin}[4\,(c+d\,x)]+6\,a^3\,b^6\,C\,\text{Sin}[4\,(c+d\,x)]\right)$$

- **Problem 699: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 313 leaves, 8 steps):

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{b^4\,d}+\frac{a\,\left(a^2\,b^4\,(A-8\,C)-2\,a^6\,C+7\,a^4\,b^2\,C+4\,b^6\,(A+2\,C)\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{7/2}\,b^4\,(a+b)^{7/2}\,d}-\frac{\left(A\,b^2+a^2\,C\right)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^3}-$$

$$\frac{a\,\left(2\,A\,b^4-3\,a^4\,C+a^2\,b^2\,(3\,A+8\,C)\right)\,\text{Tan}[c+d\,x]}{6\,b^3\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^2}-\frac{\left(4\,A\,b^6+9\,a^6\,C+2\,a^2\,b^4\,(7\,A+17\,C)-a^4\,b^2\,(3\,A+28\,C)\right)\,\text{Tan}[c+d\,x]}{6\,b^3\,\left(a^2-b^2\right)^3\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 1092 leaves):

$$-\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{b^4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}+$$

$$\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{b^4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}+$$

$$\frac{1}{\left(-a^2+b^2\right)^3\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}$$
$$\left(a^2\,A\,b^4+4\,A\,b^6-2\,a^6\,C+7\,a^4\,b^2\,C-8\,a^2\,b^4\,C+8\,b^6\,C\right)\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,i\,a\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Cos}[c]\right)\right/$$
$$\left(b^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)+$$
$$\left(2\,a\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Sin}[c]\right)\Big/$$
$$\left.\left(b^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)\right)-$$
$$\left(2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(A\,b^3\,\text{Sin}[c]+a^2\,b\,C\,\text{Sin}[c]-a\,A\,b^2\,\text{Sin}[d\,x]-a^3\,C\,\text{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a\,b\,\left(-a^2+b^2\right)\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\left((b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(-5\,a\,A\,b^3\,\text{Sin}[c]+a^3\,b\,C\,\text{Sin}[c]-6\,a\,b^3\,C\,\text{Sin}[c]+3\,a^2\,A\,b^2\,\text{Sin}[d\,x]+2\,A\,b^4\,\text{Sin}[d\,x]-3\,a^4\,C\,\text{Sin}[d\,x]+8\,a^2\,b^2\,C\,\text{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,b^2\,\left(-a^2+b^2\right)^2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\left((b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-3\,a^3\,A\,b^3\,\text{Sin}[c]-12\,a\,A\,b^5\,\text{Sin}[c]-3\,a^5\,b\,C\,\text{Sin}[c]+6\,a^3\,b^3\,C\,\text{Sin}[c]-\right.\right.$$
$$\left.\left.18\,a\,b^5\,C\,\text{Sin}[c]+13\,a^2\,A\,b^4\,\text{Sin}[d\,x]+2\,A\,b^6\,\text{Sin}[d\,x]+6\,a^6\,C\,\text{Sin}[d\,x]-17\,a^4\,b^2\,C\,\text{Sin}[d\,x]+26\,a^2\,b^4\,C\,\text{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,b^3\,\left(-a^2+b^2\right)^3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)$$

- **Problem 701: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^4} \, dx$$

Optimal (type 3, 252 leaves, 7 steps):

$$\frac{a \left(a^2 (2 A+C)+b^2 (3 A+4 C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{7/2} (a+b)^{7/2} d}-\frac{\left(A b^2+a^2 C\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^3}-\frac{a \left(5 A b^2-a^2 C+6 b^2 C\right) \text{Tan}[c+d x]}{6 b \left(a^2-b^2\right)^2 d (a+b \text{Sec}[c+d x])^2}+\frac{\left(a^4 C-2 b^4 (2 A+3 C)-a^2 b^2 (11 A+10 C)\right) \text{Tan}[c+d x]}{6 b \left(a^2-b^2\right)^3 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 868 leaves):

$$\left(\left(2 a^2 A+3 A b^2+a^2 C+4 b^2 C\right) (b+a \text{Cos}[c+d x])^4 \text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(\left(2 i a \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right] \left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}-\frac{i \text{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}\right) \left(-i b \text{Sin}\left[\frac{d x}{2}\right]+i a \text{Sin}\left[c+\frac{d x}{2}\right]\right)\right] \text{Cos}[c]\right) \Big/ \left(\sqrt{a^2-b^2} d \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}\right)+\left(2 a \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right] \left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}-\frac{i \text{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}\right) \left(-i b \text{Sin}\left[\frac{d x}{2}\right]+i a \text{Sin}\left[c+\frac{d x}{2}\right]\right)\right] \text{Sin}[c]\right) \Big/ \left(\sqrt{a^2-b^2} d \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}\right)\right)\right) \Big/ \left(\left(-a^2+b^2\right)^3 (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)+$$
$$\left(2 (b+a \text{Cos}[c+d x]) \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(A b^4 \text{Sin}[c]+a^2 b^2 C \text{Sin}[c]-a A b^3 \text{Sin}[d x]-a^3 b C \text{Sin}[d x]\right)\right) \Big/ \left(3 a^3 \left(a^2-b^2\right) d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)+$$
$$\left((b+a \text{Cos}[c+d x])^2 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(-11 a^2 A b^3 \text{Sin}[c]+6 A b^5 \text{Sin}[c]-5 a^4 b C \text{Sin}[c]+9 a^3 A b^2 \text{Sin}[d x]-4 a A b^4 \text{Sin}[d x]+3 a^5 C \text{Sin}[d x]+2 a^3 b^2 C \text{Sin}[d x]\right)\right) \Big/ \left(3 a^3 \left(a^2-b^2\right)^2 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)+$$
$$\left((b+a \text{Cos}[c+d x])^3 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(27 a^4 A b^2 \text{Sin}[c]-18 a^2 A b^4 \text{Sin}[c]+6 A b^6 \text{Sin}[c]+3 a^6 C \text{Sin}[c]+12 a^4 b^2 C \text{Sin}[c]-18 a^5 A b \text{Sin}[d x]+5 a^3 A b^3 \text{Sin}[d x]-2 a A b^5 \text{Sin}[d x]-13 a^5 b C \text{Sin}[d x]-2 a^3 b^3 C \text{Sin}[d x]\right)\right) \Big/ \left(3 a^3 \left(a^2-b^2\right)^3 d (A+2 C+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)$$

- **Problem 702: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{(a+b\,\mathrm{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 292 leaves, 7 steps):

$$\frac{A\,x}{a^4}-\frac{b\left(7\,a^2\,A\,b^4-2\,A\,b^6-a^4\,b^2\,(8\,A-C)+4\,a^6\,(2\,A+C)\right)\mathrm{ArcTanh}\left[\frac{\sqrt{a-b}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^4\,(a-b)^{7/2}\,(a+b)^{7/2}\,d}+\frac{\left(A\,b^2+a^2\,C\right)\mathrm{Tan}[c+d\,x]}{3\,a\left(a^2-b^2\right)d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$
$$\frac{\left(3\,A\,b^4-2\,a^4\,C-a^2\,b^2\,(8\,A+3\,C)\right)\mathrm{Tan}[c+d\,x]}{6\,a^2\left(a^2-b^2\right)^2d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}-\frac{\left(17\,a^2\,A\,b^4-6\,A\,b^6-2\,a^6\,C-13\,a^4\,b^2\,(2\,A+C)\right)\mathrm{Tan}[c+d\,x]}{6\,a^3\left(a^2-b^2\right)^3d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

Result (type 3, 995 leaves):

$$\frac{2\,A\,x\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}[c+d\,x]^2\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a^4\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4}+\frac{1}{\left(-a^2+b^2\right)^3\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4}$$
$$\left(-8\,a^6\,A+8\,a^4\,A\,b^2-7\,a^2\,A\,b^4+2\,A\,b^6-4\,a^6\,C-a^4\,b^2\,C\right)(b+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}[c+d\,x]^2\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,i\,b\,\mathrm{ArcTan}\left[\mathrm{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\mathrm{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}-\frac{i\,\mathrm{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}\right)\left(-i\,b\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\mathrm{Cos}[c]\right)\right/$$
$$\left(a^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}\right)+$$
$$\left(2\,b\,\mathrm{ArcTan}\left[\mathrm{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\mathrm{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}-\frac{i\,\mathrm{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}\right)\left(-i\,b\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\mathrm{Sin}[c]\right)\Bigg/$$
$$\left.\left(a^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}\right)\right)-$$
$$\left(2\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(A\,b^5\,\mathrm{Sin}[c]+a^2\,b^3\,C\,\mathrm{Sin}[c]-a\,A\,b^4\,\mathrm{Sin}[d\,x]-a^3\,b^2\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\left(a^2-b^2\right)d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)+$$
$$\left((b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(14\,a^2\,A\,b^4\,\mathrm{Sin}[c]-9\,A\,b^6\,\mathrm{Sin}[c]+\right.\right.$$
$$\left.\left.8\,a^4\,b^2\,C\,\mathrm{Sin}[c]-3\,a^2\,b^4\,C\,\mathrm{Sin}[c]-12\,a^3\,A\,b^3\,\mathrm{Sin}[d\,x]+7\,a\,A\,b^5\,\mathrm{Sin}[d\,x]-6\,a^5\,b\,C\,\mathrm{Sin}[d\,x]+a^3\,b^3\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\left(a^2-b^2\right)^2d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)+$$
$$\left((b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(-48\,a^4\,A\,b^3\,\mathrm{Sin}[c]+51\,a^2\,A\,b^5\,\mathrm{Sin}[c]-18\,A\,b^7\,\mathrm{Sin}[c]-12\,a^6\,b\,C\,\mathrm{Sin}[c]-\right.\right.$$
$$\left.\left.3\,a^4\,b^3\,C\,\mathrm{Sin}[c]+36\,a^5\,A\,b^2\,\mathrm{Sin}[d\,x]-32\,a^3\,A\,b^4\,\mathrm{Sin}[d\,x]+11\,a\,A\,b^6\,\mathrm{Sin}[d\,x]+6\,a^7\,C\,\mathrm{Sin}[d\,x]+10\,a^5\,b^2\,C\,\mathrm{Sin}[d\,x]-a^3\,b^4\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\left(a^2-b^2\right)^3d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)$$

- **Problem 703: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^4} \, dx$$

Optimal (type 3, 367 leaves, 8 steps):

$$-\frac{4 A b x}{a^5}-\frac{\left(35 a^4 A b^4-28 a^2 A b^6+8 A b^8-2 a^8 C-a^6 b^2 (20 A+3 C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^5 (a-b)^{7/2} (a+b)^{7/2} d}+\frac{\left(68 a^2 A b^4-24 A b^6+a^6 (6 A-11 C)-a^4 b^2 (65 A+4 C)\right) \text{Sin}[c+d x]}{6 a^4 \left(a^2-b^2\right)^3 d}+\frac{\left(A b^2+a^2 C\right) \text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^3}-\frac{\left(4 A b^4-3 a^4 C-a^2 b^2 (9 A+2 C)\right) \text{Sin}[c+d x]}{6 a^2 \left(a^2-b^2\right)^2 d (a+b \text{Sec}[c+d x])^2}-\frac{\left(11 a^2 A b^4-4 A b^6-2 a^6 C-3 a^4 b^2 (4 A+C)\right) \text{Sin}[c+d x]}{2 a^3 \left(a^2-b^2\right)^3 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 1089 leaves):

$$-\frac{8\,A\,b\,x\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{a^5\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}+\frac{1}{\left(-a^2+b^2\right)^3\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}$$

$$\left(-20\,a^6\,A\,b^2+35\,a^4\,A\,b^4-28\,a^2\,A\,b^6+8\,A\,b^8-2\,a^8\,C-3\,a^6\,b^2\,C\right)\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\left(2\,\mathrm{i}\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-\mathrm{i}\,\text{Sin}[2\,c]}}-\frac{\mathrm{i}\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-\mathrm{i}\,\text{Sin}[2\,c]}}\right)\left(-\mathrm{i}\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+\mathrm{i}\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Cos}[c]\right)\Big/$$

$$\left(a^5\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-\mathrm{i}\,\text{Sin}[2\,c]}\right)-$$

$$\left(2\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-\mathrm{i}\,\text{Sin}[2\,c]}}-\frac{\mathrm{i}\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-\mathrm{i}\,\text{Sin}[2\,c]}}\right)\left(-\mathrm{i}\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+\mathrm{i}\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Sin}[c]\right)\Big/$$

$$\left.\left(a^5\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-\mathrm{i}\,\text{Sin}[2\,c]}\right)\right)+$$

$$\left(2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(A\,b^6\,\text{Sin}[c]+a^2\,b^4\,C\,\text{Sin}[c]-a\,A\,b^5\,\text{Sin}[d\,x]-a^3\,b^3\,C\,\text{Sin}[d\,x]\right)\right)\Big/$$

$$\left(3\,a^5\,\left(a^2-b^2\right)\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$

$$\Big((b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\Big(-17\,a^2\,A\,b^5\,\text{Sin}[c]+12\,A\,b^7\,\text{Sin}[c]-$$

$$11\,a^4\,b^3\,C\,\text{Sin}[c]+6\,a^2\,b^5\,C\,\text{Sin}[c]+15\,a^3\,A\,b^4\,\text{Sin}[d\,x]-10\,a\,A\,b^6\,\text{Sin}[d\,x]+9\,a^5\,b^2\,C\,\text{Sin}[d\,x]-4\,a^3\,b^4\,C\,\text{Sin}[d\,x]\Big)\Big)\Big/$$

$$\left(3\,a^5\,\left(a^2-b^2\right)^2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+\frac{1}{3\,a^5\,\left(a^2-b^2\right)^3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}$$

$$(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(75\,a^4\,A\,b^4\,\text{Sin}[c]-96\,a^2\,A\,b^6\,\text{Sin}[c]+36\,A\,b^8\,\text{Sin}[c]+27\,a^6\,b^2\,C\,\text{Sin}[c]-18\,a^4\,b^4\,C\,\text{Sin}[c]+6\,a^2\,b^6\,C\,\text{Sin}[c]-$$

$$60\,a^5\,A\,b^3\,\text{Sin}[d\,x]+71\,a^3\,A\,b^5\,\text{Sin}[d\,x]-26\,a\,A\,b^7\,\text{Sin}[d\,x]-18\,a^7\,b\,C\,\text{Sin}[d\,x]+5\,a^5\,b^3\,C\,\text{Sin}[d\,x]-2\,a^3\,b^5\,C\,\text{Sin}[d\,x]\Big)+$$

$$\frac{2\,A\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Tan}[c+d\,x]}{a^4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4}$$

- **Problem 704: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 513 leaves, 9 steps):

$$\frac{\left(20\,A\,b^2+a^2\,(A+2\,C)\right)\,x}{2\,a^6}+\frac{\left(20\,A\,b^9-a^2\,b^7\,(69\,A-2\,C)-8\,a^6\,b^3\,(5\,A-C)+7\,a^4\,b^5\,(12\,A-C)-8\,a^8\,b\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^6\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)^3\,d}+$$

$$\frac{b\,\left(60\,A\,b^6-a^6\,(24\,A-26\,C)+a^4\,b^2\,(146\,A-17\,C)-a^2\,b^4\,(167\,A-6\,C)\right)\,\text{Sin}[c+d\,x]}{6\,a^5\,\left(a^2-b^2\right)^3\,d}-$$

$$\frac{\left(10\,A\,b^6-a^6\,(A-6\,C)+a^4\,b^2\,(23\,A-2\,C)-a^2\,b^4\,(27\,A-C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^4\,\left(a^2-b^2\right)^3\,d}+\frac{\left(A\,b^2+a^2\,C\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^3}-$$

$$\frac{\left(5\,A\,b^4-4\,a^4\,C-a^2\,b^2\,(10\,A+C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{6\,a^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{\left(20\,A\,b^6-a^2\,b^4\,(53\,A-2\,C)+12\,a^6\,C+a^4\,b^2\,(48\,A+C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{6\,a^3\,\left(a^2-b^2\right)^3\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 1452 leaves) :

$$\frac{1}{a^6\,\sqrt{a^2-b^2}\,\left(-a^2+b^2\right)^3\,d}b\,\left(-40\,a^6\,A\,b^2+84\,a^4\,A\,b^4-69\,a^2\,A\,b^6+20\,A\,b^8-8\,a^8\,C+8\,a^6\,b^2\,C-7\,a^4\,b^4\,C+2\,a^2\,b^6\,C\right)\,\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]-$$

$$\frac{1}{96\,a^6\,\left(a^2-b^2\right)^3\,d\,(b+a\,\text{Cos}[c+d\,x])^3}$$
$$\Big(-72\,a^{10}\,A\,b\,(c+d\,x)-1272\,a^8\,A\,b^3\,(c+d\,x)+3288\,a^6\,A\,b^5\,(c+d\,x)-1512\,a^4\,A\,b^7\,(c+d\,x)-1392\,a^2\,A\,b^9\,(c+d\,x)+$$
$$960\,A\,b^{11}\,(c+d\,x)-144\,a^{10}\,b\,C\,(c+d\,x)+336\,a^8\,b^3\,C\,(c+d\,x)-144\,a^6\,b^5\,C\,(c+d\,x)-144\,a^4\,b^7\,C\,(c+d\,x)+96\,a^2\,b^9\,C\,(c+d\,x)-$$
$$36\,a^{11}\,A\,(c+d\,x)\,\text{Cos}[c+d\,x]-756\,a^9\,A\,b^2\,(c+d\,x)\,\text{Cos}[c+d\,x]-396\,a^7\,A\,b^4\,(c+d\,x)\,\text{Cos}[c+d\,x]+6084\,a^5\,A\,b^6\,(c+d\,x)\,\text{Cos}[c+d\,x]-$$
$$7776\,a^3\,A\,b^8\,(c+d\,x)\,\text{Cos}[c+d\,x]+2880\,a\,A\,b^{10}\,(c+d\,x)\,\text{Cos}[c+d\,x]-72\,a^{11}\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]-72\,a^9\,b^2\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]+$$
$$648\,a^7\,b^4\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]-792\,a^5\,b^6\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]+288\,a^3\,b^8\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]-72\,a^{10}\,A\,b\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-$$
$$1224\,a^8\,A\,b^3\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+4104\,a^6\,A\,b^5\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-4248\,a^4\,A\,b^7\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+$$
$$1440\,a^2\,A\,b^9\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-144\,a^{10}\,b\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+432\,a^8\,b^3\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-$$
$$432\,a^6\,b^5\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+144\,a^4\,b^7\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-12\,a^{11}\,A\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]-$$
$$204\,a^9\,A\,b^2\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]+684\,a^7\,A\,b^4\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]-708\,a^5\,A\,b^6\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]+$$
$$240\,a^3\,A\,b^8\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]-24\,a^{11}\,C\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]+72\,a^9\,b^2\,C\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]-$$
$$72\,a^7\,b^4\,C\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]+24\,a^5\,b^6\,C\,(c+d\,x)\,\text{Cos}[3\,(c+d\,x)]-6\,a^{11}\,A\,\text{Sin}[c+d\,x]+270\,a^9\,A\,b^2\,\text{Sin}[c+d\,x]-$$
$$750\,a^7\,A\,b^4\,\text{Sin}[c+d\,x]-1086\,a^5\,A\,b^6\,\text{Sin}[c+d\,x]+2232\,a^3\,A\,b^8\,\text{Sin}[c+d\,x]-960\,a\,A\,b^{10}\,\text{Sin}[c+d\,x]-144\,a^9\,b^2\,C\,\text{Sin}[c+d\,x]-$$
$$288\,a^7\,b^4\,C\,\text{Sin}[c+d\,x]+228\,a^5\,b^6\,C\,\text{Sin}[c+d\,x]-96\,a^3\,b^8\,C\,\text{Sin}[c+d\,x]+60\,a^{10}\,A\,b\,\text{Sin}[2\,(c+d\,x)]+372\,a^8\,A\,b^3\,\text{Sin}[2\,(c+d\,x)]-$$
$$2772\,a^6\,A\,b^5\,\text{Sin}[2\,(c+d\,x)]+3300\,a^4\,A\,b^7\,\text{Sin}[2\,(c+d\,x)]-1200\,a^2\,A\,b^9\,\text{Sin}[2\,(c+d\,x)]-480\,a^8\,b^3\,C\,\text{Sin}[2\,(c+d\,x)]+$$
$$360\,a^6\,b^5\,C\,\text{Sin}[2\,(c+d\,x)]-120\,a^4\,b^7\,C\,\text{Sin}[2\,(c+d\,x)]-9\,a^{11}\,A\,\text{Sin}[3\,(c+d\,x)]+279\,a^9\,A\,b^2\,\text{Sin}[3\,(c+d\,x)]-$$
$$1143\,a^7\,A\,b^4\,\text{Sin}[3\,(c+d\,x)]+1253\,a^5\,A\,b^6\,\text{Sin}[3\,(c+d\,x)]-440\,a^3\,A\,b^8\,\text{Sin}[3\,(c+d\,x)]-144\,a^9\,b^2\,C\,\text{Sin}[3\,(c+d\,x)]+$$
$$128\,a^7\,b^4\,C\,\text{Sin}[3\,(c+d\,x)]-44\,a^5\,b^6\,C\,\text{Sin}[3\,(c+d\,x)]+30\,a^{10}\,A\,b\,\text{Sin}[4\,(c+d\,x)]-90\,a^8\,A\,b^3\,\text{Sin}[4\,(c+d\,x)]+90\,a^6\,A\,b^5\,\text{Sin}[4\,(c+d\,x)]-$$
$$30\,a^4\,A\,b^7\,\text{Sin}[4\,(c+d\,x)]-3\,a^{11}\,A\,\text{Sin}[5\,(c+d\,x)]+9\,a^9\,A\,b^2\,\text{Sin}[5\,(c+d\,x)]-9\,a^7\,A\,b^4\,\text{Sin}[5\,(c+d\,x)]+3\,a^5\,A\,b^6\,\text{Sin}[5\,(c+d\,x)]\Big)$$

- **Problem 705: Result more than twice size of optimal antiderivative.**

$$\int\frac{a^2-b^2\,\text{Sec}[c+d\,x]^2}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 17 leaves, 3 steps):

$$a x-\frac{b \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}$$

Result (type 3, 73 leaves):

$$a x+\frac{b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}-\frac{b \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}$$

- **Problem 709: Attempted integration timed out after 120 seconds.**

$$\int \operatorname{Sec}[c+d x]^3 \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 467 leaves, 7 steps):

$$\frac{1}{315 b^5 d} 2 (a-b) \sqrt{a+b} \left(16 a^4 C+6 a^2 b^2 (7 A+4 C)-21 b^4 (9 A+7 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{315 b^4 d} 2 (a-b) \sqrt{a+b} \left(16 a^3 C+12 a^2 b C+6 a b^2 (7 A+6 C)+21 b^3 (9 A+7 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{2 a \left(21 A b^2+8 a^2 C+13 b^2 C\right) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{315 b^3 d}-\frac{2 \left(6 a^2 C-7 b^2 (9 A+7 C)\right) \operatorname{Sec}[c+d x] \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{315 b^2 d}+\frac{2 a C \operatorname{Sec}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{63 b d}+\frac{2 C \operatorname{Sec}[c+d x]^3 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{9 d}$$

Result (type 1, 1 leaves):

???

- **Problem 710: Unable to integrate problem.**

$$\int \operatorname{Sec}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 375 leaves, 6 steps):

$$-\frac{1}{105\,b^4\,d}2\,a\,(a-b)\,\sqrt{a+b}\,\left(35\,A\,b^2+8\,a^2\,C+19\,b^2\,C\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{105\,b^3\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,\left(35\,A\,b^2+\left(8\,a^2+6\,a\,b+25\,b^2\right)\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(8\,a^2\,C+5\,b^2\,(7\,A+5\,C)\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b^2\,d}-$$

$$\frac{8\,a\,C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 8, 37 leaves) :

$$\int \text{Sec}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Problem 711: Unable to integrate problem.

$$\int \text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 308 leaves, 5 steps) :

$$\frac{1}{15\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(2\,a^2\,C-3\,b^2\,(5\,A+3\,C)\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,b^2\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,(15\,A\,b+2\,a\,C+9\,b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{4\,a\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,b\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,b\,d}$$

Result (type 8, 35 leaves) :

$$\int \text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Problem 712: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 355 leaves, 6 steps):

$$-\frac{1}{3 b^2 d}2 a (a-b) \sqrt{a+b}\, C \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{3 b d}$$
$$2 \sqrt{a+b}\, (3 A b-(a-b) C) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}-$$
$$\frac{2 A \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{d}+\frac{2 C \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 570 leaves):

$$\frac{1}{3 b \sqrt{\frac{-a+b}{a+b}}\, d\, (b+a \operatorname{Cos}[c+d x]) (A+2 C+A \operatorname{Cos}[2 c+2 d x])} 4 \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Cos}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(2 i a (a-b) C \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{(a+b) (1+\operatorname{Cos}[c+d x])}} \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right]+\right.$$
$$2 i (a-b) b (3 A+C) \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{(a+b) (1+\operatorname{Cos}[c+d x])}} \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right]-$$
$$12 i a A b \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{(a+b) (1+\operatorname{Cos}[c+d x])}} \operatorname{EllipticPi}\left[-\frac{a+b}{a-b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right]-$$
$$\left.a \sqrt{\frac{-a+b}{a+b}}\, C \operatorname{Cos}[c+d x] (b+a \operatorname{Cos}[c+d x]) \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right)+$$
$$\frac{\operatorname{Cos}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+C \operatorname{Sec}[c+d x]^2\right) \left(\frac{4 a C \operatorname{Sin}[c+d x]}{3 b}+\frac{4}{3} C \operatorname{Tan}[c+d x]\right)}{d (A+2 C+A \operatorname{Cos}[2 c+2 d x])}$$

- **Problem 713: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x] \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 352 leaves, 6 steps):

$$\frac{1}{b\,d}(a-b)\sqrt{a+b}\,(A-2\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{b\,d}$$

$$\sqrt{a+b}\,(A\,b+2\,(a-b)\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{A\,b\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}+\frac{A\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 727 leaves) :

$$\frac{2\,C\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\,\mathrm{Sin}[c+d\,x]}{d}+$$

$$\Bigg(\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\Bigg(a\,A\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+A\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,A$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+4\,a\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a\,A\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-A\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-2\,a\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$2\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+(a+b)\,(A-2\,C)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,(A\,b-(a+b)\,C)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(d\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 714: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]^2\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 411 leaves, 7 steps):

$$\frac{A\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{4\,a\,d}+\frac{1}{4\,a\,d}$$

$$\sqrt{a+b}\,\left(A\,b+2\,a\,(A+4\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{4\,a^2\,d}\sqrt{a+b}\,\left(A\,b^2-4\,a^2\,(A+2\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{A\,b\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,a\,d}+\frac{A\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1417 leaves):

$$\frac{A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,d}+$$

$$\Bigg(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\Bigg(-a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+2\,a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+8\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+16\,i\,a^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$8\, i\, a^2 A \,\text{EllipticPi}\left[-\frac{a+b}{a-b},\, i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\, \frac{a+b}{a-b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 2\, i\, A\, b^2 \,\text{EllipticPi}\left[-\frac{a+b}{a-b},\, i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\, \frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +$$

$$16\, i\, a^2 C \,\text{EllipticPi}\left[-\frac{a+b}{a-b},\, i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\, \frac{a+b}{a-b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + i\, A\,(a-b)\, b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\, \frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$2\, i\,(a-b)\,(A\, b+2\, a\,(A+2\, C))\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\, \frac{a+b}{a-b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Bigg/$$

$$\left(4\, a \sqrt{\frac{-a+b}{a+b}}\ d \sqrt{b+a\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\ \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

- **Problem 715: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^3 \sqrt{a+b\,\text{Sec}[c+d x]}\ \left(A+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 502 leaves, 8 steps):

$$-\frac{1}{24 a^2 b d}(a-b)\sqrt{a+b}\left(3 A b^2-8 a^2 (2 A+3 C)\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{24 a^2 d}\sqrt{a+b}\left(2 a A b-3 A b^2+8 a^2 (2 A+3 C)\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{8 a^3 d}b\sqrt{a+b}\left(A b^2+4 a^2 (A+2 C)\right)\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{\left(3 A b^2-8 a^2 (2 A+3 C)\right)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{24 a^2 d}+\frac{A b\,\text{Cos}[c+d x]\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{12 a d}+\frac{A\,\text{Cos}[c+d x]^2\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 4, 1347 leaves):

$$\frac{\sqrt{a+b\,\text{Sec}[c+d x]}\left(\frac{1}{12}A\,\text{Sin}[c+d x]+\frac{A b\,\text{Sin}[2 (c+d x)]}{24 a}+\frac{1}{12}A\,\text{Sin}[3 (c+d x)]\right)}{d}+$$

$$\left(\sqrt{a+b\,\text{Sec}[c+d x]}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(-16 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-16 a^2 A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+3 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-24 a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$

$$24 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+32 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-6 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+48 a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-16 a^3 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$16 a^2 A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+3 a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-24 a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+24 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$24 a^2 A b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$48\,a^2\,b\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+48\,a^2\,b\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$(a+b)\,\left(-3\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+2\,a\,b\,(14\,a\,A-A\,b+24\,a\,C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(24\,a^2\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 716: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^4\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 587 leaves, 9 steps) :

$$\frac{1}{192\,a^3\,d}(a-b)\sqrt{a+b}\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\,\mathrm{Cot}[c+d\,x]$$

$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{192\,a^3\,d}$$

$$\sqrt{a+b}\,\left(10\,a\,A\,b^2-15\,A\,b^3-24\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(7\,A+12\,C)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{64\,a^4\,d}\sqrt{a+b}\,\left(5\,A\,b^4+8\,a^2\,b^2\,(A+2\,C)-16\,a^4\,(3\,A+4\,C)\right)$$

$$\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{b\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{192\,a^3\,d}-\frac{\left(5\,A\,b^2-12\,a^2\,(3\,A+4\,C)\right)\mathrm{Cos}[c+d\,x]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{96\,a^2\,d}+$$

$$\frac{A\,b\,\mathrm{Cos}[c+d\,x]^2\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,a\,d}+\frac{A\,\mathrm{Cos}[c+d\,x]^3\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 4121 leaves) :

$$\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(\frac{A\,b\,\mathrm{Sin}[c+d\,x]}{96\,a}+\frac{(48\,a^2\,A-5\,A\,b^2+48\,a^2\,C)\,\mathrm{Sin}[2\,(c+d\,x)]}{192\,a^2}+\frac{A\,b\,\mathrm{Sin}[3\,(c+d\,x)]}{96\,a}+\frac{1}{32}\,A\,\mathrm{Sin}[4\,(c+d\,x)]\right)}{d}+$$

$$\left(\left(\frac{3\,a\,A}{8\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{A\,b^2}{96\,a\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{a\,C}{2\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{25\,A\,b\,\sqrt{\mathrm{Sec}[c+d\,x]}}{96\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{5\,A\,b^3\,\sqrt{\mathrm{Sec}[c+d\,x]}}{384\,a^2\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{3\,b\,C\,\sqrt{\mathrm{Sec}[c+d\,x]}}{8\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{7\,A\,b\,\mathrm{Cos}[2\,(c+d\,x)]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{96\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{5\,A\,b^3\,\mathrm{Cos}[2\,(c+d\,x)]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{128\,a^2\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+$$

$$\left.\frac{b\,C\,\mathrm{Cos}[2\,(c+d\,x)]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{8\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}\right)\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(\frac{b\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}}{192\,a^3\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}}+\right.$$

$$\Big(\Big(b\,(a+b)\,\big(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\big)\,\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a-b}{a+b}\Big]-$$

$$2\,a\,\big(2\,a\,A\,b^2+5\,A\,b^3+24\,a^3\,(3\,A+4\,C)-12\,a^2\,b\,(3\,A+4\,C)\big)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a-b}{a+b}\Big]-$$

$$6\,\big(-5\,A\,b^4-8\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\big)\,\text{EllipticPi}\Big[-1,\,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a-b}{a+b}\Big]\Big)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4}\Big)\Big/$$

$$\left(192\,a^3\,\sqrt{\frac{1}{1-\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\,\Big(b-b\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4+a\,\Big(-1+\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\Big)^2\Big)\right)\Bigg)\Bigg)\Big/$$

$$\left(d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\right)\left(\frac{b\,\big(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\big)\,\text{Sec}\big[\frac{1}{2}\,(c+d\,x)\big]^2\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}{384\,a^3\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}-\right.$$

$$\Big(\Big(b\,(a+b)\,\big(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\big)\,\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a-b}{a+b}\Big]-$$

$$2\,a\,\big(2\,a\,A\,b^2+5\,A\,b^3+24\,a^3\,(3\,A+4\,C)-12\,a^2\,b\,(3\,A+4\,C)\big)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a-b}{a+b}\Big]-$$

$$6\,\big(-5\,A\,b^4-8\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\big)\,\text{EllipticPi}\Big[-1,\,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a-b}{a+b}\Big]\Big)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4}$$

$$\left(-2\,b\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+2\,a\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\Bigg)\Big/$$

$$\left(192\,a^3\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)^2\right)-$$

$$\Bigg(\Bigg(b\,(a+b)\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-$$

$$2\,a\,\left(2\,a\,A\,b^2+5\,A\,b^3+24\,a^3\,(3\,A+4\,C)-12\,a^2\,b\,(3\,A+4\,C)\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-$$

$$6\,\left(-5\,A\,b^4-8\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\Bigg)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\Bigg)\Big/$$

$$\left(192\,a^3\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\,\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)+$$

$$\Bigg(\Bigg(b\,(a+b)\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-$$

$$2\,a\,\left(2\,a\,A\,b^2+5\,A\,b^3+24\,a^3\,(3\,A+4\,C)-12\,a^2\,b\,(3\,A+4\,C)\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-$$

$$6\,\left(-5\,A\,b^4-8\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\Bigg)$$

$$\left(-a\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\Bigg)\Bigg/\left(384 a^3 (a+b)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right.$$

$$\left.\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)-\frac{1}{384 a^3\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)}$$

$$\Bigg(b(a+b)\left(15 A b^2+4 a^2(7 A+12 C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$2 a\left(2 a A b^2+5 A b^3+24 a^3(3 A+4 C)-12 a^2 b(3 A+4 C)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$6\left(-5 A b^4-8 a^2 b^2(A+2 C)+16 a^4(3 A+4 C)\right)\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}-$$

$$\left(b\left(15 A b^2+4 a^2(7 A+12 C)\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right)\Bigg/\left(384 a^3\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}\right)+$$

$$\left(b\left(15 A b^2+4 a^2(7 A+12 C)\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\right.\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right)\Bigg/$$

$$\left(384\,a^3\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)+$$

$$\left(\left(b\,(a+b)\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\,a\,\left(2\,a\,A\,b^2+5\,A\,b^3+24\,a^3\,(3\,A+4\,C)-12\,a^2\,b\,(3\,A+4\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-6\,\left(-5\,A\,b^4-8\,a^2\,b^2\,(A+2\,C)+\right.$$

$$\left.\left.16\,a^4\,(3\,A+4\,C)\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\,\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\,\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Big/$$

$$\left(384\,a^3\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)+$$

$$\left(\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\,\left(-\frac{a\,\left(2\,a\,A\,b^2+5\,A\,b^3+24\,a^3\,(3\,A+4\,C)-12\,a^2\,b\,(3\,A+4\,C)\right)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+\right.$$

$$\frac{3\left(-5\,A\,b^4-8\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}+$$

$$\left.\left.\frac{b\,(a+b)\,\left(15\,A\,b^2+4\,a^2\,(7\,A+12\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}{2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\right)\Bigg/$$

$$\left.\left.\left(192\,a^3\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)\right)\right)$$

- **Problem 717: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 550 leaves, 8 steps):

$$\frac{1}{1155\, b^5\, d}4\, a\, (a-b)\, \sqrt{a+b}\, \left(8\, a^4\, C+3\, a^2\, b^2\, (11\, A+6\, C)-b^4\, (451\, A+348\, C)\right)\, \text{Cot}[c+d\, x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right],\, \frac{a+b}{a-b}\right]\, \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}}+\frac{1}{1155\, b^4\, d}$$

$$2\, (a-b)\, \sqrt{a+b}\, \left(16\, a^4\, C+12\, a^3\, b\, C+6\, a^2\, b^2\, (11\, A+8\, C)-25\, b^4\, (11\, A+9\, C)+3\, a\, b^3\, (209\, A+157\, C)\right)\, \text{Cot}[c+d\, x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right],\, \frac{a+b}{a-b}\right]\, \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}}+$$

$$\frac{2\, \left(8\, a^4\, C+25\, b^4\, (11\, A+9\, C)+a^2\, b^2\, (33\, A+19\, C)\right)\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{1155\, b^3\, d}+$$

$$\frac{4\, a\, \left(132\, A\, b^2-3\, a^2\, C+101\, b^2\, C\right)\, \text{Sec}[c+d\, x]\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{1155\, b^2\, d}+$$

$$\frac{2\, \left(a^2\, C+3\, b^2\, (11\, A+9\, C)\right)\, \text{Sec}[c+d\, x]^2\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{231\, b\, d}+$$

$$\frac{2\, a\, C\, \text{Sec}[c+d\, x]^3\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{33\, d}+\frac{2\, C\, \text{Sec}[c+d\, x]^3\, (a+b\, \text{Sec}[c+d\, x])^{3/2}\, \text{Tan}[c+d\, x]}{11\, d}$$

Result (type 1, 1 leaves):

???

- **Problem 718: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\, x]^2\, (a+b\, \text{Sec}[c+d\, x])^{3/2}\, \left(A+C\, \text{Sec}[c+d\, x]^2\right)\, dx$$

Optimal (type 4, 454 leaves, 7 steps):

$$-\frac{1}{315\, b^4\, d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,a^4\,C+21\,b^4\,(9\,A+7\,C)+3\,a^2\,b^2\,(21\,A+11\,C)\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{315\, b^3\, d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,a^3\,C+6\,a^2\,b\,C-21\,b^3\,(9\,A+7\,C)+3\,a\,b^2\,(21\,A+13\,C)\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\,a\,\left(63\,A\,b^2+8\,a^2\,C+39\,b^2\,C\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}+\frac{2\,\left(8\,a^2\,C+7\,b^2\,(9\,A+7\,C)\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}-$$

$$\frac{8\,a\,C\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{63\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{9\,b\,d}$$

Result (type 1, 1 leaves):

???

- **Problem 719: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 374 leaves, 6 steps):

$$-\frac{1}{105\,b^3\,d}4\,a\,(a-b)\,\sqrt{a+b}\,\left(70\,A\,b^2-3\,a^2\,C+41\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(105\,a\,A\,b-35\,A\,b^2+6\,a^2\,C+57\,a\,b\,C-25\,b^2\,C\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{2\,\left(6\,a^2\,C-5\,b^2\,(7\,A+5\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b\,d}-\frac{4\,a\,C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,b\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 720: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 415 leaves, 7 steps):

$$-\frac{1}{5\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(a^2\,C+b^2\,(5\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{5\,b\,d}2\,\sqrt{a+b}\,\left(a^2\,C-2\,a\,b\,(5\,A+2\,C)+b^2\,(5\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}2\,a\,A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{5\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 4, 1023 leaves):

$$-\left(\left(4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.\right.$$

$$\left(5\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+5\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$3\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-10\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-2\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-6\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+5\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$5\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+3\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$10\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$10\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+(a+b)\left(5\,A\,b^2+\left(a^2+3\,b^2\right)C\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$b\left(a^2(-5\,A+C)+2\,a\,b\,(5\,A+2\,C)+b^2(5\,A+3\,C)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(5\,b\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\right)+$$

$$\left(\text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{4\left(5\,A\,b^2+a^2\,C+3\,b^2\,C\right)\text{Sin}[c+d\,x]}{5\,b}+\frac{8}{5}\,a\,C\,\text{Tan}[c+d\,x]+\right.\right.$$

$$\left.\left.\frac{4}{5}\,b\,C\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 722: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 414 leaves, 7 steps) :

$$\frac{1}{4d}(a-b)\sqrt{a+b}\,(5A-8C)\,\text{Cot}[c+dx]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+dx])}{a-b}}+\frac{1}{4d}$$

$$\sqrt{a+b}\,(2aA+5Ab+16aC-8bC)\,\text{Cot}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+dx])}{a-b}}-$$

$$\frac{1}{4ad}\sqrt{a+b}\,\left(3Ab^2+4a^2\,(A+2C)\right)\text{Cot}[c+dx]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+dx])}{a+b}}$$

$$\sqrt{-\frac{b\,(1+\text{Sec}[c+dx])}{a-b}}+\frac{3Ab\sqrt{a+b\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{4d}+\frac{A\,\text{Cos}[c+dx]\,(a+b\,\text{Sec}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{2d}$$

Result (type 4, 1618 leaves) :

$$\frac{1}{2}\left(\frac{\text{Cos}[c+dx]\,(a+b\,\text{Sec}[c+dx])^{3/2}\left(4bC\,\text{Sin}[c+dx]+\frac{1}{2}aA\,\text{Sin}[2\,(c+dx)]\right)}{d\,(b+a\,\text{Cos}[c+dx])}-\right.$$

$$\left((a+b\,\text{Sec}[c+dx])^{3/2}\left(5aAb\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+5Ab^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-8ab\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-\right.\right.$$

$$8b^2\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-10aAb\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3+16ab\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3+$$

$$5aAb\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^5-5Ab^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^5-8ab\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^5+$$

$$8b^2\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^5-8\,\mathrm{i}\,a^2A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}-6\,\mathrm{i}\,Ab^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}-16\,\mathrm{i}\,a^2C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$8\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-6\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$16\,i\,a^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i\,(a-b)\,b\,(5\,A-8\,C)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,(a-b)\,(b\,(A-4\,C)+2\,a\,(A+2\,C))\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(2\sqrt{\frac{-a+b}{a+b}}\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\right)$$

Problem 723: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^{3/2} \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 504 leaves, 8 steps):

$$\frac{1}{24 a b d}(a-b) \sqrt{a+b} \left(3 A b^2+8 a^2 (2 A+3 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{24 a d}\sqrt{a+b} \left(16 a^2 A+14 a A b+3 A b^2+24 a^2 C+48 a b C\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{8 a^2 d}b \sqrt{a+b} \left(A b^2-12 a^2 (A+2 C)\right) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{\left(3 A b^2+8 a^2 (2 A+3 C)\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{24 a d}+\frac{A b \text{Cos}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{4 d}+\frac{A \text{Cos}[c+d x]^2 (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d}$$

Result (type 4, 1393 leaves):

$$\left(\text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^{3/2} \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{1}{6} a A \text{Sin}[c+d x]+\frac{7}{12} A b \text{Sin}[2 (c+d x)]+\frac{1}{6} a A \text{Sin}[3 (c+d x)]\right)\right) \Big/ (d (b+a \text{Cos}[c+d x]) (A+2 C+A \text{Cos}[2 c+2 d x]))+\left((a+b \text{Sec}[c+d x])^{3/2} \left(A+C \text{Sec}[c+d x]^2\right) \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \left(16 a^3 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]+16 a^2 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]+3 a A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+3 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+24 a^3 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]+24 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]-32 a^3 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-6 a A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-48 a^3 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+16 a^3 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-16 a^2 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+3 a A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-3 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+24 a^3 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-24 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-\right.\right.$$

$$72 a^2 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$6 A b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$144 a^2 b C \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$72 a^2 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + 6 A b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 144 a^2 b C \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$(a+b) \left(3 A b^2+8 a^2 (2 A+3 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 2 a b (26 a A-7 A b+48 a C-24 b C) \,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(12 a d (b+a \,\text{Cos}[c+d x])^{3/2} (A+2 C+A \,\text{Cos}[2 c+2 d x]) \,\text{Sec}[c+d x]^{7/2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\right.$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\Bigg)$$

Problem 724: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 583 leaves, 9 steps):

$$-\frac{1}{64\,a^2\,d}(a-b)\,\sqrt{a+b}\,\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{64\,a^2\,d}$$
$$\sqrt{a+b}\,\left(2\,a\,A\,b^2-3\,A\,b^3+8\,a^3\,(3\,A+4\,C)+a^2\,(52\,A\,b+80\,b\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{64\,a^3\,d}\sqrt{a+b}\,\left(3\,A\,b^4+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{b\,\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{64\,a^2\,d}+\frac{\left(A\,b^2+4\,a^2\,(3\,A+4\,C)\right)\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,a\,d}+$$
$$\frac{A\,b\,\text{Cos}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{8\,d}+\frac{A\,\text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 4278 leaves):

$$\Bigg(\text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{3}{16}\,A\,b\,\text{Sin}[c+d\,x]+\frac{\left(16\,a^2\,A+A\,b^2+16\,a^2\,C\right)\,\text{Sin}[2\,(c+d\,x)]}{32\,a}+\frac{3}{16}\,A\,b\,\text{Sin}[3\,(c+d\,x)]+\frac{1}{16}\,a\,A\,\text{Sin}[4\,(c+d\,x)]\right)\Bigg)\Bigg/$$
$$(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\Bigg(\Bigg(\frac{3\,a^2\,A}{4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{19\,A\,b^2}{16\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^2\,C}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,b^2\,C}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{19\,a\,A\,b\,\sqrt{\text{Sec}[c+d\,x]}}{16\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{A\,b^3\,\sqrt{\text{Sec}[c+d\,x]}}{64\,a\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{7\,a\,b\,C\,\sqrt{\text{Sec}[c+d\,x]}}{4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\frac{13\,a\,A\,b\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{16\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{3\,A\,b^3\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{64\,a\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{5\,a\,b\,C\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}\Bigg)$$

$$(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\Bigg(\frac{b\,\left(-3\,A\,b^2+a^2\,(52\,A+80\,C)\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}{32\,a^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}-$$

$$\Bigg(\Bigg(b\,(a+b)\,\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$2\,\Bigg(a\,\left(-A\,b^3+8\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(3\,A+4\,C)+2\,a\,b^2\,(19\,A+32\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$\left(3\,A\,b^4+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\Bigg)\Bigg)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\Bigg)\Big/$$

$$\Bigg(32\,a^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\Bigg)\Bigg)\Bigg)\Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2} \right.$$

$$\left(\frac{b\,\left(-3\,A\,b^2+a^2\,(52\,A+80\,C)\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}{64\,a^2\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}} + \right.$$

$$\left(\left(b\,(a+b)\,\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right] + \right.\right.$$

$$2\,\left(a\,\left(-A\,b^3+8\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(3\,A+4\,C)+2\,a\,b^2\,(19\,A+32\,C)\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right] + \right.$$

$$\left.\left.\left(3\,A\,b^4+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}$$

$$\left.\left(-2\,b\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+2\,a\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\Big/$$

$$\left(32\,a^2\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)^2\right) +$$

$$\left(\left(b\,(a+b)\,\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right] + \right.\right.$$

$$2\left(a\left(-A b^3+8 a^3 (3 A+4 C)-4 a^2 b (3 A+4 C)+2 a b^2 (19 A+32 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$
$$\left.\left(3 A b^4+24 a^2 b^2 (A+2 C)+16 a^4 (3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg) \Bigg/$$
$$\left(32 a^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4} \left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)-$$
$$\Bigg(\Bigg(b (a+b) \left(3 A b^2-4 a^2 (13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+$$
$$2\left(a\left(-A b^3+8 a^3 (3 A+4 C)-4 a^2 b (3 A+4 C)+2 a b^2 (19 A+32 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$
$$\left.\left(3 A b^4+24 a^2 b^2 (A+2 C)+16 a^4 (3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\right)\Bigg)$$
$$\left(-a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\Bigg) \Bigg/ \Bigg(64 a^2 (a+b) \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$
$$\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\Bigg)+\frac{1}{64 a^2 \left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)}$$
$$\Bigg(b (a+b) \left(3 A b^2-4 a^2 (13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+$$
$$2\left(a\left(-A b^3+8 a^3 (3 A+4 C)-4 a^2 b (3 A+4 C)+2 a b^2 (19 A+32 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$
$$\left.\left(3 A b^4+24 a^2 b^2 (A+2 C)+16 a^4 (3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\right)\Bigg)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4} -$$

$$\left(b\left(-3 A b^2+a^2(52 A+80 C)\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/ \left(64 a^2\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}\right)+$$

$$\left(b\left(-3 A b^2+a^2(52 A+80 C)\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right] \left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\right.\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/$$

$$\left(64 a^2 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)-$$

$$\left(\left(b(a+b)\left(3 A b^2-4 a^2(13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+\right.\right.$$

$$2\left(a\left(-A b^3+8 a^3(3 A+4 C)-4 a^2 b(3 A+4 C)+2 a b^2(19 A+32 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+\right.$$

$$\left.\left.\left(3 A b^4+24 a^2 b^2(A+2 C)+16 a^4(3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}$$

$$\left(\frac{-a\,\text{Sec}\left[\tfrac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\tfrac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\tfrac{1}{2}(c+d\,x)\right]^2\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]\left(a+b-a\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Bigg/$$

$$\left(64\,a^2\sqrt{\frac{1}{1-\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)-$$

$$\left(\sqrt{\frac{a+b-a\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\,\left(\frac{b\,(a+b)\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\text{Sec}\left[\tfrac{1}{2}(c+d\,x)\right]^2\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}{2\sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}}+\right.$$

$$2\left(\frac{a\left(-A\,b^3+8\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(3\,A+4\,C)+2\,a\,b^2\,(19\,A+32\,C)\right)\text{Sec}\left[\tfrac{1}{2}(c+d\,x)\right]^2}{2\sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}-\right.$$

$$\left.\left.\left.\frac{\left(3\,A\,b^4+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\text{Sec}\left[\tfrac{1}{2}(c+d\,x)\right]^2}{2\sqrt{1-\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\tfrac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}\right)\right)\right)\Bigg/$$

$$\left.\left.\left(32 a^2 \sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)\right)\right)$$

Problem 725: Attempted integration timed out after 120 seconds.

$$\int \mathrm{Sec}[c+d x]^3 (a+b\,\mathrm{Sec}[c+d x])^{5/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 650 leaves, 9 steps):

$$\frac{1}{45045 b^5 d} 2 (a-b)\sqrt{a+b}\left(240 a^6 C-1617 b^6 (13 A+11 C)+10 a^4 b^2 (143 A+76 C)-3 a^2 b^4 (13299 A+10223 C)\right) \mathrm{Cot}[c+d x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}+\frac{1}{45045 b^4 d} 2 (a-b)\sqrt{a+b}\left(240 a^5 C+180 a^4 b C+1617 b^5 (13 A+11 C)+10 a^3 b^2 (143 A+94 C)+15 a^2 b^3 (1573 A+1175 C)-6 a b^4 (2717 A+2174 C)\right) \mathrm{Cot}[c+d x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}+\frac{2 a\left(120 a^4 C+5 a^2 b^2 (143 A+79 C)+b^4 (23309 A+18973 C)\right)\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{45045 b^3 d}-\frac{2\left(90 a^4 C-539 b^4 (13 A+11 C)-15 a^2 b^2 (715 A+543 C)\right)\mathrm{Sec}[c+d x]\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{45045 b^2 d}+\frac{2 a\left(2717 A b^2+15 a^2 C+2209 b^2 C\right)\mathrm{Sec}[c+d x]^2\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{9009 b d}+\frac{2\left(15 a^2 C+11 b^2 (13 A+11 C)\right)\mathrm{Sec}[c+d x]^3\sqrt{a+b\,\mathrm{Sec}[c+d x]}\,\mathrm{Tan}[c+d x]}{1287 d}+\frac{10 a C\,\mathrm{Sec}[c+d x]^3 (a+b\,\mathrm{Sec}[c+d x])^{3/2}\mathrm{Tan}[c+d x]}{143 d}+\frac{2 C\,\mathrm{Sec}[c+d x]^3 (a+b\,\mathrm{Sec}[c+d x])^{5/2}\mathrm{Tan}[c+d x]}{13 d}$$

Result (type 1, 1 leaves):

???

Problem 726: Attempted integration timed out after 120 seconds.

$$\int \mathrm{Sec}[c+d x]^2 (a+b\,\mathrm{Sec}[c+d x])^{5/2}\left(A+C\,\mathrm{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 534 leaves, 8 steps) :

$$-\frac{1}{693 b^4 d}2 a (a-b) \sqrt{a+b} \left(8 a^4 C+3 a^2 b^2 (33 A+17 C)+3 b^4 (319 A+247 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{693 b^3 d}2 (a-b) \sqrt{a+b} \left(8 a^4 C+6 a^3 b C+15 b^4 (11 A+9 C)+3 a^2 b^2 (33 A+19 C)-6 a b^3 (132 A+101 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 \left(8 a^4 C+15 b^4 (11 A+9 C)+3 a^2 b^2 (33 A+19 C)\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{693 b^2 d}+\frac{2 a \left(99 A b^2+8 a^2 C+67 b^2 C\right) (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{693 b^2 d}+\frac{2 \left(8 a^2 C+9 b^2 (11 A+9 C)\right) (a+b \text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x]}{693 b^2 d}-\frac{8 a C (a+b \text{Sec}[c+d x])^{7/2} \text{Tan}[c+d x]}{99 b^2 d}+\frac{2 C \text{Sec}[c+d x] (a+b \text{Sec}[c+d x])^{7/2} \text{Tan}[c+d x]}{11 b d}$$

Result (type 1, 1 leaves) :

???

- **Problem 727: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d x] (a+b \text{Sec}[c+d x])^{5/2} \left(A+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 4, 454 leaves, 7 steps) :

$$\frac{1}{315\, b^3\, d} 2\, (a-b)\, \sqrt{a+b}\, \left(10\, a^4\, C-21\, b^4\, (9\, A+7\, C)-3\, a^2\, b^2\, (161\, A+93\, C)\right)$$

$$\text{Cot}[c+d\, x]\; \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}} +$$

$$\frac{1}{315\, b^2\, d} 2\, (a-b)\, \sqrt{a+b}\, \left(10\, a^3\, C+21\, b^3\, (9\, A+7\, C)+15\, a^2\, b\, (21\, A+11\, C)-6\, a\, b^2\, (28\, A+19\, C)\right)\, \text{Cot}[c+d\, x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}} +$$

$$\frac{4\, a\, \left(84\, A\, b^2-5\, a^2\, C+57\, b^2\, C\right)\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\; \text{Tan}[c+d\, x]}{315\, b\, d} - \frac{2\, \left(10\, a^2\, C-7\, b^2\, (9\, A+7\, C)\right)\, (a+b\, \text{Sec}[c+d\, x])^{3/2}\, \text{Tan}[c+d\, x]}{315\, b\, d} -$$

$$\frac{4\, a\, C\, (a+b\, \text{Sec}[c+d\, x])^{5/2}\, \text{Tan}[c+d\, x]}{63\, b\, d} + \frac{2\, C\, (a+b\, \text{Sec}[c+d\, x])^{7/2}\, \text{Tan}[c+d\, x]}{9\, b\, d}$$

Result (type 1, 1 leaves):

???

- **Problem 729: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\, x]\, (a+b\, \text{Sec}[c+d\, x])^{5/2}\, \left(A+C\, \text{Sec}[c+d\, x]^2\right)\, dx$$

Optimal (type 4, 478 leaves, 8 steps):

$$\frac{1}{15\, b\, d} (a-b)\, \sqrt{a+b}\, \left(a^2\, (15\, A-46\, C)-6\, b^2\, (5\, A+3\, C)\right)\, \text{Cot}[c+d\, x]\; \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}} + \frac{1}{15\, b\, d} \sqrt{a+b}\, \left(a^2\, b\, (15\, A-46\, C)+30\, a^3\, C-6\, b^3\, (5\, A+3\, C)+2\, a\, b^2\, (45\, A+17\, C)\right)$$

$$\text{Cot}[c+d\, x]\; \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}} - \frac{1}{d}$$

$$5\, a\, A\, b\, \sqrt{a+b}\; \text{Cot}[c+d\, x]\; \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}} +$$

$$\frac{A\, (a+b\, \text{Sec}[c+d\, x])^{5/2}\, \text{Sin}[c+d\, x]}{d} - \frac{a\, b\, (15\, A-16\, C)\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\; \text{Tan}[c+d\, x]}{15\, d} - \frac{b\, (5\, A-2\, C)\, (a+b\, \text{Sec}[c+d\, x])^{3/2}\, \text{Tan}[c+d\, x]}{5\, d}$$

Result (type 4, 1129 leaves):

$$\left(2\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(15\,a^3\,A\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\,a^2\,A\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-30\,a\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-30\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-46\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$46\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-18\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-18\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-30\,a^3\,A\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+60\,a\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$92\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+36\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+15\,a^3\,A\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-15\,a^2\,A\,b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-30\,a\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$30\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-46\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+46\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-18\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+18\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$150\,a^2\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$150\,a^2\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+(a+b)\left(a^2\,(15\,A-46\,C)-6\,b^2\,(5\,A+3\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\left(15\,a^3\,C+3\,b^3\,(5\,A+3\,C)+a\,b^2\,(45\,A+17\,C)+a^2\,(-45\,A\,b+23\,b\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(15\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\;+$$

$$\left(\text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{4}{15}\left(15\,A\,b^2+23\,a^2\,C+9\,b^2\,C\right)\text{Sin}[c+d\,x]+\frac{44}{15}\,a\,b\,C\,\text{Tan}[c+d\,x]+\frac{4}{5}\,b^2\,C\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 731: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 507 leaves, 8 steps):

$$\frac{1}{24\,b\,d}(a-b)\sqrt{a+b}\,\left(3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,d}\sqrt{a+b}\,\left(16\,a^2\,A+26\,a\,A\,b+33\,A\,b^2+24\,a^2\,C+144\,a\,b\,C-48\,b^2\,C\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,a\,d}5\,b\sqrt{a+b}\,\left(A\,b^2+4\,a^2\,(A+2\,C)\right)\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(15\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{5\,A\,b\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{12\,d}+\frac{A\,\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1513 leaves):

$$\left(\text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{1}{6}\left(a^2\,A+24\,b^2\,C\right)\text{Sin}[c+d\,x]+\frac{13}{12}\,a\,A\,b\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{6}\,a^2\,A\,\text{Sin}[3\,(c+d\,x)]\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$

$$33\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+33\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+24\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+24\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-48\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$48\,b^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-32\,a^3\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-66\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-48\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+96\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+33\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-33\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$24\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-24\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-48\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+48\,b^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$120\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$30\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$240\,a^2\,b\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$120\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-30\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-240\,a^2\,b\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,b\,\left(24\,b^2\,(A-C)-a\,b\,(13\,A+72\,C)+a^2\,(38\,A+72\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(12\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

- **Problem 734: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(a^2-b^2\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 353 leaves, 7 steps):

$$\frac{2\,a\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{3\,d}+\frac{1}{3\,d}$$

$$2\,\sqrt{a+b}\,\left(3\,a^2+a\,b-b^2\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{d}2\,a^2\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{2\,b^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 799 leaves):

$$-\Bigg(\Bigg(4\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(a^2-b^2\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\Bigg(\mathbb{i}\,a\,(a-b)\,b\,\mathrm{EllipticE}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$\mathbb{i}\left(3a^3-3a^2b-a\,b^2+b^3\right)\mathrm{EllipticF}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,+6\,\mathbb{i}\,a^3\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\mathbb{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$a\,b\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\sqrt{\frac{-a+b}{a+b}}\,d\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\left(a^2-2b^2+a^2\,\mathrm{Cos}[2c+2d\,x]\right)\mathrm{Sec}[c+d\,x]^{5/2}\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\Bigg)\Bigg)+$$

$$\frac{\mathrm{Cos}[c+d\,x]^2\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(a^2-b^2\,\mathrm{Sec}[c+d\,x]^2\right)\left(-\frac{4}{3}a\,b\,\mathrm{Sin}[c+d\,x]-\frac{4}{3}b^2\,\mathrm{Tan}[c+d\,x]\right)}{d\left(a^2-2b^2+a^2\,\mathrm{Cos}[2c+2d\,x]\right)}$$

Problem 735: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 393 leaves, 6 steps):

$$\frac{1}{105 b^5 d} 4 a (a-b) \sqrt{a+b} \left(35 A b^2+24 a^2 C+22 b^2 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{105 b^4 d} 2 \sqrt{a+b} \left(48 a^3 C-12 a^2 b C+5 b^3 (7 A+5 C)+2 a b^2 (35 A+22 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 \left(24 a^2 C+5 b^2 (7 A+5 C)\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{105 b^3 d}-\frac{12 a C \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{35 b^2 d}+\frac{2 C \text{Sec}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{7 b d}$$

Result (type 8, 37 leaves):

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Problem 736: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 320 leaves, 5 steps):

$$-\frac{1}{15 b^4 d}2 (a-b) \sqrt{a+b} \left(8 a^2 C+3 b^2 (5 A+3 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{15 b^3 d}2 \sqrt{a+b} \left(8 a^2 C-2 a b C+3 b^2 (5 A+3 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{8 a C \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{15 b^2 d}+\frac{2 C \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{5 b d}$$

Result (type 8, 37 leaves) :

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Problem 737: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 253 leaves, 4 steps) :

$$\frac{1}{3 b^3 d}4 a (a-b) \sqrt{a+b} C \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 b^2 d}2 \sqrt{a+b} (3 A b+(2 a+b) C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 C \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3 b d}$$

Result (type 8, 35 leaves) :

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Problem 738: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+C \text{Sec}[c+d x]^2}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 313 leaves, 5 steps) :

$$-\frac{1}{b^2 d}2\,(a-b)\,\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\,\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{2\,\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\,\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{b\,d}\,-$$

$$\frac{2\,A\,\sqrt{a+b}\;\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{a},\,\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\,\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}$$

Result (type 4, 914 leaves) :

$$\frac{4\,C\,\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[c+d\,x]}{b\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\left(4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right.$$

$$\left(-a\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}+\right.$$

$$a\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-$$

$$2\,i\,A\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,A\,b\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+i\,(a-b)\,C\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+i\,b\,(A+C)$$

$$\left.\left.\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(b\,\sqrt{\frac{-a+b}{a+b}}\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

■ Problem 740: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^2 \left(A+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 411 leaves, 7 steps):

$$-\frac{1}{4 a^2 d}3 A (a-b) \sqrt{a+b}\, \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{4 a^2 d} A (2 a-3 b) \sqrt{a+b}\, \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{4 a^3 d}\sqrt{a+b} \left(3 A b^2+4 a^2 (A+2 C)\right) \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{3 A b \sqrt{a+b\,\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{4 a^2 d} + \frac{A\,\text{Cos}[c+d x] \sqrt{a+b\,\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{2 a d}$$

Result (type 4, 1475 leaves):

$$\frac{A (b+a\,\text{Cos}[c+d x])\, \text{Sec}[c+d x]\, \text{Sin}[2 (c+d x)]}{4 a d \sqrt{a+b\,\text{Sec}[c+d x]}} - \left(\sqrt{b+a\,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(3 a A b \sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right] + 3 A b^2 \sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right] - 6 a A b \sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3 + 3 a A b \sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5 - \right.$$

$$3 A b^2 \sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5 + 8 i a^2 A\, \text{EllipticPi}\left[-\frac{a+b}{a-b}, i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}} + 6 i A b^2\, \text{EllipticPi}\left[-\frac{a+b}{a-b}, i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}} + 16 i a^2 C\, \text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\Big]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$8\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+6\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$16\,i\,a^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-3\,i\,A\,(a-b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\left(-a\,A\,b+3\,A\,b^2+2\,a^2\,(A+2\,C)\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\,a^2\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 741: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 506 leaves, 8 steps):

$$\frac{1}{24\,a^3\,b\,d}(a-b)\,\sqrt{a+b}\,\left(15\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{24\,a^3\,d}\sqrt{a+b}\,\left(10\,a\,A\,b-15\,A\,b^2-8\,a^2\,(2\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{8\,a^4\,d}b\,\sqrt{a+b}\,\left(5\,A\,b^2+4\,a^2\,(A+2\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(15\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,a^3\,d}-\frac{5\,A\,b\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,a^2\,d}+\frac{A\,\text{Cos}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}$$

Result (type 4, 1363 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,\left(\frac{A\,\text{Sin}[c+d\,x]}{12\,a}-\frac{5\,A\,b\,\text{Sin}[2\,(c+d\,x)]}{24\,a^2}+\frac{A\,\text{Sin}[3\,(c+d\,x)]}{12\,a}\right)}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\left(\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+24\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$24\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-32\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-30\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-48\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$16\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+15\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-15\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+24\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-24\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$24\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$30\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$48\,a^2\,b\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+30\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+48\,a^2\,b\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$(a+b)\,\left(15\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-2\,a\,A\,b\,(2\,a+5\,b)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(24\,a^3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 742: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d\,x]^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 460 leaves, 6 steps):

$$-\frac{1}{5\,b^5\,\sqrt{a+b}\,d}2\,\left(2\,a^2\,b^2\,(5\,A-4\,C)+16\,a^4\,C-b^4\,(5\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{5\,b^4\,\sqrt{a+b}\,d}2\,\left(16\,a^3\,C+12\,a^2\,b\,C+2\,a\,b^2\,(5\,A+2\,C)+b^3\,(5\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,\left(A\,b^2+a^2\,C\right)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,a\,\left(5\,A\,b^2+8\,a^2\,C-3\,b^2\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Tan}[c+d\,x]}{5\,b^3\,\left(a^2-b^2\right)\,d}+\frac{2\,\left(5\,A\,b^2+6\,a^2\,C-b^2\,C\right)\,\text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Tan}[c+d\,x]}{5\,b^2\,\left(a^2-b^2\right)\,d}$$

Result (type 1, 1 leaves):

???

■ Problem 743: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d\,x]^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 327 leaves, 5 steps):

$$\frac{1}{3\,b^4\,\sqrt{a+b}\,d}2\,a\,\left(3\,A\,b^2+8\,a^2\,C-5\,b^2\,C\right)\,\text{Cot}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,b^3\,\sqrt{a+b}\,d}2\,\left(3\,A\,b^2+\left(8\,a^2+6\,a\,b+b^2\right)\,C\right)\,\text{Cot}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,\left(A\,b^2+a^2\,C\right)\,\text{Tan}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Tan}[c+d\,x]}{3\,b^2\,d}$$

Result (type 1, 1 leaves):

???

Problem 744: Attempted integration timed out after 120 seconds.

$$\int \frac{\mathrm{Sec}[c+d\,x]\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 279 leaves, 4 steps):

$$-\frac{1}{b^3\sqrt{a+b}\,d}2\left(A\,b^2+2\,a^2\,C-b^2\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{b^2\sqrt{a+b}\,d}2\,(A\,b-(2\,a+b)\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{2\left(A\,b^2+a^2\,C\right)\mathrm{Tan}[c+d\,x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 1, 1 leaves):

???

Problem 745: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 381 leaves, 6 steps):

$$\frac{2\left(A\,b^2+a^2\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a\,b^2\sqrt{a+b}\,d}-\frac{2\,(A\,b-a\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a\,b\sqrt{a+b}\,d}-\frac{2\,A\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{2\left(A\,b^2+a^2\,C\right)\mathrm{Tan}[c+d\,x]}{a\left(a^2-b^2\right)d\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 1127 leaves):

$$\frac{(b+a\,\mathrm{Cos}[c+d\,x])^2\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{4\left(A\,b^2+a^2\,C\right)\mathrm{Sin}[c+d\,x]}{a\,b\left(-a^2+b^2\right)}+\frac{4\left(A\,b^2\,\mathrm{Sin}[c+d\,x]+a^2\,C\,\mathrm{Sin}[c+d\,x]\right)}{a\left(a^2-b^2\right)(b+a\,\mathrm{Cos}[c+d\,x])}\right)}{d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}-$$

$$\left(4\,(b+a\cos[c+d\,x])^{3/2}\,\left(A+C\sec[c+d\,x]^2\right)\sqrt{\frac{1}{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(a\,A\,b^2\tan\left[\frac{1}{2}(c+d\,x)\right]+A\,b^3\tan\left[\frac{1}{2}(c+d\,x)\right]+a^3\,C\tan\left[\frac{1}{2}(c+d\,x)\right]+a^2\,b\,C\tan\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,A\,b^2\tan\left[\frac{1}{2}(c+d\,x)\right]^3-\right.$$

$$2\,a^3\,C\tan\left[\frac{1}{2}(c+d\,x)\right]^3+a\,A\,b^2\tan\left[\frac{1}{2}(c+d\,x)\right]^5-A\,b^3\tan\left[\frac{1}{2}(c+d\,x)\right]^5+a^3\,C\tan\left[\frac{1}{2}(c+d\,x)\right]^5-a^2\,b\,C\tan\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$2\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\tan\left[\frac{1}{2}(c+d\,x)\right]^2+b\tan\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\tan\left[\frac{1}{2}(c+d\,x)\right]^2+b\tan\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\tan\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\tan\left[\frac{1}{2}(c+d\,x)\right]^2+b\tan\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\tan\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\tan\left[\frac{1}{2}(c+d\,x)\right]^2+b\tan\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(A\,b^2+a^2\,C\right)\text{EllipticE}\left[\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\tan\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\tan\left[\frac{1}{2}(c+d\,x)\right]^2+b\tan\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-a\,b\,(a+b)\,(A+C)\,\text{EllipticF}\left[\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\tan\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\tan\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\tan\left[\frac{1}{2}(c+d\,x)\right]^2+b\tan\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\left(-a^2 b+b^3\right) d\left(A+2 C+A \operatorname{Cos}[2 c+2 d x]\right) \sqrt{\operatorname{Sec}[c+d x]}\left(a+b \operatorname{Sec}[c+d x]\right)^{3/2}\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

- **Problem 746: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c+d x]\left(A+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 431 leaves, 7 steps):

$$-\frac{1}{a^2 b \sqrt{a+b}\, d}\left(3 A b^2-a^2 (A-2 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+$$

$$\frac{1}{a^2 b \sqrt{a+b}\, d}\left(a A b+3 A b^2+2 a^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+$$

$$\frac{1}{a^3 d} 3 A b \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+$$

$$\frac{A \operatorname{Sin}[c+d x]}{a d \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{b\left(3 A b^2-a^2 (A-2 C)\right) \operatorname{Tan}[c+d x]}{a^2\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 4, 1259 leaves):

$$\frac{(b+a \operatorname{Cos}[c+d x])^2\left(A+C \operatorname{Sec}[c+d x]^2\right)\left(\frac{4\left(A b^2+a^2 C\right) \operatorname{Sin}[c+d x]}{a^2\left(a^2-b^2\right)}-\frac{4\left(A b^3 \operatorname{Sin}[c+d x]+a^2 b C \operatorname{Sin}[c+d x]\right)}{a^2\left(a^2-b^2\right)(b+a \operatorname{Cos}[c+d x])}\right)}{d\left(A+2 C+A \operatorname{Cos}[2 c+2 d x]\right)(a+b \operatorname{Sec}[c+d x])^{3/2}}-$$

$$\left(2 (b+a \operatorname{Cos}[c+d x])^{3/2}\left(A+C \operatorname{Sec}[c+d x]^2\right) \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(a^3 A \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+a^2 A b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-3 a A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-3 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-2 a^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$

$$2 a^2 b C \tan\left[\frac{1}{2}(c+d x)\right] - 2 a^3 A \tan\left[\frac{1}{2}(c+d x)\right]^3 + 6 a A b^2 \tan\left[\frac{1}{2}(c+d x)\right]^3 + 4 a^3 C \tan\left[\frac{1}{2}(c+d x)\right]^3 + a^3 A \tan\left[\frac{1}{2}(c+d x)\right]^5 -$$

$$a^2 A b \tan\left[\frac{1}{2}(c+d x)\right]^5 - 3 a A b^2 \tan\left[\frac{1}{2}(c+d x)\right]^5 + 3 A b^3 \tan\left[\frac{1}{2}(c+d x)\right]^5 - 2 a^3 C \tan\left[\frac{1}{2}(c+d x)\right]^5 + 2 a^2 b C \tan\left[\frac{1}{2}(c+d x)\right]^5 +$$

$$6 a^2 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\tan\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \tan\left[\frac{1}{2}(c+d x)\right]^2+b \tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$6 A b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\tan\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \tan\left[\frac{1}{2}(c+d x)\right]^2+b \tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$6 a^2 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \tan\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\tan\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \tan\left[\frac{1}{2}(c+d x)\right]^2+b \tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 6 A b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\tan\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\tan\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \tan\left[\frac{1}{2}(c+d x)\right]^2+b \tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$(a+b)\left(-3 A b^2+a^2 (A-2 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\tan\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\tan\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a \tan\left[\frac{1}{2}(c+d x)\right]^2+b \tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + 2 a (a+b) (A b+a C) \,\text{EllipticF}\left[\text{ArcSin}\left[\tan\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\tan\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\tan\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \tan\left[\frac{1}{2}(c+d x)\right]^2+b \tan\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(a^2 \left(a^2-b^2\right) d (A+2 C+A \cos[2 c+2 d x]) \sqrt{\sec[c+d x]} (a+b \sec[c+d x])^{3/2} \sqrt{1+\tan\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left.\left(a \left(-1+\tan\left[\frac{1}{2}(c+d x)\right]^2\right) - b \left(1+\tan\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 747: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 501 leaves, 8 steps):

$$\frac{1}{4 a^3 \sqrt{a+b}\, d}\left(15 A b^2-a^2 (7 A-8 C)\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{4 a^3 \sqrt{a+b}\, d}\left(5 a A b+15 A b^2-2 a^2 (A-4 C)\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{4 a^4 d}\sqrt{a+b}\left(15 A b^2+4 a^2 (A+2 C)\right) \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{5 A b \text{Sin}[c+d x]}{4 a^2 d \sqrt{a+b \text{Sec}[c+d x]}} + \frac{A \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a d \sqrt{a+b \text{Sec}[c+d x]}} + \frac{b^2 \left(15 A b^2-a^2 (7 A-8 C)\right) \text{Tan}[c+d x]}{4 a^3 \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 4, 41 966 leaves): Display of huge result suppressed!

- **Problem 748: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 488 leaves, 6 steps):

$$\frac{1}{3 b^5 \sqrt{a+b} \left(a^2-b^2\right) d} 4 a \left(a^2 b^2 (A-14 C)-b^4 (3 A-4 C)+8 a^4 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 b^4 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^2 b^2 (A-8 C)+3 a b^3 (A-3 C)+16 a^4 C+12 a^3 b C-b^4 (3 A+C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{2 \left(A b^2+a^2 C\right) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}} - \frac{4 a \left(2 A b^4-3 a^4 C+5 a^2 b^2 C\right) \text{Tan}[c+d x]}{3 b^3 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}} + \frac{2 \left(A b^2+2 a^2 C-b^2 C\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3 b^3 \left(a^2-b^2\right) d}$$

Result (type 1, 1 leaves):

???

Problem 749: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 408 leaves, 5 steps):

$$\frac{1}{3 b^4 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(3 b^4 (A-C)-8 a^4 C+a^2 b^2 (A+15 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{3 b^3 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(3 b^3 (A-C)+8 a^3 C+6 a^2 b C-a b^2 (A+9 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 a \left(A b^2+a^2 C\right) \text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}} + \frac{2 \left(3 A b^4-5 a^4 C+a^2 b^2 (A+9 C)\right) \text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 750: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 378 leaves, 5 steps):

$$-\frac{1}{3 (a-b) b^3 (a+b)^{3/2} d}$$
$$4 a \left(2 A b^2-a^2 C+3 b^2 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} +$$
$$\frac{1}{3 b^2 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^2 C+3 a b (A+C)-b^2 (A+3 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{2 \left(A b^2+a^2 C\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}} - \frac{4 a \left(2 A b^2-a^2 C+3 b^2 C\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 35 leaves):

$$\int \frac{\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Problem 751: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C \text{Sec}[c+d x]^2}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 517 leaves, 7 steps):

$$-\frac{1}{3a^2b^2\sqrt{a+b}\left(a^2-b^2\right)d}2\left(3Ab^4-a^4C-a^2b^2(7A+3C)\right)\text{Cot}[c+dx]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+dx])}{a-b}}-$$

$$\frac{1}{3a^2(a-b)b(a+b)^{3/2}d}2\left(6a^2Ab-aAb^2-3Ab^3-a^3C+3a^2bC\right)\text{Cot}[c+dx]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+dx])}{a-b}}-$$

$$\frac{2A\sqrt{a+b}\,\text{Cot}[c+dx]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+dx]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+dx])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+dx])}{a-b}}}{a^3d}+$$

$$\frac{2\left(Ab^2+a^2C\right)\text{Tan}[c+dx]}{3a\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+dx])^{3/2}}-\frac{2\left(3Ab^4-a^4C-a^2b^2(7A+3C)\right)\text{Tan}[c+dx]}{3a^2\left(a^2-b^2\right)^2d\sqrt{a+b\,\text{Sec}[c+dx]}}$$

Result (type 4, 1727 leaves) :

$$\Bigg((b+a\,\text{Cos}[c+dx])^3\,\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)\Bigg(\frac{4\left(-7a^2Ab^2+3Ab^4-a^4C-3a^2b^2C\right)\text{Sin}[c+dx]}{3a^2b\left(-a^2+b^2\right)^2}-$$

$$\frac{4\left(Ab^3\,\text{Sin}[c+dx]+a^2bC\,\text{Sin}[c+dx]\right)}{3a^2\left(a^2-b^2\right)(b+a\,\text{Cos}[c+dx])^2}+\frac{8\left(4a^2Ab^2\,\text{Sin}[c+dx]-2Ab^4\,\text{Sin}[c+dx]+a^4C\,\text{Sin}[c+dx]+a^2b^2C\,\text{Sin}[c+dx]\right)}{3a^2\left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+dx])}\Bigg)\Bigg)\Bigg/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+b\,\text{Sec}[c+dx])^{5/2}\right)-\Bigg(4\,(b+a\,\text{Cos}[c+dx])^{5/2}\sqrt{\text{Sec}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}$$

$$\Bigg(7a^3Ab^2\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+7a^2Ab^3\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-3aAb^4\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-3Ab^5\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+a^5C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+$$

$$a^4bC\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+3a^3b^2C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+3a^2b^3C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-14a^3Ab^2\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3+6aAb^4\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3-$$

$$2 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-6 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+7 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-7 a^2 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$3 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+3 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 a^2 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$6 a^4 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$12 a^2 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$6 A b^5 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$6 a^4 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+12 a^2 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$6 A b^5 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+(a+b)\left(-3 A b^4+a^4 C+a^2 b^2(7 A+3 C)\right)\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$a b(a+b)\left(-2 A b^2+3 a b(A+C)+a^2(3 A+C)\right)\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,a^2\,b\left(a^2-b^2\right)^2 d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Bigg)$$

- **Problem 752: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 559 leaves, 8 steps):

$$-\frac{1}{3\,a^3\,(a-b)\,b\,(a+b)^{3/2}\,d}\left(26\,a^2\,A\,b^2-15\,A\,b^4-a^4\,(3\,A-8\,C)\right)\mathrm{Cot}[c+d\,x]$$

$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{3\,a^3\,(a-b)\,b\,(a+b)^{3/2}\,d}\left(21\,a^2\,A\,b^2-5\,a\,A\,b^3-15\,A\,b^4+a^3\,b\,(3\,A-2\,C)+6\,a^4\,C\right)\mathrm{Cot}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{a^4\,d}$$

$$5\,A\,b\,\sqrt{a+b}\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{A\,\mathrm{Sin}[c+d\,x]}{a\,d\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}-\frac{b\left(5\,A\,b^2-a^2\,(3\,A-2\,C)\right)\mathrm{Tan}[c+d\,x]}{3\,a^2\left(a^2-b^2\right)d\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}}-\frac{b\left(26\,a^2\,A\,b^2-15\,A\,b^4-a^4\,(3\,A-8\,C)\right)\mathrm{Tan}[c+d\,x]}{3\,a^3\left(a^2-b^2\right)^2 d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 1714 leaves):

$$\Bigg((b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\Bigg(-\frac{8\left(-5\,a^2\,A\,b^2+3\,A\,b^4-2\,a^4\,C\right)\mathrm{Sin}[c+d\,x]}{3\,a^3\left(-a^2+b^2\right)^2}+$$

$$\frac{4\left(A b^4 \operatorname{Sin}[c+d x]+a^2 b^2 C \operatorname{Sin}[c+d x]\right)}{3 a^3\left(a^2-b^2\right)(b+a \operatorname{Cos}[c+d x])^2}+\frac{4\left(-11 a^2 A b^3 \operatorname{Sin}[c+d x]+7 A b^5 \operatorname{Sin}[c+d x]-5 a^4 b C \operatorname{Sin}[c+d x]+a^2 b^3 C \operatorname{Sin}[c+d x]\right)}{3 a^3\left(a^2-b^2\right)^2(b+a \operatorname{Cos}[c+d x])}\Bigg)\Bigg)\Bigg/$$

$$\left(d\,(A+2C+A\operatorname{Cos}[2c+2dx])\,(a+b\operatorname{Sec}[c+dx])^{5/2}\right)-\Bigg(2\,(b+a\operatorname{Cos}[c+dx])^{5/2}\sqrt{\operatorname{Sec}[c+dx]}\,\left(A+C\operatorname{Sec}[c+dx]^2\right)$$

$$\sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}$$

$$\Bigg(3 a^5 A \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]+3 a^4 A b \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]-26 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]-26 a^2 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]+15 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]+$$

$$15 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]-8 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]-8 a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]-6 a^5 A \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^3+52 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^3-$$

$$30 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^3+16 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^3+3 a^5 A \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5-3 a^4 A b \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5-26 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5+$$

$$26 a^2 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5+15 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5-15 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5-8 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5+8 a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^5+$$

$$30 a^4 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}-$$

$$60 a^2 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}+$$

$$30 A b^5 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}+$$

$$30 a^4 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}-60 a^2 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+dx)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+30\,A\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(-26\,a^2\,A\,b^2+15\,A\,b^4+a^4\,(3\,A-8\,C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,a\,(a+b)\left(3\,a\,A\,b^2-5\,A\,b^3+3\,a^3\,C+a^2\,b\,(6\,A+C)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(3\,a\,\left(a^3-a\,b^2\right)^2 d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 753: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 645 leaves, 9 steps) :

$$-\frac{1}{12 a^4 \sqrt{a+b} \left(a^2-b^2\right) d}\left(105 A b^4+a^4 (33 A-56 C)-2 a^2 b^2 (85 A-12 C)\right)$$

$$\text{Cot}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{1}{12 a^4 \sqrt{a+b} \left(a^2-b^2\right) d}\left(35 a A b^3+105 A b^4+6 a^4 (A-8 C)-3 a^2 b^2 (45 A-8 C)-a^3 (27 A b-8 b C)\right) \text{Cot}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{1}{4 a^5 d}\sqrt{a+b} \left(35 A b^2+4 a^2 (A+2 C)\right) \text{Cot}[c+d x] \,\text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{7 A b \,\text{Sin}[c+d x]}{4 a^2 d (a+b \,\text{Sec}[c+d x])^{3/2}}+\frac{A \,\text{Cos}[c+d x] \,\text{Sin}[c+d x]}{2 a d (a+b \,\text{Sec}[c+d x])^{3/2}}+$$

$$\frac{b^2 \left(35 A b^2-a^2 (27 A-8 C)\right) \text{Tan}[c+d x]}{12 a^3 \left(a^2-b^2\right) d (a+b \,\text{Sec}[c+d x])^{3/2}}-\frac{b^2 \left(105 A b^4+a^4 (33 A-56 C)-2 a^2 b^2 (85 A-12 C)\right) \text{Tan}[c+d x]}{12 a^4 \left(a^2-b^2\right)^2 d \sqrt{a+b \,\text{Sec}[c+d x]}}$$

Result (type 4, 4981 leaves) :

$$\frac{1}{2} \left(\frac{1}{d (a+b \,\text{Sec}[c+d x])^{5/2}}\right.$$

$$(b+a \,\text{Cos}[c+d x])^3 \,\text{Sec}[c+d x]^3 \left(\frac{4 b \left(-13 a^2 A b^2+9 A b^4-7 a^4 C+3 a^2 b^2 C\right) \text{Sin}[c+d x]}{3 a^4 \left(-a^2+b^2\right)^2}-\frac{4 \left(A b^5 \,\text{Sin}[c+d x]+a^2 b^3 C \,\text{Sin}[c+d x]\right)}{3 a^4 \left(a^2-b^2\right) (b+a \,\text{Cos}[c+d x])^2}-\right.$$

$$\left.\frac{8 \left(-7 a^2 A b^4 \,\text{Sin}[c+d x]+5 A b^6 \,\text{Sin}[c+d x]-4 a^4 b^2 C \,\text{Sin}[c+d x]+2 a^2 b^4 C \,\text{Sin}[c+d x]\right)}{3 a^4 \left(a^2-b^2\right)^2 (b+a \,\text{Cos}[c+d x])}+\frac{A \,\text{Sin}[2 (c+d x)]}{2 a^3}\right)+$$

$$\left((b+a \,\text{Cos}[c+d x])^{5/2} \left(\frac{a^2 A}{\left(a^2-b^2\right)^2 \sqrt{b+a \,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{4 A b^2}{\left(a^2-b^2\right)^2 \sqrt{b+a \,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}-\right.\right.$$

$$\frac{7 A b^4}{3 a^2 \left(a^2-b^2\right)^2 \sqrt{b+a \,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{2 a^2 C}{\left(a^2-b^2\right)^2 \sqrt{b+a \,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{2 b^2 C}{3 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}-\frac{9 a A b \sqrt{\operatorname{Sec}[c+d x]}}{4 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}+\frac{31 A b^3 \sqrt{\operatorname{Sec}[c+d x]}}{6 a \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}-$$

$$\frac{35 A b^5 \sqrt{\operatorname{Sec}[c+d x]}}{12 a^3 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}+\frac{2 a b C \sqrt{\operatorname{Sec}[c+d x]}}{3 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}-\frac{2 b^3 C \sqrt{\operatorname{Sec}[c+d x]}}{3 a \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}-$$

$$\frac{11 a A b \operatorname{Cos}[2 (c+d x)] \sqrt{\operatorname{Sec}[c+d x]}}{4 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}+\frac{85 A b^3 \operatorname{Cos}[2 (c+d x)] \sqrt{\operatorname{Sec}[c+d x]}}{6 a \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}-\frac{35 A b^5 \operatorname{Cos}[2 (c+d x)] \sqrt{\operatorname{Sec}[c+d x]}}{4 a^3 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}+$$

$$\left.\frac{14 a b C \operatorname{Cos}[2 (c+d x)] \sqrt{\operatorname{Sec}[c+d x]}}{3 \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}-\frac{2 b^3 C \operatorname{Cos}[2 (c+d x)] \sqrt{\operatorname{Sec}[c+d x]}}{a \left(a^2-b^2\right)^2 \sqrt{b+a \operatorname{Cos}[c+d x]}}\right) \operatorname{Sec}[c+d x]^{5/2}$$

$$\left(-\left(b \left(105 A b^4+a^4 (33 A-56 C)+2 a^2 b^2 (-85 A+12 C)\right) \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right] \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right)\right/$$

$$\left(6 a^4 \left(a^2-b^2\right)^2 \sqrt{\frac{1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right)-$$

$$\left((a+b) \left(b \left(105 A b^4+a^4 (33 A-56 C)+2 a^2 b^2 (-85 A+12 C)\right) \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right]+\right.\right.$$

$$2 a \left(21 a A b^3-35 A b^4+a^2 b^2 (33 A-8 C)+6 a^4 (A+2 C)+a^3 (-9 A b+12 b C)\right) \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right]+$$

$$\left.6 (a-b)^2 (a+b) \left(35 A b^2+4 a^2 (A+2 C)\right) \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)$$

$$\left.\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^4}\right)\right/$$

$$\left.\left.\left(6 a^4 \left(a^2-b^2\right)^2 \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \left(b-b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^4+a \left(-1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)^2\right)\right)\right)\right)\right/$$

$$\left(d\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(-\left(b\,\left(105\,A\,b^4+a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.\right.\right.$$

$$\left.\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Big/\left(12\,a^4\,\left(a^2-b^2\right)^2\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)+$$

$$\left((a+b)\,\left(b\,\left(105\,A\,b^4+a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+\right.\right.$$

$$2\,a\,\left(21\,a\,A\,b^3-35\,A\,b^4+a^2\,b^2\,(33\,A-8\,C)+6\,a^4\,(A+2\,C)+a^3\,(-9\,A\,b+12\,b\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$\left.6\,(a-b)^2\,(a+b)\,\left(35\,A\,b^2+4\,a^2\,(A+2\,C)\right)\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}$$

$$\left.\left(-2\,b\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+2\,a\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\Big/$$

$$\left(6\,a^4\,\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)^2\right)+$$

$$\left((a+b)\,\left(b\,\left(105\,A\,b^4+a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+\right.\right.$$

$$2\,a\,\left(21\,a\,A\,b^3-35\,A\,b^4+a^2\,b^2\,(33\,A-8\,C)+6\,a^4\,(A+2\,C)+a^3\,(-9\,A\,b+12\,b\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]+$$

$$\left.6\,(a-b)^2\,(a+b)\,\left(35\,A\,b^2+4\,a^2\,(A+2\,C)\right)\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg) \Bigg/$$

$$\left(6 a^4 \left(a^2-b^2\right)^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4} \left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)-$$

$$\Bigg(\Bigg(b\left(105 A b^4+a^4(33 A-56 C)+2 a^2 b^2(-85 A+12 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+$$

$$2 a\left(21 a A b^3-35 A b^4+a^2 b^2(33 A-8 C)+6 a^4(A+2 C)+a^3(-9 A b+12 b C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+$$

$$6(a-b)^2(a+b)\left(35 A b^2+4 a^2(A+2 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\Bigg)$$

$$\left(-a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\Bigg) \Bigg/ \Bigg(12 a^4\left(a^2-b^2\right)^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\Bigg)+$$

$$\Bigg((a+b)\Bigg(b\left(105 A b^4+a^4(33 A-56 C)+2 a^2 b^2(-85 A+12 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+$$

$$2 a\left(21 a A b^3-35 A b^4+a^2 b^2(33 A-8 C)+6 a^4(A+2 C)+a^3(-9 A b+12 b C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+$$

$$6(a-b)^2(a+b)\left(35 A b^2+4 a^2(A+2 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\Bigg) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\right)\Big/\left(12\,a^4\left(a^2-b^2\right)^2\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)+$$

$$\left(b\left(105\,A\,b^4+a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right)\Big/$$

$$\left(12\,a^4\left(a^2-b^2\right)^2\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}\right)-\left(b\left(105\,A\,b^4+a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right)\Big/$$

$$\left(12\,a^4\left(a^2-b^2\right)^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)-$$

$$\left((a+b)\left(b\left(105\,A\,b^4+a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+2\,a\left(21\,a\,A\,b^3-\right.\right.\right.$$

$$35\,A\,b^4+a^2\,b^2\,(33\,A-8\,C)+6\,a^4\,(A+2\,C)+a^3\,(-9\,A\,b+12\,b\,C)\Big)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+6\,(a-b)^2\,(a+b)$$

$$\left(35\,A\,b^2+4\,a^2\,(A+2\,C)\right)\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\,\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2}\right)\right)\Big/\left(12\,a^4\,\left(a^2-b^2\right)^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)-$$

$$\left((a+b)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right.$$

$$\left(\left(a\,\left(21\,a\,A\,b^3-35\,A\,b^4+a^2\,b^2\,(33\,A-8\,C)+6\,a^4\,(A+2\,C)+a^3\,(-9\,A\,b+12\,b\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right.\right.$$

$$\left.\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)-\frac{3\,(a-b)^2\,(a+b)\,\left(35\,A\,b^2+4\,a^2\,(A+2\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}+\left(b\,\left(105\,A\,b^4+\right.\right.$$

$$\left.\left.\left.a^4\,(33\,A-56\,C)+2\,a^2\,b^2\,(-85\,A+12\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Big/\left(2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\right)\right)\Big/$$

$$\left(6 a^4 \left(a^2-b^2\right)^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \left(b-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)\Bigg)\Bigg)\Bigg)$$

Problem 754: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\text{Sec}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{7/2}}\,dx$$

Optimal (type 4, 626 leaves, 8 steps):

$$-\left(2 \left(41 a^2 A b^4-15 A b^6-3 a^6 C-29 a^4 b^2 (2 A+C)\right) \text{Cot}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(15 a^3 b^2 \sqrt{a+b} \left(a^2-b^2\right)^2 d\right)+$$

$$\left(2 \left(36 a^2 A b^3-5 a A b^4-15 A b^5+3 a^5 C+a^3 b^2 (13 A+5 C)-3 a^4 b (15 A+8 C)\right) \text{Cot}[c+d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(15 a^3 b \sqrt{a+b} \left(a^2-b^2\right)^2 d\right)-$$

$$\frac{2 A \sqrt{a+b}\,\text{Cot}[c+d x] \,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{a^4 d}+$$

$$\frac{2 \left(A b^2+a^2 C\right) \text{Tan}[c+d x]}{5 a \left(a^2-b^2\right) d \,(a+b\,\text{Sec}[c+d x])^{5/2}}-\frac{2 \left(5 A b^4-3 a^4 C-a^2 b^2 (13 A+5 C)\right) \text{Tan}[c+d x]}{15 a^2 \left(a^2-b^2\right)^2 d \,(a+b\,\text{Sec}[c+d x])^{3/2}}-$$

$$\frac{2 \left(41 a^2 A b^4-15 A b^6-3 a^6 C-29 a^4 b^2 (2 A+C)\right) \text{Tan}[c+d x]}{15 a^3 \left(a^2-b^2\right)^3 d \sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 2204 leaves):

$$\left((b+a\,\text{Cos}[c+d x])^4 \,\text{Sec}[c+d x]^2 \left(A+C\,\text{Sec}[c+d x]^2\right) \left(\frac{4 \left(58 a^4 A b^2-41 a^2 A b^4+15 A b^6+3 a^6 C+29 a^4 b^2 C\right) \text{Sin}[c+d x]}{15 a^3 b \left(-a^2+b^2\right)^3}+\right.\right.$$

$$\frac{4\left(A b^4 \operatorname{Sin}[c+d x]+a^2 b^2 C \operatorname{Sin}[c+d x]\right)}{5 a^3\left(a^2-b^2\right)(b+a \operatorname{Cos}[c+d x])^3}+\frac{4\left(-19 a^2 A b^3 \operatorname{Sin}[c+d x]+11 A b^5 \operatorname{Sin}[c+d x]-9 a^4 b C \operatorname{Sin}[c+d x]+a^2 b^3 C \operatorname{Sin}[c+d x]\right)}{15 a^3\left(a^2-b^2\right)^2(b+a \operatorname{Cos}[c+d x])^2}+$$

$$\left(4\left(74 a^4 A b^2 \operatorname{Sin}[c+d x]-65 a^2 A b^4 \operatorname{Sin}[c+d x]+23 A b^6 \operatorname{Sin}[c+d x]+9 a^6 C \operatorname{Sin}[c+d x]+25 a^4 b^2 C \operatorname{Sin}[c+d x]-2 a^2 b^4 C \operatorname{Sin}[c+d x]\right)\right)\Big/$$

$$\left.\left.\left(15 a^3\left(a^2-b^2\right)^3(b+a \operatorname{Cos}[c+d x])\right)\right)\right)\Big/\left(d\,(A+2 C+A \operatorname{Cos}[2 c+2 d x])\,(a+b \operatorname{Sec}[c+d x])^{7/2}\right)-$$

$$\left(4\,(b+a \operatorname{Cos}[c+d x])^{7/2} \operatorname{Sec}[c+d x]^{3/2}\left(A+C \operatorname{Sec}[c+d x]^2\right) \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(58 a^5 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+58 a^4 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-41 a^3 A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-41 a^2 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$15 a A b^6 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+15 A b^7 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a^7 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a^6 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+29 a^5 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$29 a^4 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-116 a^5 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+82 a^3 A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-30 a A b^6 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$

$$6 a^7 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-58 a^5 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+58 a^5 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-58 a^4 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$41 a^3 A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+41 a^2 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+15 a A b^6 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-15 A b^7 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$3 a^7 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 a^6 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+29 a^5 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-29 a^4 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$30 a^6 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$90 a^4 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$90 a^2 A b^5 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$30 A b^7 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$30 a^6 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + 90 a^4 A b^3 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$90 a^2 A b^5 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + 30 A b^7 \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$(a+b)\left(-41 a^2 A b^4+15 A b^6+3 a^6 C+29 a^4 b^2 (2 A+C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$a b (a+b)\left(-6 a A b^3+10 A b^4+3 a^4 (5 A+C)+6 a^3 b (5 A+4 C)+a^2 b^2 (-17 A+5 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(15 a^3 b \left(a^2-b^2\right)^3 d \,(A+2 C+A \,\text{Cos}[2 c+2 d x]) \,(a+b \,\text{Sec}[c+d x])^{7/2} \sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 755: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{a^2 - b^2 \operatorname{Sec}[c + d x]^2}{\sqrt{a + b \operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 303 leaves, 7 steps) :

$$\frac{2 (a - b) \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{d} +$$

$$\frac{2 b \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{d} -$$

$$\frac{2 a \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{d}$$

Result (type 4, 939 leaves) :

$$-\frac{4\,b\,\text{Cos}[c+d\,x]\,(b+a\,\text{Cos}[c+d\,x])\left(a^2-b^2\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]}{d\left(a^2-2\,b^2+a^2\,\text{Cos}[2\,c+2\,d\,x]\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\left(4\sqrt{b+a\,\text{Cos}[c+d\,x]}\left(a^2-b^2\,\text{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.$$

$$\left(-a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+\right.$$

$$a\,b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+$$

$$2\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,a^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+i\,(a-b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i\left(a^2-b^2\right)$$

$$\left.\left.\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\left(a^2-2\,b^2+a^2\,\text{Cos}[2\,c+2\,d\,x]\right)\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 757: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{a^2 - b^2 \operatorname{Sec}[c + d x]^2}{(a + b \operatorname{Sec}[c + d x])^{5/2}} \, dx$$

Optimal (type 4, 338 leaves, 7 steps):

$$\frac{4 \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{\sqrt{a+b}\, d} -$$

$$\frac{4 \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{\sqrt{a+b}\, d} -$$

$$\frac{2 \sqrt{a+b} \operatorname{Cot}[c + d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{a\, d} + \frac{4 b^2 \operatorname{Tan}[c + d x]}{\left(a^2 - b^2\right) d \sqrt{a + b \operatorname{Sec}[c + d x]}}$$

Result (type 4, 790 leaves):

$$\frac{(b + a\,\text{Cos}[c + d\,x])^2\,\text{Sec}[c + d\,x]\,(a - b\,\text{Sec}[c + d\,x])\left(\frac{4\,b\,\text{Sin}[c+d\,x]}{-a^2+b^2} - \frac{4\,b^2\,\text{Sin}[c+d\,x]}{(-a^2+b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,(-b + a\,\text{Cos}[c + d\,x])\,(a + b\,\text{Sec}[c + d\,x])^{3/2}} +$$

$$\Bigg(2\,(b + a\,\text{Cos}[c + d\,x])^{3/2}\sqrt{\text{Sec}[c + d\,x]}\,(a - b\,\text{Sec}[c + d\,x])$$

$$\Bigg(2\,i\,(a - b)\,b\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a + b}{a + b}}\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]\right],\,\frac{a + b}{a - b}\right]\sqrt{1 - \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}\,\left(1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2\right)$$

$$\sqrt{\frac{a + b - a\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a + b}} - i\,(a^2 + 2\,a\,b - 3\,b^2)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a + b}{a + b}}\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]\right],\,\frac{a + b}{a - b}\right]$$

$$\sqrt{1 - \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}\,\left(1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2\right)\sqrt{\frac{a + b - a\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a + b}} +$$

$$2\,i\,(a^2 - b^2)\,\text{EllipticPi}\left[-\frac{a + b}{a - b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a + b}{a + b}}\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]\right],\,\frac{a + b}{a - b}\right]\sqrt{1 - \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}$$

$$\left(1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2\right)\sqrt{\frac{a + b - a\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a + b}} -$$

$$2\,b\sqrt{\frac{-a + b}{a + b}}\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]\left(b - b\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^4 + a\left(-1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2\right)^2\right)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\sqrt{\frac{-a + b}{a + b}}\,(a^2 - b^2)\,d\,(-b + a\,\text{Cos}[c + d\,x])\,(a + b\,\text{Sec}[c + d\,x])^{3/2}\sqrt{\frac{1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{1 - \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}}$$

$$\sqrt{\frac{a + b - a\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^2}}\,\left(-1 + \text{Tan}\left[\frac{1}{2}\,(c + d\,x)\right]^4\right)\Bigg)$$

■ **Problem 758: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{a^2 - b^2 \operatorname{Sec}[c+d x]^2}{(a+b \operatorname{Sec}[c+d x])^{7/2}} \, dx$$

Optimal (type 4, 445 leaves, 8 steps):

$$\frac{2 \left(11 a^2-3 b^2\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{3 a (a-b) (a+b)^{3/2} d} - \frac{1}{3 a (a-b) (a+b)^{3/2} d}$$

$$2 \left(9 a^2-2 a b-3 b^2\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} -$$

$$\frac{2 \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{a^2 d} +$$

$$\frac{4 b^2 \operatorname{Tan}[c+d x]}{3 \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^{3/2}} + \frac{2 b^2 \left(11 a^2-3 b^2\right) \operatorname{Tan}[c+d x]}{3 a \left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 4, 1849 leaves):

$$\left((b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^2 (a-b \operatorname{Sec}[c+d x])\right.$$

$$\left.\left(\frac{2 b \left(-11 a^2+3 b^2\right) \operatorname{Sin}[c+d x]}{3 a \left(-a^2+b^2\right)^2} - \frac{4 b^3 \operatorname{Sin}[c+d x]}{3 a \left(a^2-b^2\right) (b+a \operatorname{Cos}[c+d x])^2} - \frac{2 \left(-13 a^2 b^2 \operatorname{Sin}[c+d x]+5 b^4 \operatorname{Sin}[c+d x]\right)}{3 a \left(a^2-b^2\right)^2 (b+a \operatorname{Cos}[c+d x])}\right)\right) \Big/$$

$$\left(d (-b+a \operatorname{Cos}[c+d x]) (a+b \operatorname{Sec}[c+d x])^{5/2}\right) +$$

$$\left(2 (b+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{3/2} (a-b \operatorname{Sec}[c+d x]) \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(11 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right] + 11 a^2 b^2 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right] - 3 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right] - 3 b^4 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right] -\right.$$

$$22 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^3 + 6 a b^3 \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^3 + 11 a^3 b \sqrt{\frac{-a+b}{a+b}} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^5 -$$

$$11\,a^2\,b^2\,\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-3\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+3\,b^4\,\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-$$

$$6\,\mathrm{i}\,a^4\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}+12\,\mathrm{i}\,a^2\,b^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-$$

$$6\,\mathrm{i}\,b^4\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-6\,\mathrm{i}\,a^4\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}+$$

$$12\,\mathrm{i}\,a^2\,b^2\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-6\,\mathrm{i}\,b^4\,\text{EllipticPi}\Big[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\sqrt{1-\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2+b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-$$

$$\mathrm{i}\,b\,\left(11\,a^3-11\,a^2\,b-3\,a\,b^2+3\,b^3\right)\,\text{EllipticE}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{a+b}{a-b}\Big]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$i\left(3a^4+9a^3b-17a^2b^2-ab^3+6b^4\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(3a\sqrt{\frac{-a+b}{a+b}}\left(a^2-b^2\right)^2 d\,(-b+a\,\text{Cos}[c+d x])\,(a+b\,\text{Sec}[c+d x])^{5/2}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 759: Unable to integrate problem.

$$\int\frac{A+C\,\text{Sec}[c+d x]^2}{\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])}\,dx$$

Optimal (type 4, 145 leaves, 8 steps):

$$\frac{2A\sqrt{\text{Cos}[c+d x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a d}-\frac{2Ab\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2 d}+$$

$$\frac{2\left(Ab^2+a^2C\right)\sqrt{\text{Cos}[c+d x]}\,\text{EllipticPi}\left[\frac{2a}{a+b},\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{a^2(a+b)\,d}$$

Result (type 8, 37 leaves):

$$\int\frac{A+C\,\text{Sec}[c+d x]^2}{\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])}\,dx$$

Problem 760: Unable to integrate problem.

$$\int\frac{A+C\,\text{Sec}[c+d x]^2}{\sqrt{\text{Sec}[c+d x]}\,\sqrt{a+b\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 213 leaves, 11 steps):

$$-\frac{2\,A\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,C\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 8, 39 leaves):

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 761: Attempted integration timed out after 120 seconds.**

$$\int(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 9, 242 leaves, 8 steps):

$$\left(\sqrt{2}\,(a+b)\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2},\,-\frac{5}{3},\,\frac{3}{2},\,\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\,\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Bigg/$$
$$\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)-$$
$$\frac{\sqrt{2}\,a\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2},\,-\frac{2}{3},\,\frac{3}{2},\,\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\,\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}}+$$
$$A\,\text{Unintegrable}\left[(a+b\,\text{Sec}[c+d\,x])^{2/3},\,x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 763: Attempted integration timed out after 120 seconds.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 9, 239 leaves, 8 steps):

$$\frac{\sqrt{2}\ C\ \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}\left(1-\text{Sec}[c+d\,x]\right),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\left(a+b\,\text{Sec}[c+d\,x]\right)^{2/3}\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}}-$$

$$\frac{\sqrt{2}\ a\,C\ \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}\left(1-\text{Sec}[c+d\,x]\right),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(a+b\,\text{Sec}[c+d\,x]\right)^{1/3}}+A\ \text{Unintegrable}\left[\frac{1}{\left(a+b\,\text{Sec}[c+d\,x]\right)^{1/3}},x\right]$$

Result (type 1, 1 leaves):

???

Problem 766: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^2\left(a+b\,\text{Sec}[c+d\,x]\right)\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 114 leaves, 7 steps):

$$\frac{(4\,a\,B+3\,b\,C)\ \text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(b\,B+a\,C)\ \text{Tan}[c+d\,x]}{d}+$$
$$\frac{(4\,a\,B+3\,b\,C)\ \text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{8\,d}+\frac{b\,C\,\text{Sec}[c+d\,x]^3\ \text{Tan}[c+d\,x]}{4\,d}+\frac{(b\,B+a\,C)\ \text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 403 leaves):

$$-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{3\,b\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+$$
$$\frac{3\,b\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{b\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{a\,B}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{3\,b\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{b\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-\frac{a\,B}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-$$
$$\frac{3\,b\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,b\,B\,\text{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,C\,\text{Tan}[c+d\,x]}{3\,d}+\frac{b\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Problem 768: Result more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Sec}[c+d\,x]\right)\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 61 leaves, 5 steps):

$$\frac{(2\,a\,B+b\,C)\ \text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{(b\,B+a\,C)\ \text{Tan}[c+d\,x]}{d}+\frac{b\,C\,\text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 164 leaves):

$$\frac{1}{4 d}\left(-2 (2 a B+b C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\right.$$
$$4 a B \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+2 b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$
$$\left.\frac{b C}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{b C}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+4 (b B+a C) \text{Tan}[c+d x]\right)$$

Problem 769: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x] (a+b \text{Sec}[c+d x]) \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 35 leaves, 5 steps) :

$$a B x+\frac{(b B+a C) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{b C \text{Tan}[c+d x]}{d}$$

Result (type 3, 159 leaves) :

$$a B x-\frac{b B \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}-\frac{a C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+$$
$$\frac{b B \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b C \text{Tan}[c+d x]}{d}$$

Problem 770: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^2 (a+b \text{Sec}[c+d x]) \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 35 leaves, 4 steps) :

$$(b B+a C) x+\frac{b C \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{a B \text{Sin}[c+d x]}{d}$$

Result (type 3, 104 leaves) :

$$b B x+a C x-\frac{b C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{b C \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{a B \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{a B \text{Cos}[c] \text{Sin}[d x]}{d}$$

Problem 776: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (a+b \text{Sec}[c+d x])^2 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 179 leaves, 8 steps) :

$$\frac{\left(8abB+4a^2C+3b^2C\right)\text{ArcTanh}[\text{Sin}[c+dx]]}{8d}+\frac{\left(4a^2bB+4b^3B-a^3C+8ab^2C\right)\text{Tan}[c+dx]}{6bd}+\frac{\left(8abB-2a^2C+9b^2C\right)\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{24d}+\frac{(4bB-aC)\,(a+b\,\text{Sec}[c+dx])^2\,\text{Tan}[c+dx]}{12bd}+\frac{C\,(a+b\,\text{Sec}[c+dx])^3\,\text{Tan}[c+dx]}{4bd}$$

Result (type 3, 457 leaves) :

$$\frac{1}{48d}\left(-6\left(8abB+4a^2C+3b^2C\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+6\left(8abB+4a^2C+3b^2C\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+\frac{3b^2C}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^4}+\frac{12a^2C+8ab(3B+C)+b^2(4B+9C)}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{8b(bB+2aC)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{16\left(3a^2B+2b^2B+4abC\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]}-\frac{3b^2C}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^4}+\frac{8b(bB+2aC)\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}-\frac{12a^2C+8ab(3B+C)+b^2(4B+9C)}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{16\left(3a^2B+2b^2B+4abC\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]}\right)$$

- **Problem 778: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+dx]\,(a+b\,\text{Sec}[c+dx])^2\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 86 leaves, 6 steps) :

$$a^2Bx+\frac{\left(4abB+2a^2C+b^2C\right)\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{b(2bB+3aC)\,\text{Tan}[c+dx]}{2d}+\frac{bC\,(a+b\,\text{Sec}[c+dx])\,\text{Tan}[c+dx]}{2d}$$

Result (type 3, 225 leaves) :

$$\frac{1}{4d}\left(4a^2Bc+4a^2Bdx-2\left(4abB+2a^2C+b^2C\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+8abB\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+4a^2C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+2b^2C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+\frac{b^2C}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}-\frac{b^2C}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+4b(bB+2aC)\,\text{Tan}[c+dx]\right)$$

- **Problem 786: Result more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+dx])^3\left(B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 180 leaves, 7 steps) :

$$\frac{\left(8 a^3 B+12 a b^2 B+12 a^2 b C+3 b^3 C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{\left(16 a^2 b B+4 b^3 B+3 a^3 C+12 a b^2 C\right) \text{Tan}[c+d x]}{6 d}+$$
$$\frac{b \left(20 a b B+6 a^2 C+9 b^2 C\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{24 d}+\frac{(4 b B+3 a C) (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{12 d}+\frac{C (a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 639 leaves) :

$$\frac{\left(-8 a^3 B-12 a b^2 B-12 a^2 b C-3 b^3 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{8 d}+$$
$$\frac{\left(8 a^3 B+12 a b^2 B+12 a^2 b C+3 b^3 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{8 d}+\frac{b^3 C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+$$
$$\frac{36 a b^2 B+4 b^3 B+36 a^2 b C+12 a b^2 C+9 b^3 C}{48 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{b^3 C}{16 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{-36 a b^2 B-4 b^3 B-36 a^2 b C-12 a b^2 C-9 b^3 C}{48 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$
$$\frac{b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a b^2 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a b^2 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$
$$\frac{9 a^2 b B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a^3 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]+6 a b^2 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+$$
$$\frac{9 a^2 b B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+3 a^3 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]+6 a b^2 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}$$

- **Problem 787: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^3 \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 137 leaves, 7 steps) :

$$a^3 B x+\frac{\left(6 a^2 b B+b^3 B+2 a^3 C+3 a b^2 C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+$$
$$\frac{b \left(9 a b B+8 a^2 C+2 b^2 C\right) \text{Tan}[c+d x]}{3 d}+\frac{b^2 (3 b B+5 a C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{6 d}+\frac{b C (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 392 leaves) :

$$\frac{1}{12\,d}\left(12\,a^3\,B\,(c+d\,x)-6\,(6\,a^2\,b\,B+b^3\,B+2\,a^3\,C+3\,a\,b^2\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.$$
$$6\,(6\,a^2\,b\,B+b^3\,B+2\,a^3\,C+3\,a\,b^2\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{b^2\,(9\,a\,C+b\,(3\,B+C))}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{2\,b^3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{4\,b\,(9\,a\,b\,B+9\,a^2\,C+2\,b^2\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+$$
$$\left.\frac{2\,b^3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}-\frac{b^2\,(9\,a\,C+b\,(3\,B+C))}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,b\,(9\,a\,b\,B+9\,a^2\,C+2\,b^2\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

Problem 788: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^3\,(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2)\,dx$$

Optimal (type 3, 131 leaves, 7 steps):

$$a^2\,(3\,b\,B+a\,C)\,x+\frac{b\,(6\,a\,b\,B+6\,a^2\,C+b^2\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+$$
$$\frac{a\,B\,(a+b\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{d}-\frac{b\,(2\,a^2\,B-b^2\,B-3\,a\,b\,C)\,\text{Tan}[c+d\,x]}{d}-\frac{b^2\,(2\,a\,B-b\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 277 leaves):

$$\frac{1}{4\,d}\left(4\,a^2\,(3\,b\,B+a\,C)\,(c+d\,x)-2\,b\,(6\,a\,b\,B+6\,a^2\,C+b^2\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.$$
$$2\,b\,(6\,a\,b\,B+6\,a^2\,C+b^2\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{b^3\,C}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\left.\frac{4\,b^2\,(b\,B+3\,a\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{b^3\,C}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,b^2\,(b\,B+3\,a\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+4\,a^3\,B\,\text{Sin}[c+d\,x]\right)$$

Problem 793: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d\,x]^3\,(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2)}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 187 leaves, 9 steps):

$$\frac{\left(2 a^2+b^2\right) (b B-a C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 b^4 d}-\frac{2 a^3 (b B-a C) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\, b^4 \sqrt{a+b}\, d}-$$

$$\frac{\left(3 a b B-3 a^2 C-2 b^2 C\right) \operatorname{Tan}[c+d x]}{3 b^3 d}+\frac{(b B-a C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 b^2 d}+\frac{C \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 b d}$$

Result (type 3, 422 leaves):

$$\frac{1}{12 b^4 d}\left(\frac{24 a^3 (b B-a C) \operatorname{ArcTanh}\left[\frac{(-a+b) \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}}+6 \left(2 a^2+b^2\right) (-b B+a C) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$

$$6 \left(2 a^2+b^2\right) (-b B+a C) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{b^2 (-3 a C+b (3 B+C))}{\left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$

$$\frac{2 b^3 C \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{4 b \left(-3 a b B+3 a^2 C+2 b^2 C\right) \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}+$$

$$\left.\frac{2 b^3 C \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-\frac{b^2 (-3 a C+b (3 B+C))}{\left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 b \left(-3 a b B+3 a^2 C+2 b^2 C\right) \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]}\right)$$

- **Problem 794: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c+d x]^2 \left(B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{a+b \operatorname{Sec}[c+d x]} \, dx$$

Optimal (type 3, 143 leaves, 8 steps):

$$-\frac{\left(2 a b B-2 a^2 C-b^2 C\right) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 b^3 d}+\frac{2 a^2 (b B-a C) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\, b^3 \sqrt{a+b}\, d}+\frac{(b B-a C) \operatorname{Tan}[c+d x]}{b^2 d}+\frac{C \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 b d}$$

Result (type 3, 300 leaves):

$$\frac{1}{4 b^3 d}\left(\frac{8 a^2 (-b B + a C) \operatorname{ArcTanh}\left[\frac{(-a+b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}} - 2\left(-2 a b B + 2 a^2 C + b^2 C\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] + \right.$$

$$2\left(-2 a b B + 2 a^2 C + b^2 C\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] + \frac{b^2 C}{\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} +$$

$$\left.\frac{4 b (b B - a C) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] - \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]} - \frac{b^2 C}{\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} + \frac{4 b (b B - a C) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] + \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

- **Problem 814: Attempted integration timed out after 120 seconds.**

$$\int \operatorname{Sec}[c+d x]^3 \sqrt{a+b \operatorname{Sec}[c+d x]} \left(B \operatorname{Sec}[c+d x] + C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 485 leaves, 8 steps):

$$-\frac{1}{315 b^5 d} 2 (a-b) \sqrt{a+b} \left(24 a^3 b B + 57 a b^3 B - 16 a^4 C - 24 a^2 b^2 C + 147 b^4 C\right)$$

$$\operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} -$$

$$\frac{1}{315 b^4 d} 2 (a-b) \sqrt{a+b} \left(3 b^3 (25 B - 49 C) + 18 a b^2 (B - 2 C) + 12 a^2 b (2 B - C) - 16 a^3 C\right) \operatorname{Cot}[c+d x]$$

$$\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} -$$

$$\frac{2 \left(12 a^2 b B - 75 b^3 B - 8 a^3 C - 13 a b^2 C\right) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{315 b^3 d} + \frac{2 \left(9 a b B - 6 a^2 C + 49 b^2 C\right) \operatorname{Sec}[c+d x] \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{315 b^2 d} +$$

$$\frac{2 (9 b B + a C) \operatorname{Sec}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{63 b d} + \frac{2 C \operatorname{Sec}[c+d x]^3 \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{9 d}$$

Result (type 1, 1 leaves):

???

- **Problem 815: Attempted integration timed out after 120 seconds.**

$$\int \operatorname{Sec}[c+d x]^2 \sqrt{a+b \operatorname{Sec}[c+d x]} \left(B \operatorname{Sec}[c+d x] + C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 397 leaves, 7 steps):

$$\frac{1}{105 b^4 d} 2 (a-b) \sqrt{a+b} \left(14 a^2 b B - 63 b^3 B - 8 a^3 C - 19 a b^2 C\right) \text{Cot}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{105 b^3 d}$$
$$2 (a-b) \sqrt{a+b} \left(b^2 (63 B - 25 C) + 2 a b (7 B - 3 C) - 8 a^2 C\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 \left(7 a b B - 4 a^2 C + 25 b^2 C\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{105 b^2 d} +$$
$$\frac{2 (7 b B + a C) \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{35 b d} + \frac{2 C \text{Sec}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{7 d}$$

Result (type 1, 1 leaves):

???

Problem 816: Unable to integrate problem.

$$\int \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \left(B \text{Sec}[c+d x] + C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 314 leaves, 6 steps):

$$-\frac{1}{15 b^3 d} 2 (a-b) \sqrt{a+b} \left(5 a b B - 2 a^2 C + 9 b^2 C\right) \text{Cot}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{15 b^2 d}$$
$$2 (a-b) \sqrt{a+b} (5 b B - 2 a C - 9 b C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}}$$
$$\sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 (5 b B - 2 a C) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{15 b d} + \frac{2 C (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{5 b d}$$

Result (type 8, 42 leaves):

$$\int \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \left(B \text{Sec}[c+d x] + C \text{Sec}[c+d x]^2\right) dx$$

Problem 817: Attempted integration timed out after 120 seconds.

$$\int \sqrt{a+b \text{Sec}[c+d x]} \left(B \text{Sec}[c+d x] + C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 256 leaves, 5 steps) :

$$-\frac{1}{3 b^2 d}2 (a-b) \sqrt{a+b} (3 b B+a C) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 b d}2 (a-b) \sqrt{a+b} (3 B-C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 C \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3 d}$$

Result (type 1, 1 leaves) :

???

- **Problem 818: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 320 leaves, 6 steps) :

$$-\frac{1}{b d}2 (a-b) \sqrt{a+b} C \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{b d}2 \sqrt{a+b} (b (B-C)+a C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{2 \sqrt{a+b} B \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{d}$$

Result (type 4, 863 leaves) :

$$\frac{2\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{d}+$$

$$\left(2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(a\,\sqrt{\frac{-a+b}{a+b}}\,\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b\,\sqrt{\frac{-a+b}{a+b}}\,\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-2\,a\,\sqrt{\frac{-a+b}{a+b}}\,\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+\right.\right.$$

$$a\,\sqrt{\frac{-a+b}{a+b}}\,\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-b\,\sqrt{\frac{-a+b}{a+b}}\,\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+2\,\mathbb{i}\,a\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\,+$$

$$2\,\mathbb{i}\,a\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\,-\mathbb{i}\,(a-b)\,C\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\,-$$

$$\mathbb{i}\,(a-b)\,(B-C)\,\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

- **Problem 819: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 344 leaves, 7 steps):

$$\frac{(a-b) \sqrt{a+b}\, B \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{b d}+$$

$$\frac{\sqrt{a+b}\, (B+2 C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}}{d}-\frac{1}{a d}$$

$$\sqrt{a+b}\, (b B+2 a C) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{B \sqrt{a+b \text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{d}$$

Result (type 4, 1107 leaves):

$$\left(\sqrt{a+b \text{Sec}[c+d x]} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(a \sqrt{\frac{-a+b}{a+b}}\, B \text{Tan}\left[\frac{1}{2} (c+d x)\right]+b \sqrt{\frac{-a+b}{a+b}}\, B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-2 a \sqrt{\frac{-a+b}{a+b}}\, B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+a \sqrt{\frac{-a+b}{a+b}}\, B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-\right.$$

$$b \sqrt{\frac{-a+b}{a+b}}\, B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-2 i b B \text{EllipticPi}\left[-\frac{a+b}{a-b}, i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-4 i a C \text{EllipticPi}\left[-\frac{a+b}{a-b}, i \text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}} \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$2\,i\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,i\,a\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$i\,(a-b)\,B\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,(a-b)\,C\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)$$

- **Problem 820: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 429 leaves, 8 steps):

$$\frac{1}{4\,a\,b\,d}(a-b)\sqrt{a+b}\,(b\,B+4\,a\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{4\,a\,d}\sqrt{a+b}\,(b\,B+2\,a\,(B+2\,C))\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{4\,a^2\,d}\sqrt{a+b}\,\left(4\,a^2\,B-b^2\,B+4\,a\,b\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\Big[\frac{a+b}{a},\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\Big],\frac{a+b}{a-b}\Big]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{(b\,B+4\,a\,C)\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,a\,d}+\frac{B\,\mathrm{Cos}[c+d\,x]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1161 leaves) :

$$\frac{B\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[2\,(c+d\,x)]}{4\,d}+\left(\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(a\,b\,B\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+b^2\,B\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+4\,a^2\,C\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]+4\,a\,b\,C\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]-2\,a\,b\,B\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^3-\right.$$

$$8\,a^2\,C\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^3+a\,b\,B\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^5-b^2\,B\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^5+4\,a^2\,C\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^5-4\,a\,b\,C\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^5-$$

$$8\,a^2\,B\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,b^2\,B\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$8\,a\,b\,C\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$8\,a^2\,B\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-8\,a\,b\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\,(b\,B+4\,a\,C)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,a\,(2\,a\,B-b\,B+4\,b\,C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\,a\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 821: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 573 leaves, 9 steps) :

$$-\frac{1}{3465\,b^5\,d}2\,(a-b)\,\sqrt{a+b}\,\left(88\,a^4\,b\,B+363\,a^2\,b^3\,B+1617\,b^5\,B-48\,a^5\,C-108\,a^3\,b^2\,C+2088\,a\,b^4\,C\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{3465\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(3\,a\,b^3\,(143\,B-471\,C)-3\,b^4\,(539\,B-225\,C)+6\,a^2\,b^2\,(11\,B-24\,C)+4\,a^3\,b\,(22\,B-9\,C)-48\,a^4\,C\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$

$$\frac{2\,\left(88\,a^3\,b\,B+429\,a\,b^3\,B-48\,a^4\,C-144\,a^2\,b^2\,C+675\,b^4\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3465\,b^3\,d}+$$

$$\frac{2\,\left(88\,a^2\,b\,B+539\,b^3\,B-48\,a^3\,C-204\,a\,b^2\,C\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{3465\,b^3\,d}-\frac{2\,\left(44\,a\,b\,B-24\,a^2\,C-81\,b^2\,C\right)\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{693\,b^3\,d}+$$

$$\frac{2\,(11\,b\,B-6\,a\,C)\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{99\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{11\,b\,d}$$

Result (type 1, 1 leaves) :

???

Problem 822: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 475 leaves, 8 steps) :

$$\frac{1}{315\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(18\,a^3\,b\,B-246\,a\,b^3\,B-8\,a^4\,C-33\,a^2\,b^2\,C-147\,b^4\,C\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{315\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(3\,b^3\,(25\,B-49\,C)-3\,a\,b^2\,(57\,B-13\,C)-6\,a^2\,b\,(3\,B-C)+8\,a^3\,C\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{2\,\left(18\,a^2\,b\,B-75\,b^3\,B-8\,a^3\,C-39\,a\,b^2\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}-\frac{2\,\left(18\,a\,b\,B-8\,a^2\,C-49\,b^2\,C\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}+$$

$$\frac{2\,(9\,b\,B-4\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{63\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{9\,b\,d}$$

Result (type 1, 1 leaves):

???

- **Problem 823: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 387 leaves, 7 steps):

$$-\frac{1}{105\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(21\,a^2\,b\,B+63\,b^3\,B-6\,a^3\,C+82\,a\,b^2\,C\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{105\,b^2\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,\left(a\,b\,(21\,B-57\,C)-b^2\,(63\,B-25\,C)-6\,a^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(21\,a\,b\,B-6\,a^2\,C+25\,b^2\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b\,d}+$$

$$\frac{2\,(7\,b\,B-2\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,b\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 824: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Sec}[c+d\,x])^{3/2}\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 312 leaves, 6 steps):

$$-\frac{1}{15\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(20\,a\,b\,B+3\,a^2\,C+9\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,b\,d}2\,(a-b)\,\sqrt{a+b}\,(15\,a\,B-5\,b\,B-3\,a\,C+9\,b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(5\,b\,B+3\,a\,C)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 1, 1 leaves):

???

Problem 826: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 361 leaves, 7 steps):

$$\frac{1}{b\,d}(a-b)\,\sqrt{a+b}\,(a\,B-2\,b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{d}\sqrt{a+b}\,(2\,b\,(B-C)+a\,(B+4\,C))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}\sqrt{a+b}\,(3\,b\,B+2\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{a\,B\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 979 leaves):

$$\frac{2\, b\, C \,\text{Cos}[c+d\,x]\, (a+b\,\text{Sec}[c+d\,x])^{3/2}\, \text{Sin}[c+d\,x]}{d\, (b+a\,\text{Cos}[c+d\,x])} +$$

$$\Bigg((a+b\,\text{Sec}[c+d\,x])^{3/2} \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\; \Bigg(a^2\, B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right] + a\, b\, B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right] - 2\, a\, b\, C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right] - 2\, b^2\, C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right] -$$

$$2\, a^2\, B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3 + 4\, a\, b\, C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3 + a^2\, B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - a\, b\, B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - 2\, a\, b\, C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 +$$

$$2\, b^2\, C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - 6\, a\, b\, B\,\text{EllipticPi}\left[-1,\, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\, \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} - 4\, a^2\, C\,\text{EllipticPi}\left[-1,\, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\, \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} - 6\, a\, b\, B\,\text{EllipticPi}\left[-1,\, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\, \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\; \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} - 4\, a^2\, C\,\text{EllipticPi}\left[-1,\, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\, \frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\; \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} +$$

$$(a+b)\, (a\,B-2\,b\,C)\, \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\, \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\; \left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} - 2\, \left(2\, a\, b\, (B-C) + a^2\, C - b^2\, (B+C)\right)\, \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\, \frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\; \left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right) \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\; \Bigg)\Bigg) \Big/$$

$$\left(d\, (b+a\,\text{Cos}[c+d\,x])^{3/2}\, \text{Sec}[c+d\,x]^{3/2} \left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}} \right)$$

- **Problem 827: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]^3\,(a+b\operatorname{Sec}[c+d x])^{3/2}\left(B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)dx$$

Optimal (type 4, 428 leaves, 8 steps):

$$\frac{1}{4 b d}(a-b)\sqrt{a+b}\,(5 b B+4 a C)\operatorname{Cot}[c+d x]\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\operatorname{Sec}[c+d x])}{a-b}}+$$
$$\frac{1}{4 d}\sqrt{a+b}\,(2 a B+5 b B+4 a C+8 b C)\operatorname{Cot}[c+d x]\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{4 a d}\sqrt{a+b}\left(4 a^2 B+3 b^2 B+12 a b C\right)\operatorname{Cot}[c+d x]$$
$$\operatorname{EllipticPi}\left[\frac{a+b}{a},\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\operatorname{Sec}[c+d x])}{a-b}}+$$
$$\frac{(5 b B+4 a C)\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{4 d}+\frac{a B\operatorname{Cos}[c+d x]\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{2 d}$$

Result (type 4, 1580 leaves):

$$\frac{a B\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[2\,(c+d x)]}{4 d}-$$
$$\Bigg(\sqrt{a+b\operatorname{Sec}[c+d x]}\Bigg(5 a b\sqrt{\frac{-a+b}{a+b}}\,B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+5 b^2\sqrt{\frac{-a+b}{a+b}}\,B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+4 a^2\sqrt{\frac{-a+b}{a+b}}\,C\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+$$
$$4 a b\sqrt{\frac{-a+b}{a+b}}\,C\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-10 a b\sqrt{\frac{-a+b}{a+b}}\,B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-8 a^2\sqrt{\frac{-a+b}{a+b}}\,C\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$
$$5 a b\sqrt{\frac{-a+b}{a+b}}\,B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-5 b^2\sqrt{\frac{-a+b}{a+b}}\,B\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+4 a^2\sqrt{\frac{-a+b}{a+b}}\,C\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$4 a b\sqrt{\frac{-a+b}{a+b}}\,C\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-8\,\mathrm{i}\,a^2 B\operatorname{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$
$$\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-6\,\mathrm{i}\,b^2 B\operatorname{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-24\,i\,a\,b\,C\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$8\,i\,a^2\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-6\,i\,b^2\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$24\,i\,a\,b\,C\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-i\,(a-b)\,(5\,b\,B+4\,a\,C)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,i\,(a-b)\,(2\,a\,B+b\,(B+4\,C))\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{b+a\,\mathrm{Cos}[c+d x]}\,\sqrt{\mathrm{Sec}[c+d x]}\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\Bigg)$$

Problem 828: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 520 leaves, 9 steps):

$$\frac{1}{24\,a\,b\,d}(a-b)\,\sqrt{a+b}\,\left(16\,a^2\,B+3\,b^2\,B+30\,a\,b\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,a\,d}\sqrt{a+b}\,\left(16\,a^2\,B+14\,a\,b\,B+3\,b^2\,B+12\,a^2\,C+30\,a\,b\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$
$$\frac{1}{8\,a^2\,d}\sqrt{a+b}\,\left(12\,a^2\,b\,B-b^3\,B+8\,a^3\,C+6\,a\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(16\,a^2\,B+3\,b^2\,B+30\,a\,b\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,a\,d}+$$
$$\frac{(7\,b\,B+6\,a\,C)\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d}+\frac{a\,B\,\text{Cos}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1532 leaves):

$$\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(\frac{1}{12}\,a\,B\,\text{Sin}[c+d\,x]+\frac{1}{24}\,(7\,b\,B+6\,a\,C)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{12}\,a\,B\,\text{Sin}[3\,(c+d\,x)]\right)}{d}+$$
$$\Bigg(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\Bigg(16\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$3\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+30\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+30\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-32\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$
$$6\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-60\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-16\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$3\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - 3\,b^3\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 + 30\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - 30\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 -$$

$$72\,a^2\,b\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} +$$

$$6\,b^3\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} -$$

$$48\,a^3\,C\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} -$$

$$36\,a\,b^2\,C\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} -$$

$$72\,a^2\,b\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} + 6\,b^3\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} - 48\,a^3\,C\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} -$$

$$36\,a\,b^2\,C\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} + (a+b)\,\left(16\,a^2\,B+3\,b^2\,B+30\,a\,b\,C\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}} -$$

$$2\,a\,\left(a\,b\,(26\,B-6\,C)+12\,a^2\,C+b^2\,(-7\,B+24\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\left(24\,a\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

Problem 829: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 565 leaves, 9 steps):

$$\frac{1}{3465\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(110\,a^4\,b\,B-3069\,a^2\,b^3\,B-1617\,b^5\,B-40\,a^5\,C-255\,a^3\,b^2\,C-3705\,a\,b^4\,C\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{3465\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(6\,a\,b^3\,(209\,B-505\,C)-3\,b^4\,(539\,B-225\,C)-a^3\,b\,(110\,B-30\,C)-15\,a^2\,b^2\,(121\,B-19\,C)+40\,a^4\,C\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{2\,\left(110\,a^3\,b\,B-1254\,a\,b^3\,B-40\,a^4\,C-285\,a^2\,b^2\,C-675\,b^4\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3465\,b^2\,d}\,-$$

$$\frac{2\,\left(110\,a^2\,b\,B-539\,b^3\,B-40\,a^3\,C-335\,a\,b^2\,C\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{3465\,b^2\,d}-\frac{2\,\left(22\,a\,b\,B-8\,a^2\,C-81\,b^2\,C\right)\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{693\,b^2\,d}+$$

$$\frac{2\,(11\,b\,B-4\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{99\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{11\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 830: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 469 leaves, 8 steps):

$$-\frac{1}{315 b^3 d} 2 (a-b) \sqrt{a+b} \left(45 a^3 b B + 435 a b^3 B - 10 a^4 C + 279 a^2 b^2 C + 147 b^4 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{315 b^2 d} 2 (a-b) \sqrt{a+b} \left(3 b^3 (25 B - 49 C) - 6 a b^2 (60 B - 19 C) + 15 a^2 b (3 B - 11 C) - 10 a^3 C\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 \left(45 a^2 b B + 75 b^3 B - 10 a^3 C + 114 a b^2 C\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{315 b d} + \frac{2 \left(45 a b B - 10 a^2 C + 49 b^2 C\right) (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{315 b d} + \frac{2 (9 b B - 2 a C) (a+b \text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x]}{63 b d} + \frac{2 C (a+b \text{Sec}[c+d x])^{7/2} \text{Tan}[c+d x]}{9 b d}$$

Result (type 1, 1 leaves) :

???

Problem 831: Attempted integration timed out after 120 seconds.

$$\int (a+b \text{Sec}[c+d x])^{5/2} \left(B \text{Sec}[c+d x] + C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 384 leaves, 7 steps) :

$$-\frac{1}{105 b^2 d} 2 (a-b) \sqrt{a+b} \left(161 a^2 b B + 63 b^3 B + 15 a^3 C + 145 a b^2 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{105 b d} 2 (a-b) \sqrt{a+b} \left(b^2 (63 B - 25 C) - 8 a b (7 B - 15 C) + 15 a^2 (7 B - C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 \left(56 a b B + 15 a^2 C + 25 b^2 C\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{105 d} + \frac{2 (7 b B + 5 a C) (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{35 d} + \frac{2 C (a+b \text{Sec}[c+d x])^{5/2} \text{Tan}[c+d x]}{7 d}$$

Result (type 1, 1 leaves) :

???

Problem 833: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^2 (a+b \text{Sec}[c+d x])^{5/2} \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 433 leaves, 8 steps):

$$\frac{1}{3 b d}(a-b) \sqrt{a+b} \left(3 a^2 B-6 b^2 B-14 a b C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 d}\sqrt{a+b} \left(2 a b (9 B-7 C)-2 b^2 (3 B-C)+3 a^2 (B+6 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{d} a \sqrt{a+b} (5 b B+2 a C) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{a B (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{d}-\frac{b (3 a B-2 b C) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3 d}$$

Result (type 4, 1146 leaves):

$$\left((a+b \text{Sec}[c+d x])^{5/2} \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(3 a^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]+3 a^2 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-6 a b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-6 b^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-14 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]-\right.$$

$$14 a b^2 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]-6 a^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+12 a b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+28 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+3 a^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-$$

$$3 a^2 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-6 a b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+6 b^3 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-14 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+14 a b^2 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-$$

$$30 a^2 b B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$12 a^3 C \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}-$$

$$30\,a^2\,b\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$
$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-12\,a^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$
$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$
$$(a+b)\,\left(3\,a^2\,B-6\,b^2\,B-14\,a\,b\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$
$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$2\,\left(9\,a^2\,b\,(B-C)+3\,a^3\,C-b^3\,(3\,B+C)-a\,b^2\,(9\,B+7\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\Bigg)\Bigg)\Bigg/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\,+$$
$$\frac{\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(\frac{2}{3}\,b\,(3\,b\,B+7\,a\,C)\,\text{Sin}[c+d\,x]+\frac{2}{3}\,b^2\,C\,\text{Tan}[c+d\,x]\right)}{d\,(b+a\,\text{Cos}[c+d\,x])^2}$$

Problem 834: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 450 leaves, 8 steps) :

$$\frac{1}{4\,b\,d}(a-b)\sqrt{a+b}\left(9\,a\,b\,B+4\,a^2\,C-8\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,d}\sqrt{a+b}\left(8\,b^2\,(B-C)+2\,a^2\,(B+2\,C)+3\,a\,b\,(3\,B+8\,C)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\left(4\,a^2\,B+15\,b^2\,B+20\,a\,b\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{a\,(7\,b\,B+4\,a\,C)\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}+\frac{a\,B\,\mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1338 leaves) :

$$\frac{\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(2\,b^2\,C\,\mathrm{Sin}[c+d\,x]+\frac{1}{4}\,a^2\,B\,\mathrm{Sin}[2\,(c+d\,x)]\right)}{d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}+$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\left(9\,a^2\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.\right.$$

$$4\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-8\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-8\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-18\,a^2\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$8\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+9\,a^2\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-9\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$4\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-4\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+8\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$8\,a^3\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$30\,a\,b^2\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$40\,a^2\,b\,C\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8 a^3 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$
$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} - 30 a b^2 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$
$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$
$$40 a^2 b C \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$
$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + (a+b)\left(9 a b B+4 a^2 C-8 b^2 C\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$
$$2\left(2 a^3 B-a^2 b(B-12 C)+12 a b^2(B-C)-4 b^3(B+C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$
$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$
$$\left(4 d (b+a \text{Cos}[c+d x])^{5/2} \text{Sec}[c+d x]^{5/2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

- **Problem 835: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^{5/2} \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 518 leaves, 9 steps) :

$$\frac{1}{24\,b\,d}(a-b)\sqrt{a+b}\,\left(16\,a^2\,B+33\,b^2\,B+54\,a\,b\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,d}\sqrt{a+b}\,\left(4\,a^2\,(4\,B+3\,C)+3\,b^2\,(11\,B+16\,C)+a\,b\,(26\,B+54\,C)\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{8\,a\,d}\sqrt{a+b}\,\left(20\,a^2\,b\,B+5\,b^3\,B+8\,a^3\,C+30\,a\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(16\,a^2\,B+33\,b^2\,B+54\,a\,b\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+$$

$$\frac{a\,(3\,b\,B+2\,a\,C)\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{a\,B\,\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1546 leaves) :

$$\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(\frac{1}{12}\,a^2\,B\,\text{Sin}[c+d\,x]+\frac{1}{24}\,a\,(13\,b\,B+6\,a\,C)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{12}\,a^2\,B\,\text{Sin}[3\,(c+d\,x)]\right)}{d}+$$

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(16\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+33\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+33\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+54\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$54\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-32\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-66\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-108\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+16\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$16\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+33\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-33\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+54\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-54\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$120\,a^2\,b\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$30\,b^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$48\,a^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$180\,a\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$120\,a^2\,b\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$
$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-30\,b^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-48\,a^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$
$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$180\,a\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$
$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+(a+b)\,\left(16\,a^2\,B+33\,b^2\,B+54\,a\,b\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$2\,\left(a^2\,b\,(38\,B-6\,C)+24\,b^3\,(B-C)+12\,a^3\,C+a\,b^2\,(-13\,B+72\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$
$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(24\, d\, \sqrt{b+a\, \text{Cos}[c+d\, x]}\, \sqrt{\text{Sec}[c+d\, x]}\, \left(1+\text{Tan}\left[\frac{1}{2}\, (c+d\, x)\right]^2\right)^{3/2} \sqrt{\frac{a+b-a\, \text{Tan}\left[\frac{1}{2}\, (c+d\, x)\right]^2+b\, \text{Tan}\left[\frac{1}{2}\, (c+d\, x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\, (c+d\, x)\right]^2}}\right)$$

Problem 837: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d\, x]^3\, \left(B\, \text{Sec}[c+d\, x]+C\, \text{Sec}[c+d\, x]^2\right)}{\sqrt{a+b\, \text{Sec}[c+d\, x]}}\, dx$$

Optimal (type 4, 411 leaves, 7 steps):

$$-\frac{1}{105\, b^5\, d} 2\, (a-b)\, \sqrt{a+b}\, \left(56\, a^2\, b\, B+63\, b^3\, B-48\, a^3\, C-44\, a\, b^2\, C\right)\, \text{Cot}[c+d\, x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right],\, \frac{a+b}{a-b}\right]\, \sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}}\, -\, \frac{1}{105\, b^4\, d}$$

$$2\, \sqrt{a+b}\, \left(b^3\, (63\, B-25\, C)-48\, a^3\, C+4\, a^2\, b\, (14\, B+3\, C)-2\, a\, b^2\, (7\, B+22\, C)\right)\, \text{Cot}[c+d\, x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Sec}[c+d\, x]}}{\sqrt{a+b}}\right],\, \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{-\frac{b\, (1+\text{Sec}[c+d\, x])}{a-b}}\, -\, \frac{2\, \left(28\, a\, b\, B-24\, a^2\, C-25\, b^2\, C\right)\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{105\, b^3\, d}\, +$$

$$\frac{2\, (7\, b\, B-6\, a\, C)\, \text{Sec}[c+d\, x]\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{35\, b^2\, d}+\frac{2\, C\, \text{Sec}[c+d\, x]^2\, \sqrt{a+b\, \text{Sec}[c+d\, x]}\, \text{Tan}[c+d\, x]}{7\, b\, d}$$

Result (type 1, 1 leaves):

???

Problem 838: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d\, x]^2\, \left(B\, \text{Sec}[c+d\, x]+C\, \text{Sec}[c+d\, x]^2\right)}{\sqrt{a+b\, \text{Sec}[c+d\, x]}}\, dx$$

Optimal (type 4, 329 leaves, 6 steps):

$$\frac{1}{15 b^4 d} 2 (a-b) \sqrt{a+b} \left(10 a b B - 8 a^2 C - 9 b^2 C\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{15 b^3 d} 2 \sqrt{a+b} \left(b^2 (5 B - 9 C) - 8 a^2 C + 2 a b (5 B + C)\right)$$

$$\text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{2 (5 b B - 4 a C) \sqrt{a+b \, \text{Sec}[c+d x]} \, \text{Tan}[c+d x]}{15 b^2 d} + \frac{2 C \, \text{Sec}[c+d x] \sqrt{a+b \, \text{Sec}[c+d x]} \, \text{Tan}[c+d x]}{5 b d}$$

Result (type 8, 44 leaves) :

$$\int \frac{\text{Sec}[c+d x]^2 \left(B \, \text{Sec}[c+d x] + C \, \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \, \text{Sec}[c+d x]}} \, dx$$

- **Problem 839: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d x] \left(B \, \text{Sec}[c+d x] + C \, \text{Sec}[c+d x]^2\right)}{\sqrt{a+b \, \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 261 leaves, 5 steps) :

$$-\frac{1}{3 b^3 d}$$

$$2 (a-b) \sqrt{a+b} (3 b B - 2 a C) \, \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} -$$

$$\frac{1}{3 b^2 d} 2 \sqrt{a+b} (3 b B - 2 a C - b C) \, \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{2 C \sqrt{a+b \, \text{Sec}[c+d x]} \, \text{Tan}[c+d x]}{3 b d}$$

Result (type 1, 1 leaves) :

???

- **Problem 840: Unable to integrate problem.**

$$\int \frac{B \, \text{Sec}[c+d x] + C \, \text{Sec}[c+d x]^2}{\sqrt{a+b \, \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 210 leaves, 4 steps) :

$$-\frac{1}{b^2 d}2\,(a-b)\,\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\sqrt{a+b}\;(B-C)\;\text{Cot}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{b\,d}$$

Result (type 8, 36 leaves) :

$$\int\frac{B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 842: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 348 leaves, 7 steps) :

$$\frac{(a-b)\,\sqrt{a+b}\;B\,\text{Cot}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,d}+$$

$$\frac{\sqrt{a+b}\;B\,\text{Cot}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}+\frac{1}{a^2 d}$$

$$\sqrt{a+b}\;(b\,B-2\,a\,C)\;\text{Cot}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{B\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{a\,d}$$

Result (type 4, 1027 leaves) :

$$\Bigg(\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\;\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\Bigg(a\sqrt{\frac{-a+b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+b\sqrt{\frac{-a+b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-$$

$$a\sqrt{\frac{-a+b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+b\sqrt{\frac{-a+b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+$$

$$2\,i\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$4\,i\,a\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,i\,a\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-i\,(a-b)\,B\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,i\,(b\,B-a\,C)$$

$$\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\;d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

Problem 843: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^3 \left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 471 leaves, 7 steps):

$$\frac{1}{15 b^5 \sqrt{a+b}\, d} 2 \left(40 a^3 b B-25 a b^3 B-48 a^4 C+24 a^2 b^2 C+9 b^4 C\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{15 b^4 \sqrt{a+b}\, d} 2 \left(b^3 (5 B-9 C)+4 a^2 b (10 B-9 C)+6 a b^2 (5 B-2 C)-48 a^3 C\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a (b B-a C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{2 \left(20 a^2 b B-5 b^3 B-24 a^3 C+9 a b^2 C\right) \sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{15 b^3 \left(a^2-b^2\right) d}-\frac{2 \left(5 a b B-6 a^2 C+b^2 C\right) \text{Sec}[c+d x] \sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{5 b^2 \left(a^2-b^2\right) d}$$

Result (type 1, 1 leaves):

???

Problem 844: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 \left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 329 leaves, 6 steps):

$$-\frac{1}{3 b^4 \sqrt{a+b}\, d} 2 \left(6 a^2 b B-3 b^3 B-8 a^3 C+5 a b^2 C\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{3 b^3 \sqrt{a+b}\, d} 2 (2 a+b) (3 b B-4 a C-b C) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{2 a^2 (b B-a C)\,\text{Tan}[c+d x]}{b^2 \left(a^2-b^2\right) d \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{2 C \sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{3 b^2 d}$$

Result (type 1, 1 leaves):

???

- **Problem 845: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d x]\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 275 leaves, 5 steps):

$$\frac{1}{b^3\sqrt{a+b}\,d}2\left(a b B-2 a^2 C+b^2 C\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{b^2\sqrt{a+b}\,d}2(b(B-C)-2 a C)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a(b B-a C)\text{Tan}[c+d x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

- **Problem 846: Attempted integration timed out after 120 seconds.**

$$\int \frac{B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 254 leaves, 5 steps):

$$-\frac{2(b B-a C)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}}{b^2\sqrt{a+b}\,d}+\frac{2(B+C)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}}{b\sqrt{a+b}\,d}-\frac{2(b B-a C)\text{Tan}[c+d x]}{\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

- **Problem 847: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 376 leaves, 7 steps):

$$\frac{2\,(b\,B-a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,\sqrt{a+b}\,d}-$$
$$\frac{2\,(b\,B-a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,b\,\sqrt{a+b}\,d}-$$
$$\frac{2\,\sqrt{a+b}\,B\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{2\,b\,(b\,B-a\,C)\,\text{Tan}[c+d\,x]}{a\,(a^2-b^2)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1445 leaves):

$$\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\left(\frac{2\,(-b\,B+a\,C)\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)}-\frac{2\,(-b^2\,B\,\text{Sin}[c+d\,x]+a\,b\,C\,\text{Sin}[c+d\,x])}{a\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d\,x])}\right)}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\left(2\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$
$$\left(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a^2\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a\,b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$
$$2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+2\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$
$$b^2\,\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-a^2\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$
$$2\,i\,a^2\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$
$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,b^2\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$2\,i\,a^2\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{a+b}{a-b}\right]\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\ \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +2\,i\,b^2\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\ \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +$$

$$i\,(a-b)\,(-b\,B+a\,C)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +i\,(a-b)\,(2\,b\,B+a\,(B-C))\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\sqrt{\frac{-a+b}{a+b}}\ \left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d x]}\ \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 848: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d x]^2\left(B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 427 leaves, 8 steps):

$$\frac{1}{a^2 b \sqrt{a+b}\, d}\left(a^2 B - 3 b^2 B + 2 a b C\right) \text{Cot}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{1}{a^2 \sqrt{a+b}\, d}\,(3 b B + a\,(B - 2 C))\, \text{Cot}[c+d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{1}{a^3 d}\sqrt{a+b}\,\,(3 b B - 2 a C)\, \text{Cot}[c+d x] \,\text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{B\,\text{Sin}[c+d x]}{a\, d \sqrt{a+b\,\text{Sec}[c+d x]}} + \frac{b\left(a^2 B - 3 b^2 B + 2 a b C\right) \text{Tan}[c+d x]}{a^2 \left(a^2-b^2\right) d \sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 1613 leaves) :

$$\frac{(b + a\,\text{Cos}[c+d x])^2\, \text{Sec}[c+d x]^2 \left(-\frac{2 b\,(b B - a C)\,\text{Sin}[c+d x]}{a^2\,(-a^2+b^2)} + \frac{2\left(-b^3 B\,\text{Sin}[c+d x] + a b^2 C\,\text{Sin}[c+d x]\right)}{a^2\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d x])}\right)}{d\,(a + b\,\text{Sec}[c+d x])^{3/2}} -$$

$$\left((b + a\,\text{Cos}[c+d x])^{3/2}\, \text{Sec}[c+d x]^{3/2} \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(a^3 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] + a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - 3 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - 3 b^3 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] + 2 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] +\right.$$

$$2 a b^2 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - 2 a^3 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 + 6 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 - 4 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 + a^3 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 -$$

$$a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 - 3 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 + 3 b^3 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 + 2 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 - 2 a b^2 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5 +$$

$$6 a^2 b B\,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$6 b^3 B\,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$4 a^3 C\,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 + b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$4\,a\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$6\,a^2\,b\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-6\,b^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$4\,a^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+4\,a\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$(a+b)\,\left(a^2\,B-3\,b^2\,B+2\,a\,b\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-2\,a\,(a+b)\,(-b\,B+a\,C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a^2\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\sqrt{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 849: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d x]^3 \left(B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right)}{(a+b \,\text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 509 leaves, 7 steps):

$$-\frac{1}{3 (a-b) b^5 (a+b)^{3/2} d} 2 \left(8 a^4 b B-15 a^2 b^3 B+3 b^5 B-16 a^5 C+28 a^3 b^2 C-8 a b^4 C\right) \text{Cot}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{3 b^4 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(a^3 b (8 B-12 C)-9 a b^3 (B-C)-b^4 (3 B-C)-16 a^4 C+2 a^2 b^2 (3 B+8 C)\right) \text{Cot}[c+d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 a (b B-a C) \,\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \,\text{Sec}[c+d x])^{3/2}} - \frac{2 a^2 \left(3 a^2 b B-7 b^3 B-6 a^3 C+10 a b^2 C\right) \text{Tan}[c+d x]}{3 b^3 \left(a^2-b^2\right)^2 d \sqrt{a+b \,\text{Sec}[c+d x]}} - \frac{2 \left(a b B-2 a^2 C+b^2 C\right) \sqrt{a+b \,\text{Sec}[c+d x]} \,\text{Tan}[c+d x]}{3 b^3 \left(a^2-b^2\right) d}$$

Result (type 1, 1 leaves):

???

Problem 850: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 \left(B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right)}{(a+b \,\text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 417 leaves, 6 steps):

$$\frac{1}{3 (a-b) b^4 (a+b)^{3/2} d} 2 \left(2 a^3 b B-6 a b^3 B-8 a^4 C+15 a^2 b^2 C-3 b^4 C\right) \text{Cot}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 b^3 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^2 b (B-3 C)-3 b^3 (B-C)-8 a^3 C+3 a b^2 (B+3 C)\right) \text{Cot}[c+d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{2 a^2 (b B-a C) \,\text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right) d (a+b \,\text{Sec}[c+d x])^{3/2}} + \frac{2 a \left(2 a^2 b B-6 b^3 B-5 a^3 C+9 a b^2 C\right) \text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \,\text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 851: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x] \left(B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 387 leaves, 6 steps):

$$\frac{1}{3 (a-b) b^3 (a+b)^{3/2} d} 2 \left(a^2 b B+3 b^3 B+2 a^3 C-6 a b^2 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 b^2 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^2 C-3 b^2 (B+C)+a b (B+3 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a (b B-a C) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}}+\frac{2 \left(a^2 b B+3 b^3 B+2 a^3 C-6 a b^2 C\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 852: Unable to integrate problem.

$$\int \frac{B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 353 leaves, 6 steps):

$$-\frac{1}{3 (a-b) b^2 (a+b)^{3/2} d} 2 \left(4 a b B-a^2 C-3 b^2 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 (a-b) b (a+b)^{3/2} d} 2 (3 a B-b B+a C-3 b C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{2 (b B-a C) \text{Tan}[c+d x]}{3 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}}-\frac{2 \left(4 a b B-a^2 C-3 b^2 C\right) \text{Tan}[c+d x]}{3 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 36 leaves):

$$\int \frac{B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

- **Problem 853: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c+d x] \left(B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 495 leaves, 8 steps):

$$\frac{1}{3 a^2 (a-b) b (a+b)^{3/2} d} 2 \left(7 a^2 b B-3 b^3 B-4 a^3 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{1}{3 a^2 (a-b) b (a+b)^{3/2} d} 2 \left(6 a^2 b B-a b^2 B-3 b^3 B-3 a^3 C+a^2 b C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{2 \sqrt{a+b}\, B \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{a^3 d} + \frac{2 b (b B-a C) \operatorname{Tan}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^{3/2}} + \frac{2 b \left(7 a^2 b B-3 b^3 B-4 a^3 C\right) \operatorname{Tan}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 4, 2039 leaves):

$$\frac{1}{d (a+b \operatorname{Sec}[c+d x])^{5/2}} (b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x]^3 \left(\frac{2 \left(-7 a^2 b B+3 b^3 B+4 a^3 C\right) \operatorname{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2} - \frac{2 \left(b^3 B \operatorname{Sin}[c+d x]-a b^2 C \operatorname{Sin}[c+d x]\right)}{3 a^2 \left(a^2-b^2\right) (b+a \operatorname{Cos}[c+d x])^2} - \frac{2 \left(-8 a^2 b^2 B \operatorname{Sin}[c+d x]+4 b^4 B \operatorname{Sin}[c+d x]+5 a^3 b C \operatorname{Sin}[c+d x]-a b^3 C \operatorname{Sin}[c+d x]\right)}{3 a^2 \left(a^2-b^2\right)^2 (b+a \operatorname{Cos}[c+d x])}\right) +$$

$$\left(2 (b+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2} \sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\Bigg(7\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+7\,a^2\,b^2\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-3\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$3\,b^4\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-4\,a^4\,\sqrt{\frac{-a+b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-4\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$14\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+6\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+8\,a^4\,\sqrt{\frac{-a+b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$

$$7\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-7\,a^2\,b^2\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,a\,b^3\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$3\,b^4\,\sqrt{\frac{-a+b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-4\,a^4\,\sqrt{\frac{-a+b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+4\,a^3\,b\,\sqrt{\frac{-a+b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$6\,i\,a^4\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+12\,i\,a^2\,b^2\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$6\,i\,b^4\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-6\,i\,a^4\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$12\,\mathrm{i}\,a^2\,b^2\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-6\,\mathrm{i}\,b^4\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$\mathrm{i}\,(a-b)\,\left(-7\,a^2\,b\,B+3\,b^3\,B+4\,a^3\,C\right)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$\mathrm{i}\,(a-b)\,\left(-4\,a\,b^2\,B-6\,b^3\,B+3\,a^3\,(B-C)+a^2\,b\,(9\,B+C)\right)\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\Bigg)\Bigg)\Bigg/$$

$$\left(3\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 854: Attempted integration timed out after 120 seconds.**

$$\int\frac{B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 446 leaves, 7 steps) :

$$-\frac{1}{15\,(a-b)^2\,b^2\,(a+b)^{5/2}\,d}2\left(23\,a^2\,b\,B+9\,b^3\,B-3\,a^3\,C-29\,a\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,b\,\sqrt{a+b}\,\left(a^2-b^2\right)^2\,d}2\left(3\,a^2\,(5\,B+C)-8\,a\,b\,(B+3\,C)+b^2\,(9\,B+5\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$
$$\frac{2\,(b\,B-a\,C)\,\text{Tan}[c+d\,x]}{5\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{5/2}}-\frac{2\left(8\,a\,b\,B-3\,a^2\,C-5\,b^2\,C\right)\,\text{Tan}[c+d\,x]}{15\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{2\left(23\,a^2\,b\,B+9\,b^3\,B-3\,a^3\,C-29\,a\,b^2\,C\right)\,\text{Tan}[c+d\,x]}{15\,\left(a^2-b^2\right)^3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 1, 1 leaves) :

???

■ Problem 857: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])^{2/3}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 229 leaves, 8 steps) :

$$\left(\sqrt{2}\,(a+b)\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2},\,-\frac{5}{3},\,\frac{3}{2},\,\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\,\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)+$$
$$\left(\sqrt{2}\,(b\,B-a\,C)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2},\,-\frac{2}{3},\,\frac{3}{2},\,\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\,\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\,(a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/$$
$$\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)$$

Result (type 6, 33 208 leaves) : Display of huge result suppressed!

■ Problem 858: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])^{1/3}\,\left(B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 6, 229 leaves, 8 steps) :

$$\left(\sqrt{2}\,(a+b)\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{4}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\right)+\left(\sqrt{2}\,(b\,B-a\,C)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\right)$$

Result (type 6, 33 199 leaves) : Display of huge result suppressed!

- **Problem 859: Result more than twice size of optimal antiderivative.**

$$\int\frac{B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 6, 226 leaves, 8 steps) :

$$\frac{\sqrt{2}\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}}+\frac{\sqrt{2}\,(b\,B-a\,C)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{1/3}}$$

Result (type 6, 18 676 leaves) : Display of huge result suppressed!

- **Problem 860: Result more than twice size of optimal antiderivative.**

$$\int\frac{B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{2/3}}\,dx$$

Optimal (type 6, 226 leaves, 8 steps) :

$$\frac{\sqrt{2}\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{1/3}\,\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}}+\frac{\sqrt{2}\,(b\,B-a\,C)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{2/3}}$$

Result (type 6, 18 666 leaves) : Display of huge result suppressed!

- **Problem 861: Result more than twice size of optimal antiderivative.**

$$\int\text{Sec}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 165 leaves, 7 steps) :

$$\frac{(4\,a\,A+3\,b\,B+3\,a\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(5\,A\,b+5\,a\,B+4\,b\,C)\,\text{Tan}[c+d\,x]}{5\,d}+\frac{(4\,a\,A+3\,b\,B+3\,a\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{(b\,B+a\,C)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{b\,C\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}+\frac{(5\,A\,b+5\,a\,B+4\,b\,C)\,\text{Tan}[c+d\,x]^3}{15\,d}$$

Result (type 3, 660 leaves) :

$$-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{3\,b\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}-\frac{3\,a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+$$
$$\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{3\,b\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{3\,a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+$$
$$\frac{b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{a\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{a\,A}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{3\,b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{3\,a\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-$$
$$\frac{a\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-\frac{a\,A}{4\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{3\,b\,B}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-$$
$$\frac{3\,a\,C}{16\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,A\,b\,\text{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,B\,\text{Tan}[c+d\,x]}{3\,d}+\frac{8\,b\,C\,\text{Tan}[c+d\,x]}{15\,d}+$$
$$\frac{A\,b\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{4\,b\,C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,d}+\frac{b\,C\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

- **Problem 862: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 137 leaves, 7 steps) :

$$\frac{(4\,A\,b+4\,a\,B+3\,b\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(3\,a\,A+2\,b\,B+2\,a\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{(4\,A\,b+4\,a\,B+3\,b\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{(b\,B+a\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{b\,C\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 545 leaves) :

$$-\frac{A\,b\,Log\left[Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{a\,B\,Log\left[Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{3\,b\,C\,Log\left[Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{A\,b\,Log\left[Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a\,B\,Log\left[Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{3\,b\,C\,Log\left[Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{b\,C}{16\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{A\,b}{4\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{a\,B}{4\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{3\,b\,C}{16\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]-Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{b\,C}{16\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^4}-\frac{A\,b}{4\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a\,B}{4\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{3\,b\,C}{16\,d\left(Cos\left[\frac{1}{2}(c+d\,x)\right]+Sin\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{a\,A\,Tan[c+d\,x]}{d}+\frac{2\,b\,B\,Tan[c+d\,x]}{3\,d}+\frac{2\,a\,C\,Tan[c+d\,x]}{3\,d}+\frac{b\,B\,Sec[c+d\,x]^2\,Tan[c+d\,x]}{3\,d}+\frac{a\,C\,Sec[c+d\,x]^2\,Tan[c+d\,x]}{3\,d}$$

- **Problem 865: Result more than twice size of optimal antiderivative.**

$$\int Cos[c+d\,x]\,(a+b\,Sec[c+d\,x])\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)dx$$

Optimal (type 3, 52 leaves, 5 steps):

$$(A\,b+a\,B)\,x+\frac{(b\,B+a\,C)\,ArcTanh[Sin[c+d\,x]]}{d}+\frac{a\,A\,Sin[c+d\,x]}{d}+\frac{b\,C\,Tan[c+d\,x]}{d}$$

Result (type 3, 187 leaves):

$$A\,b\,x+a\,B\,x-\frac{b\,B\,Log\left[Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]-Sin\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}-\frac{a\,C\,Log\left[Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]-Sin\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{b\,B\,Log\left[Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]+Sin\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,C\,Log\left[Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]+Sin\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,A\,Cos[d\,x]\,Sin[c]}{d}+\frac{a\,A\,Cos[c]\,Sin[d\,x]}{d}+\frac{b\,C\,Tan[c+d\,x]}{d}$$

- **Problem 872: Result more than twice size of optimal antiderivative.**

$$\int (a+b\,Sec[c+d\,x])^2\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)dx$$

Optimal (type 3, 134 leaves, 6 steps):

$$a^2\,A\,x+\frac{\left(2\,a^2\,B+b^2\,B+2\,a\,b\,(2\,A+C)\right)ArcTanh[Sin[c+d\,x]]}{2\,d}+\frac{\left(3\,A\,b^2+6\,a\,b\,B+2\,a^2\,C+2\,b^2\,C\right)Tan[c+d\,x]}{3\,d}+\frac{b\,(3\,b\,B+2\,a\,C)\,Sec[c+d\,x]\,Tan[c+d\,x]}{6\,d}+\frac{C\,(a+b\,Sec[c+d\,x])^2\,Tan[c+d\,x]}{3\,d}$$

Result (type 3, 322 leaves):

$$\frac{1}{24\,d}\,\mathrm{Sec}[c+d\,x]^3\left(9\,\mathrm{Cos}[c+d\,x]\left(2\,a^2\,A\,(c+d\,x)-\left(2\,a^2\,B+b^2\,B+2\,a\,b\,(2\,A+C)\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\left(2\,a^2\,B+b^2\,B+2\,a\,b\,(2\,A+C)\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+3\,\mathrm{Cos}[3\,(c+d\,x)]\left(2\,a^2\,A\,(c+d\,x)-\left(2\,a^2\,B+b^2\,B+2\,a\,b\,(2\,A+C)\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\left(2\,a^2\,B+b^2\,B+2\,a\,b\,(2\,A+C)\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+4\left(3\,A\,b^2+6\,a\,b\,B+3\,a^2\,C+4\,b^2\,C+3\,b\,(b\,B+2\,a\,C)\,\mathrm{Cos}[c+d\,x]+\left(3\,A\,b^2+6\,a\,b\,B+3\,a^2\,C+2\,b^2\,C\right)\mathrm{Cos}[2\,(c+d\,x)]\right)\mathrm{Sin}[c+d\,x]\right)$$

- **Problem 873: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Sec}[c+d\,x])^2\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 126 leaves, 6 steps):

$$a\,(2\,A\,b+a\,B)\,x+\frac{\left(2\,A\,b^2+4\,a\,b\,B+2\,a^2\,C+b^2\,C\right)\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{A\,(a+b\,\mathrm{Sec}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{d}-\frac{b\,(2\,a\,A-b\,B-2\,a\,C)\,\mathrm{Tan}[c+d\,x]}{d}-\frac{b^2\,(2\,A-C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 453 leaves):

$$\frac{1}{4\,d}\,\mathrm{Sec}[c+d\,x]^2\left(4\,a\,A\,b\,c+2\,a^2\,B\,c+4\,a\,A\,b\,d\,x+2\,a^2\,B\,d\,x-2\,A\,b^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-4\,a\,b\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-2\,a^2\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-b^2\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,A\,b^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+4\,a\,b\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,a^2\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+b^2\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(2\,A\,b+a\,B)\,(c+d\,x)-\left(2\,A\,b^2+4\,a\,b\,B+2\,a^2\,C+b^2\,C\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\left(2\,A\,b^2+4\,a\,b\,B+2\,a^2\,C+b^2\,C\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\left(a^2\,A+2\,b^2\,C\right)\mathrm{Sin}[c+d\,x]+2\,b^2\,B\,\mathrm{Sin}[2\,(c+d\,x)]+4\,a\,b\,C\,\mathrm{Sin}[2\,(c+d\,x)]+a^2\,A\,\mathrm{Sin}[3\,(c+d\,x)]\right)$$

Problem 880: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 207 leaves, 7 steps):

$$a^3\,A\,x+\frac{\left(8\,a^3\,B+12\,a\,b^2\,B+12\,a^2\,b\,(2\,A+C)+b^3\,(4\,A+3\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{\left(16\,a^2\,b\,B+4\,b^3\,B+3\,a^3\,C+6\,a\,b^2\,(3\,A+2\,C)\right)\,\text{Tan}[c+d\,x]}{6\,d}+\frac{b\,\left(12\,A\,b^2+20\,a\,b\,B+6\,a^2\,C+9\,b^2\,C\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{24\,d}+\frac{(4\,b\,B+3\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]}{12\,d}+\frac{C\,(a+b\,\text{Sec}[c+d\,x])^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 687 leaves):

$$\left(\left(-24\,a^2\,A\,b-4\,A\,b^3-8\,a^3\,B-12\,a\,b^2\,B-12\,a^2\,b\,C-3\,b^3\,C\right)\,\text{Cos}[c+d\,x]^5\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(4\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$
$$\left(\left(24\,a^2\,A\,b+4\,A\,b^3+8\,a^3\,B+12\,a\,b^2\,B+12\,a^2\,b\,C+3\,b^3\,C\right)\,\text{Cos}[c+d\,x]^5\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(4\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$
$$\frac{1}{48\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(36\,a^3\,A\,(c+d\,x)+48\,a^3\,A\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+12\,a^3\,A\,(c+d\,x)\,\text{Cos}[4\,(c+d\,x)]+12\,A\,b^3\,\text{Sin}[c+d\,x]+36\,a\,b^2\,B\,\text{Sin}[c+d\,x]+36\,a^2\,b\,C\,\text{Sin}[c+d\,x]+33\,b^3\,C\,\text{Sin}[c+d\,x]+72\,a\,A\,b^2\,\text{Sin}[2\,(c+d\,x)]+72\,a^2\,b\,B\,\text{Sin}[2\,(c+d\,x)]+32\,b^3\,B\,\text{Sin}[2\,(c+d\,x)]+24\,a^3\,C\,\text{Sin}[2\,(c+d\,x)]+96\,a\,b^2\,C\,\text{Sin}[2\,(c+d\,x)]+12\,A\,b^3\,\text{Sin}[3\,(c+d\,x)]+36\,a\,b^2\,B\,\text{Sin}[3\,(c+d\,x)]+36\,a^2\,b\,C\,\text{Sin}[3\,(c+d\,x)]+9\,b^3\,C\,\text{Sin}[3\,(c+d\,x)]+36\,a\,A\,b^2\,\text{Sin}[4\,(c+d\,x)]+36\,a^2\,b\,B\,\text{Sin}[4\,(c+d\,x)]+8\,b^3\,B\,\text{Sin}[4\,(c+d\,x)]+12\,a^3\,C\,\text{Sin}[4\,(c+d\,x)]+24\,a\,b^2\,C\,\text{Sin}[4\,(c+d\,x)]\right)$$

Problem 881: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 192 leaves, 7 steps):

$$a^2\,(3\,A\,b+a\,B)\,x+\frac{\left(6\,a^2\,b\,B+b^3\,B+2\,a^3\,C+3\,a\,b^2\,(2\,A+C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{A\,(a+b\,\text{Sec}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{d}+\frac{b\,\left(9\,a\,b\,B-a^2\,(6\,A-8\,C)+b^2\,(3\,A+2\,C)\right)\,\text{Tan}[c+d\,x]}{3\,d}-\frac{b^2\,(6\,a\,A-3\,b\,B-5\,a\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{6\,d}-\frac{b\,(3\,A-C)\,(a+b\,\text{Sec}[c+d\,x])^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1335 leaves):

$$\frac{2 a^2 (3 A b + a B) (c + d x) \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)}{d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])} +$$

$$\left(\left(-6 a A b^2 - 6 a^2 b B - b^3 B - 2 a^3 C - 3 a b^2 C\right) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) +$$

$$\left(\left(6 a A b^2 + 6 a^2 b B + b^3 B + 2 a^3 C + 3 a b^2 C\right) \text{Cos}[c + d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) +$$

$$\left(\left(3 b^3 B + 9 a b^2 C + b^3 C\right) \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(6 d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2\right) +$$

$$\left(b^3 C \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right) \Big/ \left(3 d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^3\right) +$$

$$\left(b^3 C \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right) \Big/ \left(3 d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^3\right) +$$

$$\left(\left(-3 b^3 B - 9 a b^2 C - b^3 C\right) \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(6 d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2\right) +$$

$$\left(2 \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \left(3 A b^3 \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 9 a b^2 B \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 9 a^2 b C \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 2 b^3 C \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) \Big/ \left(3 d (b + a \text{Cos}[c + d x])^3 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) +$$

$$\left(2 \text{Cos}[c + d x]^5 (a + b \text{Sec}[c + d x])^3 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \left(3 A b^3 \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 9 a b^2 B \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 9 a^2 b C \text{Sin}\left[\frac{1}{2} (c + d x)\right] + 2 b^3 C \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)\right) \Big/$$

$$\left(3\, d\, (b + a \,\text{Cos}[c + d\, x])^3\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])\, \left(\text{Cos}\left[\frac{1}{2}\, (c + d\, x)\right] + \text{Sin}\left[\frac{1}{2}\, (c + d\, x)\right]\right)\right) +$$

$$\frac{2\, a^3\, A\, \text{Cos}[c + d\, x]^5\, (a + b\, \text{Sec}[c + d\, x])^3\, \left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)\, \text{Sin}[c + d\, x]}{d\, (b + a\, \text{Cos}[c + d\, x])^3\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])}$$

- **Problem 887: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c + d\, x]^2\, (a + b\, \text{Sec}[c + d\, x])^4\, \left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)\, dx$$

Optimal (type 3, 491 leaves, 10 steps) :

$$\frac{\left(8\, a^4\, B + 36\, a^2\, b^2\, B + 5\, b^4\, B + 8\, a^3\, b\, (4\, A + 3\, C) + 4\, a\, b^3\, (6\, A + 5\, C)\right)\, \text{ArcTanh}[\text{Sin}[c + d\, x]]}{16\, d} - \frac{1}{420\, b^2\, d}$$

$$\left(28\, a^5\, b\, B - 847\, a^3\, b^3\, B - 896\, a\, b^5\, B - 8\, a^6\, C - 32\, b^6\, (7\, A + 6\, C) - 4\, a^4\, b^2\, (42\, A + 23\, C) - 32\, a^2\, b^4\, (49\, A + 39\, C)\right)\, \text{Tan}[c + d\, x] -$$

$$\frac{1}{1680\, b\, d}\left(56\, a^4\, b\, B - 1246\, a^2\, b^3\, B - 525\, b^5\, B - 16\, a^5\, C - 48\, a^3\, b^2\, (7\, A + 4\, C) - 4\, a\, b^4\, (406\, A + 333\, C)\right)\, \text{Sec}[c + d\, x]\, \text{Tan}[c + d\, x] -$$

$$\frac{\left(28\, a^3\, b\, B - 371\, a\, b^3\, B - 8\, a^4\, C - 32\, b^4\, (7\, A + 6\, C) - 12\, a^2\, b^2\, (14\, A + 9\, C)\right)\, (a + b\, \text{Sec}[c + d\, x])^2\, \text{Tan}[c + d\, x]}{840\, b^2\, d} -$$

$$\frac{\left(28\, a^2\, b\, B - 175\, b^3\, B - 8\, a^3\, C - 4\, a\, b^2\, (42\, A + 31\, C)\right)\, (a + b\, \text{Sec}[c + d\, x])^3\, \text{Tan}[c + d\, x]}{840\, b^2\, d} +$$

$$\frac{\left(42\, A\, b^2 - 7\, a\, b\, B + 2\, a^2\, C + 36\, b^2\, C\right)\, (a + b\, \text{Sec}[c + d\, x])^4\, \text{Tan}[c + d\, x]}{210\, b^2\, d} +$$

$$\frac{(7\, b\, B - 2\, a\, C)\, (a + b\, \text{Sec}[c + d\, x])^5\, \text{Tan}[c + d\, x]}{42\, b^2\, d} + \frac{C\, \text{Sec}[c + d\, x]\, (a + b\, \text{Sec}[c + d\, x])^5\, \text{Tan}[c + d\, x]}{7\, b\, d}$$

Result (type 3, 1348 leaves) :

$$\left(\left(-32\,a^3\,A\,b-24\,a\,A\,b^3-8\,a^4\,B-36\,a^2\,b^2\,B-5\,b^4\,B-24\,a^3\,b\,C-20\,a\,b^3\,C\right)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\,\left(8\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(\left(32\,a^3\,A\,b+24\,a\,A\,b^3+8\,a^4\,B+36\,a^2\,b^2\,B+5\,b^4\,B+24\,a^3\,b\,C+20\,a\,b^3\,C\right)\,\text{Cos}[c+d\,x]^6\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right.$$
$$\left.(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\,\left(8\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\frac{(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(b^4\,B\,\text{Sin}[c+d\,x]+4\,a\,b^3\,C\,\text{Sin}[c+d\,x]\right)}{3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}+$$

$$\left(\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(24\,a\,A\,b^3\,\text{Sin}[c+d\,x]+36\,a^2\,b^2\,B\,\text{Sin}[c+d\,x]+5\,b^4\,B\,\text{Sin}[c+d\,x]+24\,a^3\,b\,C\,\text{Sin}[c+d\,x]+20\,a\,b^3\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(12\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(32\,a^3\,A\,b\,\text{Sin}[c+d\,x]+24\,a\,A\,b^3\,\text{Sin}[c+d\,x]+\right.\right.$$
$$\left.\left.8\,a^4\,B\,\text{Sin}[c+d\,x]+36\,a^2\,b^2\,B\,\text{Sin}[c+d\,x]+5\,b^4\,B\,\text{Sin}[c+d\,x]+24\,a^3\,b\,C\,\text{Sin}[c+d\,x]+20\,a\,b^3\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(8\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+\left(2\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^4\right.$$
$$\left.\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(7\,A\,b^4\,\text{Sin}[c+d\,x]+28\,a\,b^3\,B\,\text{Sin}[c+d\,x]+42\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]+6\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(35\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(2\,\text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(210\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+28\,A\,b^4\,\text{Sin}[c+d\,x]+\right.\right.$$
$$\left.\left.140\,a^3\,b\,B\,\text{Sin}[c+d\,x]+112\,a\,b^3\,B\,\text{Sin}[c+d\,x]+35\,a^4\,C\,\text{Sin}[c+d\,x]+168\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]+24\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(105\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(2\,\text{Cos}[c+d\,x]^5\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(105\,a^4\,A\,\text{Sin}[c+d\,x]+420\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+56\,A\,b^4\,\text{Sin}[c+d\,x]+\right.\right.$$
$$\left.\left.280\,a^3\,b\,B\,\text{Sin}[c+d\,x]+224\,a\,b^3\,B\,\text{Sin}[c+d\,x]+70\,a^4\,C\,\text{Sin}[c+d\,x]+336\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]+48\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(105\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\frac{2\,b^4\,C\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Tan}[c+d\,x]}{7\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}$$

- **Problem 889: Result more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 290 leaves, 8 steps) :

$$a^4 A x+\frac{\left(8 a^4 B+24 a^2 b^2 B+3 b^4 B+16 a^3 b (2 A+C)+4 a b^3 (4 A+3 C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+$$

$$\frac{\left(95 a^3 b B+80 a b^3 B+12 a^4 C+4 b^4 (5 A+4 C)+2 a^2 b^2 (85 A+56 C)\right) \text{Tan}[c+d x]}{30 d}+$$

$$\frac{b \left(130 a^2 b B+45 b^3 B+24 a^3 C+4 a b^2 (40 A+29 C)\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{120 d}+$$

$$\frac{\left(20 A b^2+35 a b B+12 a^2 C+16 b^2 C\right) (a+b \text{Sec}[c+d x])^2 \text{Tan}[c+d x]}{60 d}+$$

$$\frac{(5 b B+4 a C) (a+b \text{Sec}[c+d x])^3 \text{Tan}[c+d x]}{20 d}+\frac{C (a+b \text{Sec}[c+d x])^4 \text{Tan}[c+d x]}{5 d}$$

Result (type 3, 915 leaves) :

$$\Bigg(\left(-32 a^3 A b-16 a A b^3-8 a^4 B-24 a^2 b^2 B-3 b^4 B-16 a^3 b C-12 a b^3 C\right) \text{Cos}[c+d x]^6 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]$$
$$(a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\Bigg) \Big/ \left(4 d (b+a \text{Cos}[c+d x])^4 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\right)+$$

$$\Bigg(\left(32 a^3 A b+16 a A b^3+8 a^4 B+24 a^2 b^2 B+3 b^4 B+16 a^3 b C+12 a b^3 C\right) \text{Cos}[c+d x]^6 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]$$
$$(a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\Bigg) \Big/ \left(4 d (b+a \text{Cos}[c+d x])^4 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\right)+$$

$$\Big(\text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\Big(600 a^4 A (c+d x) \text{Cos}[c+d x]+300 a^4 A (c+d x) \text{Cos}[3 (c+d x)]+60 a^4 A (c+d x) \text{Cos}[5 (c+d x)]+720 a^2 A b^2 \text{Sin}[c+d x]+$$
$$160 A b^4 \text{Sin}[c+d x]+480 a^3 b B \text{Sin}[c+d x]+640 a b^3 B \text{Sin}[c+d x]+120 a^4 C \text{Sin}[c+d x]+960 a^2 b^2 C \text{Sin}[c+d x]+$$
$$320 b^4 C \text{Sin}[c+d x]+480 a A b^3 \text{Sin}[2 (c+d x)]+720 a^2 b^2 B \text{Sin}[2 (c+d x)]+210 b^4 B \text{Sin}[2 (c+d x)]+480 a^3 b C \text{Sin}[2 (c+d x)]+$$
$$840 a b^3 C \text{Sin}[2 (c+d x)]+1080 a^2 A b^2 \text{Sin}[3 (c+d x)]+200 A b^4 \text{Sin}[3 (c+d x)]+720 a^3 b B \text{Sin}[3 (c+d x)]+800 a b^3 B \text{Sin}[3 (c+d x)]+$$
$$180 a^4 C \text{Sin}[3 (c+d x)]+1200 a^2 b^2 C \text{Sin}[3 (c+d x)]+160 b^4 C \text{Sin}[3 (c+d x)]+240 a A b^3 \text{Sin}[4 (c+d x)]+360 a^2 b^2 B \text{Sin}[4 (c+d x)]+$$
$$45 b^4 B \text{Sin}[4 (c+d x)]+240 a^3 b C \text{Sin}[4 (c+d x)]+180 a b^3 C \text{Sin}[4 (c+d x)]+360 a^2 A b^2 \text{Sin}[5 (c+d x)]+40 A b^4 \text{Sin}[5 (c+d x)]+$$
$$240 a^3 b B \text{Sin}[5 (c+d x)]+160 a b^3 B \text{Sin}[5 (c+d x)]+60 a^4 C \text{Sin}[5 (c+d x)]+240 a^2 b^2 C \text{Sin}[5 (c+d x)]+32 b^4 C \text{Sin}[5 (c+d x)]\Big)\Big) \Big/$$
$$\left(480 d (b+a \text{Cos}[c+d x])^4 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\right)$$

Problem 890: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x] (a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 273 leaves, 8 steps) :

$$a^3 (4 A b + a B) x + \frac{\left(32 a^3 b B + 16 a b^3 B + 8 a^4 C + 24 a^2 b^2 (2 A + C) + b^4 (4 A + 3 C)\right) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{A (a + b \text{Sec}[c + d x])^4 \text{Sin}[c + d x]}{d} + \frac{b \left(34 a^2 b B + 4 b^3 B - a^3 (12 A - 19 C) + 8 a b^2 (3 A + 2 C)\right) \text{Tan}[c + d x]}{6 d} + \frac{b^2 \left(32 a b B - a^2 (24 A - 26 C) + 3 b^2 (4 A + 3 C)\right) \text{Sec}[c + d x] \text{Tan}[c + d x]}{24 d} - \frac{b (12 a A - 4 b B - 7 a C) (a + b \text{Sec}[c + d x])^2 \text{Tan}[c + d x]}{12 d} - \frac{b (4 A - C) (a + b \text{Sec}[c + d x])^3 \text{Tan}[c + d x]}{4 d}$$

Result (type 3, 813 leaves) :

$$\left(\left(-48 a^2 A b^2 - 4 A b^4 - 32 a^3 b B - 16 a b^3 B - 8 a^4 C - 24 a^2 b^2 C - 3 b^4 C\right) \text{Cos}[c + d x]^6 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] (a + b \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(4 d (b + a \text{Cos}[c + d x])^4 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) + \left(\left(48 a^2 A b^2 + 4 A b^4 + 32 a^3 b B + 16 a b^3 B + 8 a^4 C + 24 a^2 b^2 C + 3 b^4 C\right) \text{Cos}[c + d x]^6 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] (a + b \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right) \Big/ \left(4 d (b + a \text{Cos}[c + d x])^4 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])\right) + \frac{1}{48 d (b + a \text{Cos}[c + d x])^4 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x])} \text{Cos}[c + d x]^2 (a + b \text{Sec}[c + d x])^4 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) \left(144 a^3 A b (c + d x) + 36 a^4 B (c + d x) + 192 a^3 A b (c + d x) \text{Cos}[2 (c + d x)] + 48 a^4 B (c + d x) \text{Cos}[2 (c + d x)] + 48 a^3 A b (c + d x) \text{Cos}[4 (c + d x)] + 12 a^4 B (c + d x) \text{Cos}[4 (c + d x)] + 12 a^4 A \text{Sin}[c + d x] + 12 A b^4 \text{Sin}[c + d x] + 48 a b^3 B \text{Sin}[c + d x] + 72 a^2 b^2 C \text{Sin}[c + d x] + 33 b^4 C \text{Sin}[c + d x] + 96 a A b^3 \text{Sin}[2 (c + d x)] + 144 a^2 b^2 B \text{Sin}[2 (c + d x)] + 32 b^4 B \text{Sin}[2 (c + d x)] + 96 a^3 b C \text{Sin}[2 (c + d x)] + 128 a b^3 C \text{Sin}[2 (c + d x)] + 18 a^4 A \text{Sin}[3 (c + d x)] + 12 A b^4 \text{Sin}[3 (c + d x)] + 48 a b^3 B \text{Sin}[3 (c + d x)] + 72 a^2 b^2 C \text{Sin}[3 (c + d x)] + 9 b^4 C \text{Sin}[3 (c + d x)] + 48 a A b^3 \text{Sin}[4 (c + d x)] + 72 a^2 b^2 B \text{Sin}[4 (c + d x)] + 8 b^4 B \text{Sin}[4 (c + d x)] + 48 a^3 b C \text{Sin}[4 (c + d x)] + 32 a b^3 C \text{Sin}[4 (c + d x)] + 6 a^4 A \text{Sin}[5 (c + d x)]\right)$$

- **Problem 898: Result more than twice size of optimal antiderivative.**

$$\int (a + b \text{Sec}[c + d x])^2 \left(a b B - a^2 C + b^2 B \text{Sec}[c + d x] + b^2 C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 3, 149 leaves, 7 steps) :

$$a^3 (b B - a C) x + \frac{b \left(6 a^2 b B + b^3 B - 4 a^3 C + 2 a b^2 C\right) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{b^2 \left(9 a b B - a^2 C + 2 b^2 C\right) \text{Tan}[c + d x]}{3 d} + \frac{b^3 (3 b B + 2 a C) \text{Sec}[c + d x] \text{Tan}[c + d x]}{6 d} + \frac{b^2 C (a + b \text{Sec}[c + d x])^2 \text{Tan}[c + d x]}{3 d}$$

Result (type 3, 462 leaves) :

$$-\frac{a^3 (-b B+a C) (c+d x)}{d}+\frac{\left(-6 a^2 b^2 B-b^4 B+4 a^3 b C-2 a b^3 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+$$
$$\frac{\left(6 a^2 b^2 B+b^4 B-4 a^3 b C+2 a b^3 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{2 d}+\frac{3 b^4 B+6 a b^3 C+b^4 C}{12 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$
$$\frac{b^4 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{b^4 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{-3 b^4 B-6 a b^3 C-b^4 C}{12 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+$$
$$\frac{9 a b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 b^4 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{9 a b^3 B \text{Sin}\left[\frac{1}{2} (c+d x)\right]+2 b^4 C \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}$$

- **Problem 899: Result more than twice size of optimal antiderivative.**

$$\int (a+b \text{Sec}[c+d x]) \left(a b B-a^2 C+b^2 B \text{Sec}[c+d x]+b^2 C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 97 leaves, 6 steps):

$$a^2 (b B-a C) x+\frac{b \left(4 a b B-2 a^2 C+b^2 C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{b^2 (2 b B+a C) \text{Tan}[c+d x]}{2 d}+\frac{b^2 C (a+b \text{Sec}[c+d x]) \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 379 leaves):

$$-\frac{1}{4 d} \text{Sec}[c+d x]^2 \left(-2 a^2 b B c+2 a^3 c C-2 a^2 b B d x+2 a^3 C d x+4 a b^2 B \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$
$$2 a^2 b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+b^3 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-4 a b^2 B$$
$$\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+2 a^2 b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-b^3 C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$
$$\text{Cos}[2 (c+d x)] \left(2 a^2 (-b B+a C) (c+d x)+b \left(4 a b B-2 a^2 C+b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$
$$\left.\left.b \left(4 a b B-2 a^2 C+b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)-2 b^3 C \text{Sin}[c+d x]-2 b^3 B \text{Sin}[2 (c+d x)]-2 a b^2 C \text{Sin}[2 (c+d x)]\right)$$

- **Problem 900: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 215 leaves, 8 steps):

$$\frac{\left(2 a^2 b B+b^3 B-2 a^3 C-a b^2 (2 A+C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 b^4 d}+\frac{2 a^2 \left(A b^2-a (b B-a C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b}\ b^4 \sqrt{a+b}\ d}+$$
$$\frac{\left(3 A b^2-3 a b B+3 a^2 C+2 b^2 C\right) \text{Tan}[c+d x]}{3 b^3 d}+\frac{(b B-a C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b^2 d}+\frac{C \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 b d}$$

Result (type 3, 965 leaves):

$$\left(\left(2 a A b^2-2 a^2 b B-b^3 B+2 a^3 C+a b^2 C\right) \text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(b^4 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])\right)+$$
$$\left(\left(-2 a A b^2+2 a^2 b B+b^3 B-2 a^3 C-a b^2 C\right) \text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$
$$\left.\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(b^4 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])\right)+$$
$$\left(\left(A b^2-a b B+a^2 C\right) \text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$
$$\left(-\left(4 i a^2 \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right] \left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}-\frac{i \text{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}\right) \left(-i b \text{Sin}\left[\frac{d x}{2}\right]+i a \text{Sin}\left[c+\frac{d x}{2}\right]\right)\right]\right.\right.$$
$$\left.\text{Cos}[c]\right) \Big/ \left(b^4 \sqrt{a^2-b^2}\ d \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}\right)-$$
$$\left(4 a^2 \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right] \left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}-\frac{i \text{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}\right) \left(-i b \text{Sin}\left[\frac{d x}{2}\right]+i a \text{Sin}\left[c+\frac{d x}{2}\right]\right)\right]\right.$$
$$\left.\left.\left.\text{Sin}[c]\right) \Big/ \left(b^4 \sqrt{a^2-b^2}\ d \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}\right)\right)\right) \Big/ ((A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x]))+$$
$$\left((b+a \text{Cos}[c+d x]) \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(12 A b^2 \text{Sin}[d x]-12 a b B \text{Sin}[d x]+12 a^2 C \text{Sin}[d x]+\right.\right.$$
$$12 b^2 C \text{Sin}[d x]-6 A b^2 \text{Sin}[2 c+d x]+6 a b B \text{Sin}[2 c+d x]-6 a^2 C \text{Sin}[2 c+d x]+3 b^2 B \text{Sin}[c+2 d x]-3 a b C \text{Sin}[c+2 d x]+3 b^2 B$$
$$\left.\left.\text{Sin}[3 c+2 d x]-3 a b C \text{Sin}[3 c+2 d x]+6 A b^2 \text{Sin}[2 c+3 d x]-6 a b B \text{Sin}[2 c+3 d x]+6 a^2 C \text{Sin}[2 c+3 d x]+4 b^2 C \text{Sin}[2 c+3 d x]\right)\right) \Big/$$
$$\left(12 b^3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])\right)$$

- **Problem 901: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 153 leaves, 7 steps):

$$\frac{\left(b^2 (2 A+C)-2 a (b B-a C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 b^3 d}-\frac{2 a \left(A b^2-a (b B-a C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a-b} b^3 \sqrt{a+b} d}+\frac{(b B-a C) \text{Tan}[c+d x]}{b^2 d}+\frac{C \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b d}$$

Result (type 3, 472 leaves):

$$\Bigg(\text{Cos}[c+d x] (b+a \text{Cos}[c+d x]) \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \Bigg(-2 \left(2 A b^2-2 a b B+2 a^2 C+b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+2 \left(2 A b^2-2 a b B+2 a^2 C+b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{8 a \left(A b^2+a (-b B+a C)\right) \text{ArcTan}\left[\frac{(i \text{Cos}[c]+\text{Sin}[c]) \left(a \text{Sin}[c]+(-b+a \text{Cos}[c]) \text{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{a^2-b^2} \sqrt{(\text{Cos}[c]-i \text{Sin}[c])^2}}\right] (i \text{Cos}[c]+\text{Sin}[c])}{\sqrt{a^2-b^2} \sqrt{(\text{Cos}[c]-i \text{Sin}[c])^2}}+\frac{b^2 C}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 b (b B-a C) \text{Sin}\left[\frac{d x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}-\frac{b^2 C}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 b (b B-a C) \text{Sin}\left[\frac{d x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}\Bigg)\Bigg) \Big/ \left(2 b^3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)]) (a+b \text{Sec}[c+d x])\right)$$

- **Problem 902: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 3, 106 leaves, 6 steps):

$$\frac{(b B - a C) \text{ArcTanh}[\text{Sin}[c + d x]]}{b^2 d} + \frac{2 \left(A b^2 - a (b B - a C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{\sqrt{a - b} \; b^2 \sqrt{a + b} \; d} + \frac{C \text{ Tan}[c + d x]}{b d}$$

Result (type 3, 365 leaves) :

$$\frac{1}{b^2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 (c + d x)]) (a + b \text{Sec}[c + d x])} 2 \text{Cos}[c + d x] (b + a \text{Cos}[c + d x]) \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)$$
$$\left(- (b B - a C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + (b B - a C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right] - \right.$$
$$\frac{2 \, \mathbb{i} \left(A b^2 + a (-b B + a C)\right) \text{ArcTan}\left[\frac{(\mathbb{i} \text{Cos}[c] + \text{Sin}[c]) \left(a \text{Sin}[c] + (-b + a \text{Cos}[c]) \text{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{a^2 - b^2} \sqrt{(\text{Cos}[c] - \mathbb{i} \text{Sin}[c])^2}}\right] (\text{Cos}[c] - \mathbb{i} \text{Sin}[c])}{\sqrt{a^2 - b^2} \sqrt{(\text{Cos}[c] - \mathbb{i} \text{Sin}[c])^2}} +$$
$$\left.\frac{b C \text{Sin}\left[\frac{d x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right] - \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] - \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)} + \frac{b C \text{Sin}\left[\frac{d x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right] + \text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c + d x)\right] + \text{Sin}\left[\frac{1}{2} (c + d x)\right]\right)}\right)$$

- **Problem 903: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2}{a + b \text{Sec}[c + d x]} \, dx$$

Optimal (type 3, 94 leaves, 6 steps) :

$$\frac{A x}{a} + \frac{C \text{ArcTanh}[\text{Sin}[c + d x]]}{b d} - \frac{2 \left(A b^2 - a (b B - a C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a \sqrt{a - b} \; b \sqrt{a + b} \; d}$$

Result (type 3, 261 leaves) :

$$\left(2\left(C+B\cos[c+d x]+A\cos[c+d x]^2\right)\right.$$

$$\left(\sqrt{a^2-b^2}\left(A b d x-a C \operatorname{Log}\left[\cos\left[\frac{1}{2}(c+d x)\right]-\sin\left[\frac{1}{2}(c+d x)\right]\right]+a C \operatorname{Log}\left[\cos\left[\frac{1}{2}(c+d x)\right]+\sin\left[\frac{1}{2}(c+d x)\right]\right]\right)\sqrt{(\cos[c]-i \sin[c])^2}+\right.$$

$$\left.\left.2\left(A b^2+a(-b B+a C)\right) \operatorname{ArcTan}\left[\frac{(i \cos[c]+\sin[c])\left(a \sin[c]+(-b+a \cos[c]) \operatorname{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{a^2-b^2}\sqrt{(\cos[c]-i \sin[c])^2}}\right](i \cos[c]+\sin[c])\right)\right)\Big/$$

$$\left(a b \sqrt{a^2-b^2}\, d\,(A+2 C+2 B \cos[c+d x]+A \cos[2(c+d x)])\sqrt{(\cos[c]-i \sin[c])^2}\right)$$

Problem 908: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[c+d x]^4\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^2}\, dx$$

Optimal (type 3, 407 leaves, 9 steps):

$$\frac{\left(6 a^2 b B+b^3 B-8 a^3 C-2 a b^2(2 A+C)\right) \operatorname{ArcTanh}[\sin[c+d x]]}{2 b^5 d}+$$

$$\frac{2 a^2\left(2 a^2 A b^2-3 A b^4-3 a^3 b B+4 a b^3 B+4 a^4 C-5 a^2 b^2 C\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b}\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{3/2} b^5 (a+b)^{3/2} d}-$$

$$\frac{\left(9 a^3 b B-6 a b^3 B-a^2 b^2(6 A-7 C)-12 a^4 C+b^4(3 A+2 C)\right) \operatorname{Tan}[c+d x]}{3 b^4\left(a^2-b^2\right) d}+\frac{\left(3 a^2 b B-b^3 B-2 a b^2(A-C)-4 a^3 C\right) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 b^3\left(a^2-b^2\right) d}+$$

$$\frac{\left(3 A b^2-3 a b B+4 a^2 C-b^2 C\right) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 b^2\left(a^2-b^2\right) d}-\frac{\left(A b^2-a(b B-a C)\right) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{b\left(a^2-b^2\right) d\,(a+b \operatorname{Sec}[c+d x])}$$

Result (type 3, 973 leaves):

$$-\left(4 a^2 \left(-2 a^2 A b^2+3 A b^4+3 a^3 b B-4 a b^3 B-4 a^4 C+5 a^2 b^2 C\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right] (b+a \text{Cos}[c+d x])^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(b^5 \sqrt{a^2-b^2} \left(-a^2+b^2\right) d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^2\right)+$$
$$\left(\left(4 a A b^2-6 a^2 b B-b^3 B+8 a^3 C+2 a b^2 C\right) (b+a \text{Cos}[c+d x])^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(b^5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^2\right)+$$
$$\left(\left(-4 a A b^2+6 a^2 b B+b^3 B-8 a^3 C-2 a b^2 C\right) (b+a \text{Cos}[c+d x])^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/ \left(b^5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^2\right)+$$
$$\left((b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^3 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(-6 a^2 A b^3 \text{Sin}[c+d x]+6 A b^5 \text{Sin}[c+d x]+9 a^3 b^2 B \text{Sin}[c+d x]-9 a b^4 B \text{Sin}[c+d x]-12 a^4 b C \text{Sin}[c+d x]+12 b^5 C \text{Sin}[c+d x]-12 a^3 A b^2 \text{Sin}[2 (c+d x)]+6 a A b^4 \text{Sin}[2 (c+d x)]+18 a^4 b B \text{Sin}[2 (c+d x)]-18 a^2 b^3 B \text{Sin}[2 (c+d x)]+6 b^5 B \text{Sin}[2 (c+d x)]-24 a^5 C \text{Sin}[2 (c+d x)]+22 a^3 b^2 C \text{Sin}[2 (c+d x)]-4 a b^4 C \text{Sin}[2 (c+d x)]-6 a^2 A b^3 \text{Sin}[3 (c+d x)]+6 A b^5 \text{Sin}[3 (c+d x)]+9 a^3 b^2 B \text{Sin}[3 (c+d x)]-9 a b^4 B \text{Sin}[3 (c+d x)]-12 a^4 b C \text{Sin}[3 (c+d x)]+8 a^2 b^3 C \text{Sin}[3 (c+d x)]+4 b^5 C \text{Sin}[3 (c+d x)]-6 a^3 A b^2 \text{Sin}[4 (c+d x)]+3 a A b^4 \text{Sin}[4 (c+d x)]+9 a^4 b B \text{Sin}[4 (c+d x)]-6 a^2 b^3 B \text{Sin}[4 (c+d x)]-12 a^5 C \text{Sin}[4 (c+d x)]+7 a^3 b^2 C \text{Sin}[4 (c+d x)]+2 a b^4 C \text{Sin}[4 (c+d x)]\right)\right) \Big/ \left(12 b^4 \left(-a^2+b^2\right) d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^2\right)$$

- **Problem 910: Result more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^2} \, dx$$

Optimal (type 3, 177 leaves, 7 steps):

$$\frac{(b B-2 a C) \text{ArcTanh}[\text{Sin}[c+d x]]}{b^3 d}-\frac{2 \left(A b^4+a^3 b B-2 a b^3 B-2 a^4 C+3 a^2 b^2 C\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{3/2} b^3 (a+b)^{3/2} d}+\frac{C \text{Tan}[c+d x]}{b^2 d}+\frac{a \left(A b^2-a (b B-a C)\right) \text{Tan}[c+d x]}{b^2 \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 382 leaves):

$$\frac{1}{b^3 d (A+2C+2B\cos[c+dx]+A\cos[2(c+dx)])(a+b\sec[c+dx])^2} 2 (b+a\cos[c+dx]) \left(A+B\sec[c+dx]+C\sec[c+dx]^2\right) \left(\frac{2\left(A b^4+a\left(a^2 b B-2 b^3 B-2 a^3 C+3 a b^2 C\right)\right) \text{ArcTanh}\left[\frac{(-a+b)\tan\left[\frac{1}{2}(c+dx)\right]}{\sqrt{a^2-b^2}}\right](b+a\cos[c+dx])}{\left(a^2-b^2\right)^{3/2}} - (b B-2 a C)(b+a\cos[c+dx]) \text{Log}\left[\cos\left[\frac{1}{2}(c+dx)\right]-\sin\left[\frac{1}{2}(c+dx)\right]\right] + (b B-2 a C)(b+a\cos[c+dx]) \text{Log}\left[\cos\left[\frac{1}{2}(c+dx)\right]+\sin\left[\frac{1}{2}(c+dx)\right]\right] + \frac{b C (b+a\cos[c+dx]) \sin\left[\frac{1}{2}(c+dx)\right]}{\cos\left[\frac{1}{2}(c+dx)\right]-\sin\left[\frac{1}{2}(c+dx)\right]} + \frac{b C (b+a\cos[c+dx]) \sin\left[\frac{1}{2}(c+dx)\right]}{\cos\left[\frac{1}{2}(c+dx)\right]+\sin\left[\frac{1}{2}(c+dx)\right]} + \frac{a b\left(A b^2+a(-b B+a C)\right)\sin[c+dx]}{(a-b)(a+b)}\right)$$

Problem 911: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sec[c+dx]\left(A+B\sec[c+dx]+C\sec[c+dx]^2\right)}{(a+b\sec[c+dx])^2}\,dx$$

Optimal (type 3, 148 leaves, 6 steps):

$$\frac{C\,\text{ArcTanh}[\sin[c+dx]]}{b^2 d} + \frac{2\left(a A b^2-b^3 B-a^3 C+2 a b^2 C\right)\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\tan\left[\frac{1}{2}(c+dx)\right]}{\sqrt{a+b}}\right]}{(a-b)^{3/2} b^2 (a+b)^{3/2} d} - \frac{\left(A b^2-a(b B-a C)\right)\tan[c+dx]}{b\left(a^2-b^2\right) d (a+b\sec[c+dx])}$$

Result (type 3, 356 leaves):

$$\frac{1}{b^2 d (A+2C+2B\cos[c+dx]+A\cos[2(c+dx)])(a+b\sec[c+dx])^2} 2 (b+a\cos[c+dx]) \left(A+B\sec[c+dx]+C\sec[c+dx]^2\right) \left(-C(b+a\cos[c+dx])\text{Log}\left[\cos\left[\frac{1}{2}(c+dx)\right]-\sin\left[\frac{1}{2}(c+dx)\right]\right] + C(b+a\cos[c+dx])\text{Log}\left[\cos\left[\frac{1}{2}(c+dx)\right]+\sin\left[\frac{1}{2}(c+dx)\right]\right] + \left(2\left(b^3 B+a^3 C-a b^2(A+2C)\right)\text{ArcTan}\left[\frac{(i\cos[c]+\sin[c])\left(a\sin[c]+(-b+a\cos[c])\tan\left[\frac{dx}{2}\right]\right)}{\sqrt{a^2-b^2}\sqrt{(\cos[c]-i\sin[c])^2}}\right](b+a\cos[c+dx])(i\cos[c]+\sin[c])\right) \Big/ \left(\left(a^2-b^2\right)^{3/2}\sqrt{(\cos[c]-i\sin[c])^2}\right) + \frac{b\left(A b^2+a(-b B+a C)\right)(b\sin[c]-a\sin[dx])}{a(a-b)(a+b)\left(\cos\left[\frac{c}{2}\right]-\sin\left[\frac{c}{2}\right]\right)\left(\cos\left[\frac{c}{2}\right]+\sin\left[\frac{c}{2}\right]\right)}\right)$$

- **Problem 912: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2}{(a + b \operatorname{Sec}[c + d x])^2} \, dx$$

Optimal (type 3, 138 leaves, 5 steps):

$$\frac{A x}{a^2} - \frac{2 \left(2 a^2 A b - A b^3 - a^3 B + a^2 b C\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^2 (a-b)^{3/2} (a+b)^{3/2} d} + \frac{\left(A b^2 - a (b B - a C)\right) \operatorname{Tan}[c + d x]}{a \left(a^2 - b^2\right) d (a + b \operatorname{Sec}[c + d x])}$$

Result (type 3, 299 leaves):

$$\left(2 (b + a \operatorname{Cos}[c + d x]) \left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \left(A x (b + a \operatorname{Cos}[c + d x]) - \left(2 i \left(A b^3 + a^3 B - a^2 b (2 A + C)\right) \operatorname{ArcTan}\left[\frac{(i \operatorname{Cos}[c] + \operatorname{Sin}[c]) \left(a \operatorname{Sin}[c] + (-b + a \operatorname{Cos}[c]) \operatorname{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{a^2 - b^2} \sqrt{(\operatorname{Cos}[c] - i \operatorname{Sin}[c])^2}}\right] (b + a \operatorname{Cos}[c + d x]) (\operatorname{Cos}[c] - i \operatorname{Sin}[c])\right) \Big/ \left(\left(a^2 - b^2\right)^{3/2} d \sqrt{(\operatorname{Cos}[c] - i \operatorname{Sin}[c])^2}\right) + \frac{\left(A b^2 + a (-b B + a C)\right) (-b \operatorname{Sin}[c] + a \operatorname{Sin}[d x])}{(a - b) (a + b) d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right)}\right)\right) \Big/ \left(a^2 (A + 2 C + 2 B \operatorname{Cos}[c + d x] + A \operatorname{Cos}[2 (c + d x)]) (a + b \operatorname{Sec}[c + d x])^2\right)$$

- **Problem 916: Result more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[c + d x]^4 \left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right)}{(a + b \operatorname{Sec}[c + d x])^3} \, dx$$

Optimal (type 3, 465 leaves, 9 steps):

$$\frac{\left(2 A b^2-6 a b B+12 a^2 C+b^2 C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 b^5 d}-\frac{1}{(a-b)^{5/2} b^5 (a+b)^{5/2} d}$$

$$a \left(6 A b^6-6 a^5 b B+15 a^3 b^3 B-12 a b^5 B+a^4 b^2 (2 A-29 C)-5 a^2 b^4 (A-4 C)+12 a^6 C\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]+$$

$$\frac{\left(6 a^4 b B-11 a^2 b^3 B+2 b^5 B-a^3 b^2 (2 A-21 C)+a b^4 (5 A-6 C)-12 a^5 C\right) \text{Tan}[c+d x]}{2 b^4 \left(a^2-b^2\right)^2 d}-$$

$$\frac{\left(3 a^3 b B-6 a b^3 B-a^2 b^2 (A-10 C)+b^4 (4 A-C)-6 a^4 C\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b^3 \left(a^2-b^2\right)^2 d}-$$

$$\frac{\left(A b^2-a (b B-a C)\right) \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{2 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^2}+\frac{\left(3 A b^4+a \left(2 a^2 b B-5 b^3 B-4 a^3 C+7 a b^2 C\right)\right) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{2 b^2 \left(a^2-b^2\right)^2 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 1124 leaves) :

$$\left(2 a \left(2 a^4 A b^2-5 a^2 A b^4+6 A b^6-6 a^5 b B+15 a^3 b^3 B-12 a b^5 B+12 a^6 C-29 a^4 b^2 C+20 a^2 b^4 C\right)\right.$$

$$\left.\text{ArcTanh}\left[\frac{(-a+b) \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right] (b+a \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(b^5 \sqrt{a^2-b^2} \left(-a^2+b^2\right)^2 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)+$$

$$\left(\left(-2 A b^2+6 a b B-12 a^2 C-b^2 C\right) (b+a \text{Cos}[c+d x])^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(b^5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)+$$

$$\left(\left(2 A b^2-6 a b B+12 a^2 C+b^2 C\right) (b+a \text{Cos}[c+d x])^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right) \Big/$$

$$\left(b^5 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)+\left((b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^3 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(-6 a^4 A b^3 \text{Sin}[c+d x]+12 a^2 A b^5 \text{Sin}[c+d x]+18 a^5 b^2 B \text{Sin}[c+d x]-32 a^3 b^4 B \text{Sin}[c+d x]+8 a b^6 B \text{Sin}[c+d x]-\right.$$

$$36 a^6 b C \text{Sin}[c+d x]+72 a^4 b^3 C \text{Sin}[c+d x]-38 a^2 b^5 C \text{Sin}[c+d x]+8 b^7 C \text{Sin}[c+d x]-4 a^5 A b^2 \text{Sin}[2 (c+d x)]+$$

$$10 a^3 A b^4 \text{Sin}[2 (c+d x)]+12 a^6 b B \text{Sin}[2 (c+d x)]-14 a^4 b^3 B \text{Sin}[2 (c+d x)]-12 a^2 b^5 B \text{Sin}[2 (c+d x)]+8 b^7 B \text{Sin}[2 (c+d x)]-$$

$$24 a^7 C \text{Sin}[2 (c+d x)]+26 a^5 b^2 C \text{Sin}[2 (c+d x)]+20 a^3 b^4 C \text{Sin}[2 (c+d x)]-16 a b^6 C \text{Sin}[2 (c+d x)]-6 a^4 A b^3 \text{Sin}[3 (c+d x)]+$$

$$12 a^2 A b^5 \text{Sin}[3 (c+d x)]+18 a^5 b^2 B \text{Sin}[3 (c+d x)]-32 a^3 b^4 B \text{Sin}[3 (c+d x)]+8 a b^6 B \text{Sin}[3 (c+d x)]-36 a^6 b C \text{Sin}[3 (c+d x)]+$$

$$64 a^4 b^3 C \text{Sin}[3 (c+d x)]-22 a^2 b^5 C \text{Sin}[3 (c+d x)]-2 a^5 A b^2 \text{Sin}[4 (c+d x)]+5 a^3 A b^4 \text{Sin}[4 (c+d x)]+6 a^6 b B \text{Sin}[4 (c+d x)]-$$

$$\left.\left.11 a^4 b^3 B \text{Sin}[4 (c+d x)]+2 a^2 b^5 B \text{Sin}[4 (c+d x)]-12 a^7 C \text{Sin}[4 (c+d x)]+21 a^5 b^2 C \text{Sin}[4 (c+d x)]-6 a^3 b^4 C \text{Sin}[4 (c+d x)]\right)\right) \Big/$$

$$\left(8 b^4 \left(-a^2+b^2\right)^2 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^3\right)$$

- **Problem 918: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right)}{(a+b \,\text{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 242 leaves, 7 steps) :

$$\frac{C \,\text{ArcTanh}[\text{Sin}[c+d x]]}{b^3 d}+\frac{\left(a^2 b^3 B+2 b^5 B-2 a^5 C+5 a^3 b^2 C-3 a b^4 (A+2 C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \,\text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{5/2} b^3 (a+b)^{5/2} d}+$$
$$\frac{a \left(A b^2-a (b B-a C)\right) \text{Tan}[c+d x]}{2 b^2 \left(a^2-b^2\right) d (a+b \,\text{Sec}[c+d x])^2}+\frac{\left(2 A b^4+a^3 b B-4 a b^3 B-3 a^4 C+a^2 b^2 (A+6 C)\right) \text{Tan}[c+d x]}{2 b^2 \left(a^2-b^2\right)^2 d (a+b \,\text{Sec}[c+d x])}$$

Result (type 3, 1071 leaves) :

$$-\left(2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

$$\left(b^3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\right)+$$

$$\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{b^3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3}+$$

$$\Bigg(\left(-3\,a\,A\,b^4+a^2\,b^3\,B+2\,b^5\,B-2\,a^5\,C+5\,a^3\,b^2\,C-6\,a\,b^4\,C\right)\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-\Bigg(2\,i\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]$$

$$\text{Cos}[c]\Bigg)\Big/\left(b^3\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)-$$

$$\Bigg(2\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Sin}[c]\Bigg)\Big/$$

$$\left(b^3\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)\Bigg)\Bigg)\Big/\left(\left(-a^2+b^2\right)^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Big((b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\big(-2\,a^4\,A\,b^2\,\text{Sin}[c]-5\,a^2\,A\,b^4\,\text{Sin}[c]-2\,A\,b^6\,\text{Sin}[c]+3\,a^3\,b^3\,B\,\text{Sin}[c]+6\,a\,b^5\,B\,\text{Sin}[c]+2\,a^6\,C\,\text{Sin}[c]-a^4\,b^2\,C\,\text{Sin}[c]-10\,a^2\,b^4\,C\,\text{Sin}[c]+$$

$$5\,a^3\,A\,b^3\,\text{Sin}[d\,x]+4\,a\,A\,b^5\,\text{Sin}[d\,x]+a^4\,b^2\,B\,\text{Sin}[d\,x]-10\,a^2\,b^4\,B\,\text{Sin}[d\,x]-7\,a^5\,b\,C\,\text{Sin}[d\,x]+16\,a^3\,b^3\,C\,\text{Sin}[d\,x]-$$

$$3\,a^3\,A\,b^3\,\text{Sin}[2\,c+d\,x]+a^4\,b^2\,B\,\text{Sin}[2\,c+d\,x]+2\,a^2\,b^4\,B\,\text{Sin}[2\,c+d\,x]+a^5\,b\,C\,\text{Sin}[2\,c+d\,x]-4\,a^3\,b^3\,C\,\text{Sin}[2\,c+d\,x]+$$

$$2\,a^4\,A\,b^2\,\text{Sin}[c+2\,d\,x]+a^2\,A\,b^4\,\text{Sin}[c+2\,d\,x]-3\,a^3\,b^3\,B\,\text{Sin}[c+2\,d\,x]-2\,a^6\,C\,\text{Sin}[c+2\,d\,x]+5\,a^4\,b^2\,C\,\text{Sin}[c+2\,d\,x]\big)\Big)\Big/$$

$$\left(2\,a\,b^2\,\left(-a^2+b^2\right)^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 919: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 202 leaves, 6 steps):

$$-\frac{\left(3\,a\,b\,B-a^2\,(2\,A+C)-b^2\,(A+2\,C)\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{5/2}\,(a+b)^{5/2}\,d}-$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Tan}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{\left(a^2\,b\,B+2\,b^3\,B+a^3\,C-a\,b^2\,(3\,A+4\,C)\right)\,\text{Tan}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 800 leaves):

$$\left(\left(2 a^2 A + A b^2 - 3 a b B + a^2 C + 2 b^2 C\right) (b + a \text{Cos}[c + d x])^3 \text{Sec}[c + d x] \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right.$$
$$\left(-\left(2 i \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right] \left(\frac{\text{Cos}[c]}{\sqrt{a^2 - b^2} \sqrt{\text{Cos}[2 c] - i \text{Sin}[2 c]}} - \frac{i \text{Sin}[c]}{\sqrt{a^2 - b^2} \sqrt{\text{Cos}[2 c] - i \text{Sin}[2 c]}}\right) \left(-i b \text{Sin}\left[\frac{d x}{2}\right] + i a \text{Sin}\left[c + \frac{d x}{2}\right]\right)\right]\right.\right.$$
$$\left.\text{Cos}[c]\right) \Big/ \left(\sqrt{a^2 - b^2} d \sqrt{\text{Cos}[2 c] - i \text{Sin}[2 c]}\right) -$$
$$\left(2 \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right] \left(\frac{\text{Cos}[c]}{\sqrt{a^2 - b^2} \sqrt{\text{Cos}[2 c] - i \text{Sin}[2 c]}} - \frac{i \text{Sin}[c]}{\sqrt{a^2 - b^2} \sqrt{\text{Cos}[2 c] - i \text{Sin}[2 c]}}\right) \left(-i b \text{Sin}\left[\frac{d x}{2}\right] + i a \text{Sin}\left[c + \frac{d x}{2}\right]\right)\right] \text{Sin}[c]\right) \Big/$$
$$\left.\left.\left(\sqrt{a^2 - b^2} d \sqrt{\text{Cos}[2 c] - i \text{Sin}[2 c]}\right)\right)\right) \Big/$$
$$\left(\left(-a^2 + b^2\right)^2 (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) (a + b \text{Sec}[c + d x])^3\right) +$$
$$\left((b + a \text{Cos}[c + d x]) \text{Sec}[c] \text{Sec}[c + d x] \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right)\right.$$
$$\left(4 a^4 A b \text{Sin}[c] + 7 a^2 A b^3 \text{Sin}[c] - 2 A b^5 \text{Sin}[c] - 2 a^5 B \text{Sin}[c] - 5 a^3 b^2 B \text{Sin}[c] - 2 a b^4 B \text{Sin}[c] + 3 a^4 b C \text{Sin}[c] +\right.$$
$$6 a^2 b^3 C \text{Sin}[c] - 11 a^3 A b^2 \text{Sin}[d x] + 2 a A b^4 \text{Sin}[d x] + 5 a^4 b B \text{Sin}[d x] + 4 a^2 b^3 B \text{Sin}[d x] + a^5 C \text{Sin}[d x] - 10 a^3 b^2 C \text{Sin}[d x] +$$
$$5 a^3 A b^2 \text{Sin}[2 c + d x] - 2 a A b^4 \text{Sin}[2 c + d x] - 3 a^4 b B \text{Sin}[2 c + d x] + a^5 C \text{Sin}[2 c + d x] + 2 a^3 b^2 C \text{Sin}[2 c + d x] -$$
$$\left.\left.4 a^4 A b \text{Sin}[c + 2 d x] + a^2 A b^3 \text{Sin}[c + 2 d x] + 2 a^5 B \text{Sin}[c + 2 d x] + a^3 b^2 B \text{Sin}[c + 2 d x] - 3 a^4 b C \text{Sin}[c + 2 d x]\right)\right) \Big/$$
$$\left(2 a^2 \left(a^2 - b^2\right)^2 d (A + 2 C + 2 B \text{Cos}[c + d x] + A \text{Cos}[2 c + 2 d x]) (a + b \text{Sec}[c + d x])^3\right)$$

- **Problem 920: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2}{(a + b \text{Sec}[c + d x])^3} \, dx$$

Optimal (type 3, 229 leaves, 6 steps):

$$\frac{A x}{a^3} + \frac{\left(5 a^2 A b^3 - 2 A b^5 + 2 a^5 B + a^3 b^2 B - 3 a^4 b (2 A + C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^3 (a - b)^{5/2} (a + b)^{5/2} d} +$$
$$\frac{\left(A b^2 - a (b B - a C)\right) \text{Tan}[c + d x]}{2 a \left(a^2 - b^2\right) d (a + b \text{Sec}[c + d x])^2} - \frac{\left(2 A b^4 + 3 a^3 b B - a^4 C - a^2 b^2 (5 A + 2 C)\right) \text{Tan}[c + d x]}{2 a^2 \left(a^2 - b^2\right)^2 d (a + b \text{Sec}[c + d x])}$$

Result (type 3, 1093 leaves):

$$\Bigg(\left(6 a^4 A b-5 a^2 A b^3+2 A b^5-2 a^5 B-a^3 b^2 B+3 a^4 b C\right) (b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sec}[c+d x] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(\left(2 \text{i} \operatorname{ArcTan}\left[\operatorname{Sec}\left[\frac{d x}{2}\right]\left(\frac{\operatorname{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-\text{i} \operatorname{Sin}[2 c]}}-\frac{\text{i} \operatorname{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-\text{i} \operatorname{Sin}[2 c]}}\right)\left(-\text{i} b \operatorname{Sin}\left[\frac{d x}{2}\right]+\text{i} a \operatorname{Sin}\left[c+\frac{d x}{2}\right]\right)\right] \operatorname{Cos}[c]\right) \Big/\right.\right.$$

$$\left.\left(a^3 \sqrt{a^2-b^2}\, d \sqrt{\operatorname{Cos}[2 c]-\text{i} \operatorname{Sin}[2 c]}\right)+\right.$$

$$\left(2 \operatorname{ArcTan}\left[\operatorname{Sec}\left[\frac{d x}{2}\right]\left(\frac{\operatorname{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-\text{i} \operatorname{Sin}[2 c]}}-\frac{\text{i} \operatorname{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\operatorname{Cos}[2 c]-\text{i} \operatorname{Sin}[2 c]}}\right)\left(-\text{i} b \operatorname{Sin}\left[\frac{d x}{2}\right]+\text{i} a \operatorname{Sin}\left[c+\frac{d x}{2}\right]\right)\right] \operatorname{Sin}[c]\right) \Big/$$

$$\left.\left.\left(a^3 \sqrt{a^2-b^2}\, d \sqrt{\operatorname{Cos}[2 c]-\text{i} \operatorname{Sin}[2 c]}\right)\right)\right) \Big/$$

$$\left(\left(-a^2+b^2\right)^2 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a+b \operatorname{Sec}[c+d x])^3\right)+$$

$$\Big((b+a \operatorname{Cos}[c+d x]) \operatorname{Sec}[c] \operatorname{Sec}[c+d x] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\big(2 a^6 A d x \operatorname{Cos}[c]-6 a^2 A b^4 d x \operatorname{Cos}[c]+4 A b^6 d x \operatorname{Cos}[c]+4 a^5 A b d x \operatorname{Cos}[d x]-8 a^3 A b^3 d x \operatorname{Cos}[d x]+4 a A b^5 d x \operatorname{Cos}[d x]+$$
$$4 a^5 A b d x \operatorname{Cos}[2 c+d x]-8 a^3 A b^3 d x \operatorname{Cos}[2 c+d x]+4 a A b^5 d x \operatorname{Cos}[2 c+d x]+a^6 A d x \operatorname{Cos}[c+2 d x]-2 a^4 A b^2 d x \operatorname{Cos}[c+2 d x]+$$
$$a^2 A b^4 d x \operatorname{Cos}[c+2 d x]+a^6 A d x \operatorname{Cos}[3 c+2 d x]-2 a^4 A b^2 d x \operatorname{Cos}[3 c+2 d x]+a^2 A b^4 d x \operatorname{Cos}[3 c+2 d x]-6 a^4 A b^2 \operatorname{Sin}[c]-$$
$$9 a^2 A b^4 \operatorname{Sin}[c]+6 A b^6 \operatorname{Sin}[c]+4 a^5 b B \operatorname{Sin}[c]+7 a^3 b^3 B \operatorname{Sin}[c]-2 a b^5 B \operatorname{Sin}[c]-2 a^6 C \operatorname{Sin}[c]-5 a^4 b^2 C \operatorname{Sin}[c]-2 a^2 b^4 C \operatorname{Sin}[c]+$$
$$17 a^3 A b^3 \operatorname{Sin}[d x]-8 a A b^5 \operatorname{Sin}[d x]-11 a^4 b^2 B \operatorname{Sin}[d x]+2 a^2 b^4 B \operatorname{Sin}[d x]+5 a^5 b C \operatorname{Sin}[d x]+4 a^3 b^3 C \operatorname{Sin}[d x]-7 a^3 A b^3 \operatorname{Sin}[2 c+d x]+$$
$$4 a A b^5 \operatorname{Sin}[2 c+d x]+5 a^4 b^2 B \operatorname{Sin}[2 c+d x]-2 a^2 b^4 B \operatorname{Sin}[2 c+d x]-3 a^5 b C \operatorname{Sin}[2 c+d x]+6 a^4 A b^2 \operatorname{Sin}[c+2 d x]-$$
$$3 a^2 A b^4 \operatorname{Sin}[c+2 d x]-4 a^5 b B \operatorname{Sin}[c+2 d x]+a^3 b^3 B \operatorname{Sin}[c+2 d x]+2 a^6 C \operatorname{Sin}[c+2 d x]+a^4 b^2 C \operatorname{Sin}[c+2 d x]\big)\Big) \Big/$$

$$\left(2 a^3 \left(a^2-b^2\right)^2 d\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) (a+b \operatorname{Sec}[c+d x])^3\right)$$

- **Problem 921: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cos}[c+d x] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^3} \, dx$$

Optimal (type 3, 330 leaves, 7 steps):

$$-\frac{(3 A b-a B) x}{a^4}-\frac{\left(15 a^2 A b^4-6 A b^6+6 a^5 b B-5 a^3 b^3 B+2 a b^5 B-2 a^6 C-a^4 b^2 (12 A+C)\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^4 (a-b)^{5/2} (a+b)^{5/2} d}-$$

$$\frac{\left(11 a^2 A b^2-6 A b^4-5 a^3 b B+2 a b^3 B-a^4 (2 A-3 C)\right) \operatorname{Sin}[c+d x]}{2 a^3 \left(a^2-b^2\right)^2 d}+$$

$$\frac{\left(A b^2-a (b B-a C)\right) \operatorname{Sin}[c+d x]}{2 a \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^2}-\frac{\left(3 A b^4+4 a^3 b B-a b^3 B-2 a^4 C-a^2 b^2 (6 A+C)\right) \operatorname{Sin}[c+d x]}{2 a^2 \left(a^2-b^2\right)^2 d (a+b \operatorname{Sec}[c+d x])}$$

Result (type 3, 1015 leaves):

$$-\frac{2\,(3\,A\,b-a\,B)\,x\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^3}+$$

$$\Bigg(\left(12\,a^4\,A\,b^2-15\,a^2\,A\,b^4+6\,A\,b^6-6\,a^5\,b\,B+5\,a^3\,b^3\,B-2\,a\,b^5\,B+2\,a^6\,C+a^4\,b^2\,C\right)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(-\left(2\,i\,\mathrm{ArcTan}\left[\mathrm{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\mathrm{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}-\frac{i\,\mathrm{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}\right)\left(-i\,b\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\right.\right.$$

$$\left.\mathrm{Cos}[c]\right)\Big/\left(a^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}\right)-$$

$$\left(2\,\mathrm{ArcTan}\left[\mathrm{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\mathrm{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}-\frac{i\,\mathrm{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}}\right)\left(-i\,b\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\mathrm{Sin}[c]\right)\Big/$$

$$\left.\left.\left(a^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\mathrm{Cos}[2\,c]-i\,\mathrm{Sin}[2\,c]}\right)\right)\right)\Big/$$

$$\left(\left(-a^2+b^2\right)^2\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\Big((b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(-A\,b^5\,\mathrm{Sin}[c]+a\,b^4\,B\,\mathrm{Sin}[c]-a^2\,b^3\,C\,\mathrm{Sin}[c]+a\,A\,b^4\,\mathrm{Sin}[d\,x]-a^2\,b^3\,B\,\mathrm{Sin}[d\,x]+a^3\,b^2\,C\,\mathrm{Sin}[d\,x]\right)\Big)\Big/$$

$$\left(a^4\,\left(a^2-b^2\right)\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\Big((b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\big(9\,a^2\,A\,b^4\,\mathrm{Sin}[c]-6\,A\,b^6\,\mathrm{Sin}[c]-7\,a^3\,b^3\,B\,\mathrm{Sin}[c]+4\,a\,b^5\,B\,\mathrm{Sin}[c]+5\,a^4\,b^2\,C\,\mathrm{Sin}[c]-2\,a^2\,b^4\,C\,\mathrm{Sin}[c]-$$

$$8\,a^3\,A\,b^3\,\mathrm{Sin}[d\,x]+5\,a\,A\,b^5\,\mathrm{Sin}[d\,x]+6\,a^4\,b^2\,B\,\mathrm{Sin}[d\,x]-3\,a^2\,b^4\,B\,\mathrm{Sin}[d\,x]-4\,a^5\,b\,C\,\mathrm{Sin}[d\,x]+a^3\,b^3\,C\,\mathrm{Sin}[d\,x]\big)\Big)\Big/$$

$$\left(a^4\,\left(a^2-b^2\right)^2\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\frac{2\,A\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Tan}[c+d\,x]}{a^3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^3}$$

Problem 922: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+b\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 3, 453 leaves, 8 steps):

$$\frac{\left(12\,A\,b^2-6\,a\,b\,B+a^2\,(A+2\,C)\right)x}{2\,a^5}-\frac{1}{a^5\,(a-b)^{5/2}\,(a+b)^{5/2}\,d}$$

$$b\left(12\,A\,b^6-12\,a^5\,b\,B+15\,a^3\,b^3\,B-6\,a\,b^5\,B-a^2\,b^4\,(29\,A-2\,C)+5\,a^4\,b^2\,(4\,A-C)+6\,a^6\,C\right)\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]-$$

$$\frac{\left(12\,A\,b^5-2\,a^5\,B+11\,a^3\,b^2\,B-6\,a\,b^4\,B+a^4\,b\,(6\,A-5\,C)-a^2\,b^3\,(21\,A-2\,C)\right)\text{Sin}[c+d\,x]}{2\,a^4\,\left(a^2-b^2\right)^2\,d}+$$

$$\frac{\left(6\,A\,b^4+6\,a^3\,b\,B-3\,a\,b^3\,B+a^4\,(A-4\,C)-a^2\,b^2\,(10\,A-C)\right)\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,\left(a^2-b^2\right)^2\,d}+$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{\left(7\,a^2\,A\,b^2-4\,A\,b^4-5\,a^3\,b\,B+2\,a\,b^3\,B+3\,a^4\,C\right)\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 1150 leaves):

$$\frac{1}{a^5\,\sqrt{a^2-b^2}\,\left(-a^2+b^2\right)^2\,d}$$

$$b\left(20\,a^4\,A\,b^2-29\,a^2\,A\,b^4+12\,A\,b^6-12\,a^5\,b\,B+15\,a^3\,b^3\,B-6\,a\,b^5\,B+6\,a^6\,C-5\,a^4\,b^2\,C+2\,a^2\,b^4\,C\right)\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]+$$

$$\frac{1}{16\,a^5\,\left(a^2-b^2\right)^2\,d\,(b+a\,\text{Cos}[c+d\,x])^2}$$

$$\left(4\,a^8\,A\,(c+d\,x)+48\,a^6\,A\,b^2\,(c+d\,x)-12\,a^4\,A\,b^4\,(c+d\,x)-136\,a^2\,A\,b^6\,(c+d\,x)+96\,A\,b^8\,(c+d\,x)-24\,a^7\,b\,B\,(c+d\,x)+72\,a^3\,b^5\,B\,(c+d\,x)-\right.$$
$$48\,a\,b^7\,B\,(c+d\,x)+8\,a^8\,C\,(c+d\,x)-24\,a^4\,b^4\,C\,(c+d\,x)+16\,a^2\,b^6\,C\,(c+d\,x)+16\,a^7\,A\,b\,(c+d\,x)\,\text{Cos}[c+d\,x]+160\,a^5\,A\,b^3\,(c+d\,x)\,\text{Cos}[c+d\,x]-$$
$$368\,a^3\,A\,b^5\,(c+d\,x)\,\text{Cos}[c+d\,x]+192\,a\,A\,b^7\,(c+d\,x)\,\text{Cos}[c+d\,x]-96\,a^6\,b^2\,B\,(c+d\,x)\,\text{Cos}[c+d\,x]+192\,a^4\,b^4\,B\,(c+d\,x)\,\text{Cos}[c+d\,x]-$$
$$96\,a^2\,b^6\,B\,(c+d\,x)\,\text{Cos}[c+d\,x]+32\,a^7\,b\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]-64\,a^5\,b^3\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]+32\,a^3\,b^5\,C\,(c+d\,x)\,\text{Cos}[c+d\,x]+$$
$$4\,a^8\,A\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+40\,a^6\,A\,b^2\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-92\,a^4\,A\,b^4\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+48\,a^2\,A\,b^6\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-$$
$$24\,a^7\,b\,B\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+48\,a^5\,b^3\,B\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-24\,a^3\,b^5\,B\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+8\,a^8\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-$$
$$16\,a^6\,b^2\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+8\,a^4\,b^4\,C\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]-8\,a^7\,A\,b\,\text{Sin}[c+d\,x]-32\,a^5\,A\,b^3\,\text{Sin}[c+d\,x]+$$
$$160\,a^3\,A\,b^5\,\text{Sin}[c+d\,x]-96\,a\,A\,b^7\,\text{Sin}[c+d\,x]+4\,a^8\,B\,\text{Sin}[c+d\,x]+8\,a^6\,b^2\,B\,\text{Sin}[c+d\,x]-84\,a^4\,b^4\,B\,\text{Sin}[c+d\,x]+48\,a^2\,b^6\,B\,\text{Sin}[c+d\,x]+$$
$$40\,a^5\,b^3\,C\,\text{Sin}[c+d\,x]-16\,a^3\,b^5\,C\,\text{Sin}[c+d\,x]+2\,a^8\,A\,\text{Sin}[2\,(c+d\,x)]-48\,a^6\,A\,b^2\,\text{Sin}[2\,(c+d\,x)]+130\,a^4\,A\,b^4\,\text{Sin}[2\,(c+d\,x)]-$$
$$72\,a^2\,A\,b^6\,\text{Sin}[2\,(c+d\,x)]+16\,a^7\,b\,B\,\text{Sin}[2\,(c+d\,x)]-64\,a^5\,b^3\,B\,\text{Sin}[2\,(c+d\,x)]+36\,a^3\,b^5\,B\,\text{Sin}[2\,(c+d\,x)]+24\,a^6\,b^2\,C\,\text{Sin}[2\,(c+d\,x)]-$$
$$12\,a^4\,b^4\,C\,\text{Sin}[2\,(c+d\,x)]-8\,a^7\,A\,b\,\text{Sin}[3\,(c+d\,x)]+16\,a^5\,A\,b^3\,\text{Sin}[3\,(c+d\,x)]-8\,a^3\,A\,b^5\,\text{Sin}[3\,(c+d\,x)]+4\,a^8\,B\,\text{Sin}[3\,(c+d\,x)]-$$
$$\left.8\,a^6\,b^2\,B\,\text{Sin}[3\,(c+d\,x)]+4\,a^4\,b^4\,B\,\text{Sin}[3\,(c+d\,x)]+a^8\,A\,\text{Sin}[4\,(c+d\,x)]-2\,a^6\,A\,b^2\,\text{Sin}[4\,(c+d\,x)]+a^4\,A\,b^4\,\text{Sin}[4\,(c+d\,x)]\right)$$

- **Problem 923: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 470 leaves, 9 steps):

$$\frac{(b B-4 a C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{b^5 d}-\frac{1}{(a-b)^{7/2} b^5 (a+b)^{7/2} d}$$

$$\left(2 A b^8+2 a^7 b B-7 a^5 b^3 B+8 a^3 b^5 B-8 a b^7 B-8 a^8 C+28 a^6 b^2 C-35 a^4 b^4 C+a^2 b^6 (3 A+20 C)\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]-$$

$$\frac{\left(5 A b^4+3 a^3 b B-8 a b^3 B-12 a^4 C+23 a^2 b^2 C-6 b^4 C\right) \operatorname{Tan}[c+d x]}{6 b^4 \left(a^2-b^2\right)^2 d}-\frac{\left(A b^2-a (b B-a C)\right) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^3}+$$

$$\frac{\left(3 A b^4+a^3 b B-6 a b^3 B-4 a^4 C+a^2 b^2 (2 A+9 C)\right) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{6 b^2 \left(a^2-b^2\right)^2 d (a+b \operatorname{Sec}[c+d x])^2}+$$

$$\frac{a \left(2 A b^6-a^5 b B+2 a^3 b^3 B-6 a b^5 B+4 a^6 C-11 a^4 b^2 C+3 a^2 b^4 (A+4 C)\right) \operatorname{Tan}[c+d x]}{2 b^4 \left(a^2-b^2\right)^3 d (a+b \operatorname{Sec}[c+d x])}$$

Result (type 3, 1197 leaves):

$$-\left(2\left(3a^2Ab^6+2Ab^8+2a^7bB-7a^5b^3B+8a^3b^5B-8ab^7B-8a^8C+28a^6b^2C-35a^4b^4C+20a^2b^6C\right)\right.$$
$$\left.\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{a^2-b^2}}\right](b+a\,\text{Cos}[c+dx])^4\,\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(b^5\sqrt{a^2-b^2}\left(-a^2+b^2\right)^3 d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+b\,\text{Sec}[c+dx])^4\right)-$$
$$\left(2\,(bB-4aC)\,(b+a\,\text{Cos}[c+dx])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(b^5 d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+b\,\text{Sec}[c+dx])^4\right)+$$
$$\left(2\,(bB-4aC)\,(b+a\,\text{Cos}[c+dx])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}[c+dx]^2\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right)\Big/$$
$$\left(b^5 d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+b\,\text{Sec}[c+dx])^4\right)+$$
$$\left((b+a\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\right.$$
$$\left(-6a^4Ab^5\,\text{Sin}[c+dx]-54a^2Ab^7\,\text{Sin}[c+dx]+30a^7b^2B\,\text{Sin}[c+dx]-90a^5b^4B\,\text{Sin}[c+dx]+120a^3b^6B\,\text{Sin}[c+dx]-\right.$$
$$120a^8bC\,\text{Sin}[c+dx]+294a^6b^3C\,\text{Sin}[c+dx]-174a^4b^5C\,\text{Sin}[c+dx]-108a^2b^7C\,\text{Sin}[c+dx]+48b^9C\,\text{Sin}[c+dx]-$$
$$16a^5Ab^4\,\text{Sin}[2(c+dx)]-2a^3Ab^6\,\text{Sin}[2(c+dx)]-72aAb^8\,\text{Sin}[2(c+dx)]+12a^8bB\,\text{Sin}[2(c+dx)]+10a^6b^3B\,\text{Sin}[2(c+dx)]-$$
$$76a^4b^5B\,\text{Sin}[2(c+dx)]+144a^2b^7B\,\text{Sin}[2(c+dx)]-48a^9C\,\text{Sin}[2(c+dx)]-40a^7b^2C\,\text{Sin}[2(c+dx)]+370a^5b^4C\,\text{Sin}[2(c+dx)]-$$
$$444a^3b^6C\,\text{Sin}[2(c+dx)]+72ab^8C\,\text{Sin}[2(c+dx)]-6a^4Ab^5\,\text{Sin}[3(c+dx)]-54a^2Ab^7\,\text{Sin}[3(c+dx)]+30a^7b^2B\,\text{Sin}[3(c+dx)]-90$$
$$a^5b^4B\,\text{Sin}[3(c+dx)]+120a^3b^6B\,\text{Sin}[3(c+dx)]-120a^8bC\,\text{Sin}[3(c+dx)]+342a^6b^3C\,\text{Sin}[3(c+dx)]-318a^4b^5C\,\text{Sin}[3(c+dx)]+$$
$$36a^2b^7C\,\text{Sin}[3(c+dx)]-4a^5Ab^4\,\text{Sin}[4(c+dx)]-11a^3Ab^6\,\text{Sin}[4(c+dx)]+6a^8bB\,\text{Sin}[4(c+dx)]-17a^6b^3B\,\text{Sin}[4(c+dx)]+$$
$$\left.\left.26a^4b^5B\,\text{Sin}[4(c+dx)]-24a^9C\,\text{Sin}[4(c+dx)]+68a^7b^2C\,\text{Sin}[4(c+dx)]-65a^5b^4C\,\text{Sin}[4(c+dx)]+6a^3b^6C\,\text{Sin}[4(c+dx)]\right)\right)\Big/$$
$$\left(24b^4\left(-a^2+b^2\right)^3 d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+b\,\text{Sec}[c+dx])^4\right)$$

- **Problem 924: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+dx]^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{(a+b\,\text{Sec}[c+dx])^4}\,dx$$

Optimal (type 3, 358 leaves, 8 steps):

$$\frac{C\,\text{ArcTanh}[\text{Sin}[c+dx]]}{b^4 d}-\frac{\left(3a^2b^5B+2b^7B-a^3b^4(A-8C)+2a^7C-7a^5b^2C-4ab^6(A+2C)\right)\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{a+b}}\right]}{(a-b)^{7/2}b^4(a+b)^{7/2}d}-$$
$$\frac{\left(Ab^2-a(bB-aC)\right)\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3b\left(a^2-b^2\right)d\,(a+b\,\text{Sec}[c+dx])^3}-\frac{a\left(2Ab^4-5ab^3B-3a^4C+a^2b^2(3A+8C)\right)\text{Tan}[c+dx]}{6b^3\left(a^2-b^2\right)^2 d\,(a+b\,\text{Sec}[c+dx])^2}-$$
$$\frac{\left(4Ab^6+a^3b^3B-16ab^5B+9a^6C+2a^2b^4(7A+17C)-a^4b^2(3A+28C)\right)\text{Tan}[c+dx]}{6b^3\left(a^2-b^2\right)^3 d\,(a+b\,\text{Sec}[c+dx])}$$

Result (type 3, 1302 leaves) :

$$-\left(2\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(b^4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\left(2\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(b^4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\Bigg(\left(-a^3\,A\,b^4-4\,a\,A\,b^6+3\,a^2\,b^5\,B+2\,b^7\,B+2\,a^7\,C-7\,a^5\,b^2\,C+8\,a^3\,b^4\,C-8\,a\,b^6\,C\right)\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(-\Bigg(2\,i\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]$$
$$\text{Cos}[c]\Bigg)\Big/\left(b^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)-$$
$$\Bigg(2\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}-\frac{i\,\text{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}}\right)\left(-i\,b\,\text{Sin}\left[\frac{d\,x}{2}\right]+i\,a\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Sin}[c]\Bigg)\Big/$$
$$\left(b^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]}\right)\Bigg)\Bigg)\Big/\left(\left(-a^2+b^2\right)^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)-$$
$$\left(2\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(A\,b^3\,\text{Sin}[c]-a\,b^2\,B\,\text{Sin}[c]+a^2\,b\,C\,\text{Sin}[c]-a\,A\,b^2\,\text{Sin}[d\,x]+a^2\,b\,B\,\text{Sin}[d\,x]-a^3\,C\,\text{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a\,b\,\left(-a^2+b^2\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\Big((b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-5\,a\,A\,b^3\,\text{Sin}[c]+2\,a^2\,b^2\,B\,\text{Sin}[c]+3\,b^4\,B\,\text{Sin}[c]+\right.$$
$$\left.a^3\,b\,C\,\text{Sin}[c]-6\,a\,b^3\,C\,\text{Sin}[c]+3\,a^2\,A\,b^2\,\text{Sin}[d\,x]+2\,A\,b^4\,\text{Sin}[d\,x]-5\,a\,b^3\,B\,\text{Sin}[d\,x]-3\,a^4\,C\,\text{Sin}[d\,x]+8\,a^2\,b^2\,C\,\text{Sin}[d\,x]\right)\Big)\Big/$$
$$\left(3\,b^2\,\left(-a^2+b^2\right)^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)+$$
$$\Big((b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-3\,a^3\,A\,b^3\,\text{Sin}[c]-12\,a\,A\,b^5\,\text{Sin}[c]+9\,a^2\,b^4\,B\,\text{Sin}[c]+6\,b^6\,B\,\text{Sin}[c]-3\,a^5\,b\,C\,\text{Sin}[c]+6\,a^3\,b^3\,C\,\text{Sin}[c]-18\,a\,b^5\,C\,\text{Sin}[c]+\right.$$
$$\left.13\,a^2\,A\,b^4\,\text{Sin}[d\,x]+2\,A\,b^6\,\text{Sin}[d\,x]-4\,a^3\,b^3\,B\,\text{Sin}[d\,x]-11\,a\,b^5\,B\,\text{Sin}[d\,x]+6\,a^6\,C\,\text{Sin}[d\,x]-17\,a^4\,b^2\,C\,\text{Sin}[d\,x]+26\,a^2\,b^4\,C\,\text{Sin}[d\,x]\right)\Big)\Big/$$
$$\left(3\,b^3\,\left(-a^2+b^2\right)^3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^4\right)$$

- **Problem 926: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 299 leaves, 7 steps) :

$$-\frac{\left(4 a^2 b B+b^3 B-a^3 (2 A+C)-a b^2 (3 A+4 C)\right) \text{ArcTanh}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{(a-b)^{7/2} (a+b)^{7/2} d}-\frac{\left(A b^2-a (b B-a C)\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^3}+\frac{\left(2 a^2 b B+3 b^3 B+a^3 C-a b^2 (5 A+6 C)\right) \text{Tan}[c+d x]}{6 b \left(a^2-b^2\right)^2 d (a+b \text{Sec}[c+d x])^2}+\frac{\left(2 a^3 b B+13 a b^3 B+a^4 C-2 b^4 (2 A+3 C)-a^2 b^2 (11 A+10 C)\right) \text{Tan}[c+d x]}{6 b \left(a^2-b^2\right)^3 d (a+b \text{Sec}[c+d x])}$$

Result (type 3, 1069 leaves) :

$$\left(\left(-2 a^3 A-3 a A b^2+4 a^2 b B+b^3 B-a^3 C-4 a b^2 C\right) (b+a \text{Cos}[c+d x])^4 \text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$
$$\left(-\left(2 i \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}-\frac{i \text{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}\right)\left(-i b \text{Sin}\left[\frac{d x}{2}\right]+i a \text{Sin}\left[c+\frac{d x}{2}\right]\right)\right]\right.\right.$$
$$\left.\text{Cos}[c]\right) \Big/ \left(\sqrt{a^2-b^2} d \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}\right)-$$
$$\left(2 \text{ArcTan}\left[\text{Sec}\left[\frac{d x}{2}\right]\left(\frac{\text{Cos}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}-\frac{i \text{Sin}[c]}{\sqrt{a^2-b^2} \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}}\right)\left(-i b \text{Sin}\left[\frac{d x}{2}\right]+i a \text{Sin}\left[c+\frac{d x}{2}\right]\right)\right] \text{Sin}[c]\right) \Big/$$
$$\left.\left.\left(\sqrt{a^2-b^2} d \sqrt{\text{Cos}[2 c]-i \text{Sin}[2 c]}\right)\right)\right) \Big/$$
$$\left(\left(-a^2+b^2\right)^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)+$$
$$\left(2 (b+a \text{Cos}[c+d x]) \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(A b^4 \text{Sin}[c]-a b^3 B \text{Sin}[c]+a^2 b^2 C \text{Sin}[c]-a A b^3 \text{Sin}[d x]+a^2 b^2 B \text{Sin}[d x]-a^3 b C \text{Sin}[d x]\right)\right) \Big/$$
$$\left(3 a^3 \left(a^2-b^2\right) d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)+$$
$$\left((b+a \text{Cos}[c+d x])^2 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$
$$\left(-11 a^2 A b^3 \text{Sin}[c]+6 A b^5 \text{Sin}[c]+8 a^3 b^2 B \text{Sin}[c]-3 a b^4 B \text{Sin}[c]-5 a^4 b C \text{Sin}[c]+9 a^3 A b^2 \text{Sin}[d x]-\right.$$
$$\left.\left.4 a A b^4 \text{Sin}[d x]-6 a^4 b B \text{Sin}[d x]+a^2 b^3 B \text{Sin}[d x]+3 a^5 C \text{Sin}[d x]+2 a^3 b^2 C \text{Sin}[d x]\right)\right) \Big/$$
$$\left(3 a^3 \left(a^2-b^2\right)^2 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)+$$
$$\left((b+a \text{Cos}[c+d x])^3 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$
$$\left(27 a^4 A b^2 \text{Sin}[c]-18 a^2 A b^4 \text{Sin}[c]+6 A b^6 \text{Sin}[c]-12 a^5 b B \text{Sin}[c]-3 a^3 b^3 B \text{Sin}[c]+3 a^6 C \text{Sin}[c]+12 a^4 b^2 C \text{Sin}[c]-18 a^5 A b \text{Sin}[d x]+\right.$$
$$\left.\left.5 a^3 A b^3 \text{Sin}[d x]-2 a A b^5 \text{Sin}[d x]+6 a^6 B \text{Sin}[d x]+10 a^4 b^2 B \text{Sin}[d x]-a^2 b^4 B \text{Sin}[d x]-13 a^5 b C \text{Sin}[d x]-2 a^3 b^3 C \text{Sin}[d x]\right)\right) \Big/$$
$$\left(3 a^3 \left(a^2-b^2\right)^3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^4\right)$$

- **Problem 927: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2}{(a+b\,\mathrm{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 336 leaves, 7 steps):

$$\frac{A\,x}{a^4}-\frac{\left(7\,a^2\,A\,b^5-2\,A\,b^7-2\,a^7\,B-3\,a^5\,b^2\,B-a^4\,b^3\,(8\,A-C)+4\,a^6\,b\,(2\,A+C)\right)\mathrm{ArcTanh}\left[\frac{\sqrt{a-b}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^4\,(a-b)^{7/2}\,(a+b)^{7/2}\,d}+\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\mathrm{Tan}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)d\,(a+b\,\mathrm{Sec}[c+d\,x])^3}-$$
$$\frac{\left(3\,A\,b^4+5\,a^3\,b\,B-2\,a^4\,C-a^2\,b^2\,(8\,A+3\,C)\right)\mathrm{Tan}[c+d\,x]}{6\,a^2\,\left(a^2-b^2\right)^2 d\,(a+b\,\mathrm{Sec}[c+d\,x])^2}-\frac{\left(17\,a^2\,A\,b^4-6\,A\,b^6+11\,a^5\,b\,B+4\,a^3\,b^3\,B-2\,a^6\,C-13\,a^4\,b^2\,(2\,A+C)\right)\mathrm{Tan}[c+d\,x]}{6\,a^3\,\left(a^2-b^2\right)^3 d\,(a+b\,\mathrm{Sec}[c+d\,x])}$$

Result (type 3, 1230 leaves):

$$\frac{2\,A\,x\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4}+$$

$$\Bigg(\left(-8\,a^6\,A\,b+8\,a^4\,A\,b^3-7\,a^2\,A\,b^5+2\,A\,b^7+2\,a^7\,B+3\,a^5\,b^2\,B-4\,a^6\,b\,C-a^4\,b^3\,C\right)\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,\mathrm{i}\,\mathrm{ArcTan}\left[\mathrm{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\mathrm{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-\mathrm{i}\,\mathrm{Sin}[2\,c]}}-\frac{\mathrm{i}\,\mathrm{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-\mathrm{i}\,\mathrm{Sin}[2\,c]}}\right)\left(-\mathrm{i}\,b\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+\mathrm{i}\,a\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\mathrm{Cos}[c]\right)\Big/\right.$$

$$\left(a^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\mathrm{Cos}[2\,c]-\mathrm{i}\,\mathrm{Sin}[2\,c]}\right)+$$

$$\left(2\,\mathrm{ArcTan}\left[\mathrm{Sec}\left[\frac{d\,x}{2}\right]\left(\frac{\mathrm{Cos}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-\mathrm{i}\,\mathrm{Sin}[2\,c]}}-\frac{\mathrm{i}\,\mathrm{Sin}[c]}{\sqrt{a^2-b^2}\,\sqrt{\mathrm{Cos}[2\,c]-\mathrm{i}\,\mathrm{Sin}[2\,c]}}\right)\left(-\mathrm{i}\,b\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+\mathrm{i}\,a\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\mathrm{Sin}[c]\right)\Big/$$

$$\left.\left.\left(a^4\,\sqrt{a^2-b^2}\,d\,\sqrt{\mathrm{Cos}[2\,c]-\mathrm{i}\,\mathrm{Sin}[2\,c]}\right)\right)\right)\Big/\left(\left(-a^2+b^2\right)^3\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)-$$

$$\left(2\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(A\,b^5\,\mathrm{Sin}[c]-a\,b^4\,B\,\mathrm{Sin}[c]+a^2\,b^3\,C\,\mathrm{Sin}[c]-a\,A\,b^4\,\mathrm{Sin}[d\,x]+a^2\,b^3\,B\,\mathrm{Sin}[d\,x]-a^3\,b^2\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\,\left(a^2-b^2\right)\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)+$$

$$\left((b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$
$$\left(14\,a^2\,A\,b^4\,\mathrm{Sin}[c]-9\,A\,b^6\,\mathrm{Sin}[c]-11\,a^3\,b^3\,B\,\mathrm{Sin}[c]+6\,a\,b^5\,B\,\mathrm{Sin}[c]+8\,a^4\,b^2\,C\,\mathrm{Sin}[c]-3\,a^2\,b^4\,C\,\mathrm{Sin}[c]-\right.$$
$$\left.\left.12\,a^3\,A\,b^3\,\mathrm{Sin}[d\,x]+7\,a\,A\,b^5\,\mathrm{Sin}[d\,x]+9\,a^4\,b^2\,B\,\mathrm{Sin}[d\,x]-4\,a^2\,b^4\,B\,\mathrm{Sin}[d\,x]-6\,a^5\,b\,C\,\mathrm{Sin}[d\,x]+a^3\,b^3\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\,\left(a^2-b^2\right)^2\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)+$$

$$\left((b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(-48\,a^4\,A\,b^3\,\mathrm{Sin}[c]+51\,a^2\,A\,b^5\,\mathrm{Sin}[c]-18\,A\,b^7\,\mathrm{Sin}[c]+\right.\right.$$
$$27\,a^5\,b^2\,B\,\mathrm{Sin}[c]-18\,a^3\,b^4\,B\,\mathrm{Sin}[c]+6\,a\,b^6\,B\,\mathrm{Sin}[c]-12\,a^6\,b\,C\,\mathrm{Sin}[c]-3\,a^4\,b^3\,C\,\mathrm{Sin}[c]+36\,a^5\,A\,b^2\,\mathrm{Sin}[d\,x]-32\,a^3\,A\,b^4\,\mathrm{Sin}[d\,x]+$$
$$\left.\left.11\,a\,A\,b^6\,\mathrm{Sin}[d\,x]-18\,a^6\,b\,B\,\mathrm{Sin}[d\,x]+5\,a^4\,b^3\,B\,\mathrm{Sin}[d\,x]-2\,a^2\,b^5\,B\,\mathrm{Sin}[d\,x]+6\,a^7\,C\,\mathrm{Sin}[d\,x]+10\,a^5\,b^2\,C\,\mathrm{Sin}[d\,x]-a^3\,b^4\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\,\left(a^2-b^2\right)^3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right)$$

- **Problem 928: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+b\,\mathrm{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 3, 471 leaves, 8 steps):

$$-\frac{(4\,A\,b-a\,B)\,x}{a^5}-\frac{1}{a^5\,(a-b)^{7/2}\,(a+b)^{7/2}\,d}$$

$$\left(35\,a^4\,A\,b^4-28\,a^2\,A\,b^6+8\,A\,b^8+8\,a^7\,b\,B-8\,a^5\,b^3\,B+7\,a^3\,b^5\,B-2\,a\,b^7\,B-2\,a^8\,C-a^6\,b^2\,(20\,A+3\,C)\right)\,\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]+$$

$$\frac{\left(68\,a^2\,A\,b^4-24\,A\,b^6+26\,a^5\,b\,B-17\,a^3\,b^3\,B+6\,a\,b^5\,B+a^6\,(6\,A-11\,C)-a^4\,b^2\,(65\,A+4\,C)\right)\,\text{Sin}[c+d\,x]}{6\,a^4\,\left(a^2-b^2\right)^3\,d}+$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^3}-\frac{\left(4\,A\,b^4+6\,a^3\,b\,B-a\,b^3\,B-3\,a^4\,C-a^2\,b^2\,(9\,A+2\,C)\right)\,\text{Sin}[c+d\,x]}{6\,a^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^2}-$$

$$\frac{\left(11\,a^2\,A\,b^4-4\,A\,b^6+6\,a^5\,b\,B-2\,a^3\,b^3\,B+a\,b^5\,B-2\,a^6\,C-3\,a^4\,b^2\,(4\,A+C)\right)\,\text{Sin}[c+d\,x]}{2\,a^3\,\left(a^2-b^2\right)^3\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 3, 1367 leaves) :

$$-\frac{2\,(4\,A\,b-a\,B)\,x\,(b+a\,Cos[c+d\,x])^4\,Sec[c+d\,x]^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)}{a^5\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^4}+$$

$$\left(\left(-20\,a^6\,A\,b^2+35\,a^4\,A\,b^4-28\,a^2\,A\,b^6+8\,A\,b^8+8\,a^7\,b\,B-8\,a^5\,b^3\,B+7\,a^3\,b^5\,B-2\,a\,b^7\,B-2\,a^8\,C-3\,a^6\,b^2\,C\right)\right.$$

$$(b+a\,Cos[c+d\,x])^4\,Sec[c+d\,x]^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)$$

$$\left(-\left(2\,i\,ArcTan\left[Sec\left[\frac{d\,x}{2}\right]\left(\frac{Cos[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2\,c]-i\,Sin[2\,c]}}-\frac{i\,Sin[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2\,c]-i\,Sin[2\,c]}}\right)\left(-i\,b\,Sin\left[\frac{d\,x}{2}\right]+i\,a\,Sin\left[c+\frac{d\,x}{2}\right]\right)\right]\right.\right.$$

$$\left.Cos[c]\right)\Big/\left(a^5\,\sqrt{a^2-b^2}\,d\,\sqrt{Cos[2\,c]-i\,Sin[2\,c]}\right)-$$

$$\left(2\,ArcTan\left[Sec\left[\frac{d\,x}{2}\right]\left(\frac{Cos[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2\,c]-i\,Sin[2\,c]}}-\frac{i\,Sin[c]}{\sqrt{a^2-b^2}\,\sqrt{Cos[2\,c]-i\,Sin[2\,c]}}\right)\left(-i\,b\,Sin\left[\frac{d\,x}{2}\right]+i\,a\,Sin\left[c+\frac{d\,x}{2}\right]\right)\right]\,Sin[c]\right)\Big/$$

$$\left.\left.\left(a^5\,\sqrt{a^2-b^2}\,d\,\sqrt{Cos[2\,c]-i\,Sin[2\,c]}\right)\right)\right)\Big/$$

$$\left(\left(-a^2+b^2\right)^3\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^4\right)+$$

$$\left(2\,(b+a\,Cos[c+d\,x])\,Sec[c]\,Sec[c+d\,x]^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left.\left(A\,b^6\,Sin[c]-a\,b^5\,B\,Sin[c]+a^2\,b^4\,C\,Sin[c]-a\,A\,b^5\,Sin[d\,x]+a^2\,b^4\,B\,Sin[d\,x]-a^3\,b^3\,C\,Sin[d\,x]\right)\right)\Big/$$

$$\left(3\,a^5\,\left(a^2-b^2\right)\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^4\right)+$$

$$\left((b+a\,Cos[c+d\,x])^2\,Sec[c]\,Sec[c+d\,x]^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(-17\,a^2\,A\,b^5\,Sin[c]+12\,A\,b^7\,Sin[c]+14\,a^3\,b^4\,B\,Sin[c]-9\,a\,b^6\,B\,Sin[c]-11\,a^4\,b^3\,C\,Sin[c]+6\,a^2\,b^5\,C\,Sin[c]+\right.$$

$$\left.\left.15\,a^3\,A\,b^4\,Sin[d\,x]-10\,a\,A\,b^6\,Sin[d\,x]-12\,a^4\,b^3\,B\,Sin[d\,x]+7\,a^2\,b^5\,B\,Sin[d\,x]+9\,a^5\,b^2\,C\,Sin[d\,x]-4\,a^3\,b^4\,C\,Sin[d\,x]\right)\right)\Big/$$

$$\left(3\,a^5\,\left(a^2-b^2\right)^2\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^4\right)+$$

$$\left((b+a\,Cos[c+d\,x])^3\,Sec[c]\,Sec[c+d\,x]^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(75\,a^4\,A\,b^4\,Sin[c]-96\,a^2\,A\,b^6\,Sin[c]+36\,A\,b^8\,Sin[c]-48\,a^5\,b^3\,B\,Sin[c]+51\,a^3\,b^5\,B\,Sin[c]-18\,a\,b^7\,B\,Sin[c]+\right.$$

$$27\,a^6\,b^2\,C\,Sin[c]-18\,a^4\,b^4\,C\,Sin[c]+6\,a^2\,b^6\,C\,Sin[c]-60\,a^5\,A\,b^3\,Sin[d\,x]+71\,a^3\,A\,b^5\,Sin[d\,x]-26\,a\,A\,b^7\,Sin[d\,x]+$$

$$\left.\left.36\,a^6\,b^2\,B\,Sin[d\,x]-32\,a^4\,b^4\,B\,Sin[d\,x]+11\,a^2\,b^6\,B\,Sin[d\,x]-18\,a^7\,b\,C\,Sin[d\,x]+5\,a^5\,b^3\,C\,Sin[d\,x]-2\,a^3\,b^5\,C\,Sin[d\,x]\right)\right)\Big/$$

$$\left(3\,a^5\,\left(a^2-b^2\right)^3\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^4\right)+$$

$$\frac{2\,A\,(b+a\,Cos[c+d\,x])^4\,Sec[c+d\,x]\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\,Tan[c+d\,x]}{a^4\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^4}$$

- **Problem 929: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{Cos[c+d\,x]^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)}{(a+b\,Sec[c+d\,x])^4}\,dx$$

Optimal (type 3, 648 leaves, 9 steps):

$$\frac{\left(20\,A\,b^2-8\,a\,b\,B+a^2\,(A+2\,C)\right)\,x}{2\,a^6}+\left(b\,\left(20\,A\,b^8+20\,a^7\,b\,B-35\,a^5\,b^3\,B+28\,a^3\,b^5\,B-8\,a\,b^7\,B-a^2\,b^6\,(69\,A-2\,C)-8\,a^6\,b^2\,(5\,A-C)+7\,a^4\,b^4\,(12\,A-C)-8\,a^8\,C\right)\right.$$

$$\left.\text{ArcTanh}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(a^6\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)^3\,d\right)+\frac{1}{6\,a^5\,\left(a^2-b^2\right)^3\,d}$$

$$\left(60\,A\,b^7+6\,a^7\,B-65\,a^5\,b^2\,B+68\,a^3\,b^4\,B-24\,a\,b^6\,B+a^4\,b^3\,(146\,A-17\,C)-a^2\,b^5\,(167\,A-6\,C)-a^6\,(24\,A\,b-26\,b\,C)\right)\,\text{Sin}[c+d\,x]-$$

$$\frac{1}{2\,a^4\,\left(a^2-b^2\right)^3\,d}\left(10\,A\,b^6-12\,a^5\,b\,B+11\,a^3\,b^3\,B-4\,a\,b^5\,B-a^6\,(A-6\,C)+a^4\,b^2\,(23\,A-2\,C)-a^2\,b^4\,(27\,A-C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]+$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^3}-\frac{\left(5\,A\,b^4+7\,a^3\,b\,B-2\,a\,b^3\,B-4\,a^4\,C-a^2\,b^2\,(10\,A+C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{6\,a^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+$$

$$\left(\left(20\,A\,b^6-27\,a^5\,b\,B+20\,a^3\,b^3\,B-8\,a\,b^5\,B-a^2\,b^4\,(53\,A-2\,C)+12\,a^6\,C+a^4\,b^2\,(48\,A+C)\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(6\,a^3\,\left(a^2-b^2\right)^3\,d\,(a+b\,\text{Sec}[c+d\,x])\right)$$

Result (type 3, 658 leaves):

$$\frac{\left(a^2\,A+20\,A\,b^2-8\,a\,b\,B+2\,a^2\,C\right)\,(c+d\,x)}{2\,a^6\,d}+\frac{1}{a^6\,\sqrt{a^2-b^2}\,\left(-a^2+b^2\right)^3\,d}$$

$$b\,\left(-40\,a^6\,A\,b^2+84\,a^4\,A\,b^4-69\,a^2\,A\,b^6+20\,A\,b^8+20\,a^7\,b\,B-35\,a^5\,b^3\,B+28\,a^3\,b^5\,B-8\,a\,b^7\,B-8\,a^8\,C+8\,a^6\,b^2\,C-7\,a^4\,b^4\,C+2\,a^2\,b^6\,C\right)$$

$$\text{ArcTanh}\left[\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^2-b^2}}\right]+\frac{(4\,A\,b-a\,B)\,\left(-\frac{i\,\text{Cos}[c+d\,x]}{2\,a^5}-\frac{\text{Sin}[c+d\,x]}{2\,a^5}\right)}{d}+$$

$$\frac{(4\,A\,b-a\,B)\,\left(\frac{i\,\text{Cos}[c+d\,x]}{2\,a^5}-\frac{\text{Sin}[c+d\,x]}{2\,a^5}\right)}{d}+\frac{A\,b^6\,\text{Sin}[c+d\,x]-a\,b^5\,B\,\text{Sin}[c+d\,x]+a^2\,b^4\,C\,\text{Sin}[c+d\,x]}{3\,a^5\,\left(a^2-b^2\right)\,d\,(b+a\,\text{Cos}[c+d\,x])^3}+$$

$$\left(-18\,a^2\,A\,b^5\,\text{Sin}[c+d\,x]+13\,A\,b^7\,\text{Sin}[c+d\,x]+15\,a^3\,b^4\,B\,\text{Sin}[c+d\,x]-10\,a\,b^6\,B\,\text{Sin}[c+d\,x]-12\,a^4\,b^3\,C\,\text{Sin}[c+d\,x]+7\,a^2\,b^5\,C\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(6\,a^5\,\left(a^2-b^2\right)^2\,d\,(b+a\,\text{Cos}[c+d\,x])^2\right)+$$

$$\left(90\,a^4\,A\,b^4\,\text{Sin}[c+d\,x]-122\,a^2\,A\,b^6\,\text{Sin}[c+d\,x]+47\,A\,b^8\,\text{Sin}[c+d\,x]-60\,a^5\,b^3\,B\,\text{Sin}[c+d\,x]+71\,a^3\,b^5\,B\,\text{Sin}[c+d\,x]-26\,a\,b^7\,B\,\text{Sin}[c+d\,x]+\right.$$

$$\left.36\,a^6\,b^2\,C\,\text{Sin}[c+d\,x]-32\,a^4\,b^4\,C\,\text{Sin}[c+d\,x]+11\,a^2\,b^6\,C\,\text{Sin}[c+d\,x]\right)\Big/\left(6\,a^5\,\left(a^2-b^2\right)^3\,d\,(b+a\,\text{Cos}[c+d\,x])\right)+\frac{A\,\text{Sin}[2\,(c+d\,x)]}{4\,a^4\,d}$$

Problem 930: Result more than twice size of optimal antiderivative.

$$\int\frac{a\,b\,B-a^2\,C+b^2\,B\,\text{Sec}[c+d\,x]+b^2\,C\,\text{Sec}[c+d\,x]^2}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 24 leaves, 3 steps):

$$(b B - a C)\, x + \frac{b C \,\text{ArcTanh}[\text{Sin}[c + d x]]}{d}$$

Result (type 3, 81 leaves):

$$b B x - a C x - \frac{b C \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{b C \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d}$$

Problem 934: Result more than twice size of optimal antiderivative.

$$\int \frac{a b B - a^2 C + b^2 B \,\text{Sec}[c + d x] + b^2 C \,\text{Sec}[c + d x]^2}{(a + b \,\text{Sec}[c + d x])^5}\, dx$$

Optimal (type 3, 336 leaves, 8 steps):

$$\frac{(b B - a C)\, x}{a^4} - \frac{1}{a^4 (a - b)^{7/2} (a + b)^{7/2} d}$$

$$b \left(8 a^6 b B - 8 a^4 b^3 B + 7 a^2 b^5 B - 2 b^7 B - 10 a^7 C + 5 a^5 b^2 C - 7 a^3 b^4 C + 2 a b^6 C\right) \text{ArcTanh}\left[\frac{\sqrt{a - b}\, \text{Tan}\left[\frac{1}{2} (c + d x)\right]}{\sqrt{a + b}}\right] +$$

$$\frac{b^2 (b B - 2 a C)\, \text{Tan}[c + d x]}{3 a \left(a^2 - b^2\right) d\, (a + b \,\text{Sec}[c + d x])^3} + \frac{b^2 \left(8 a^2 b B - 3 b^3 B - 13 a^3 C + 3 a b^2 C\right) \text{Tan}[c + d x]}{6 a^2 \left(a^2 - b^2\right)^2 d\, (a + b \,\text{Sec}[c + d x])^2} +$$

$$\frac{b^2 \left(26 a^4 b B - 17 a^2 b^3 B + 6 b^5 B - 37 a^5 C + 13 a^3 b^2 C - 6 a b^4 C\right) \text{Tan}[c + d x]}{6 a^3 \left(a^2 - b^2\right)^3 d\, (a + b \,\text{Sec}[c + d x])}$$

Result (type 3, 1287 leaves):

$$\Big(b\left(-8 a^6 b B+8 a^4 b^3 B-7 a^2 b^5 B+2 b^7 B+10 a^7 C-5 a^5 b^2 C+7 a^3 b^4 C-2 a b^6 C\right) \text{ArcTanh}\left[\frac{(-a+b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2-b^2}}\right] (b+a \text{Cos}[c+d x])^4 \text{Sec}[c+d x]^3 (b B-a C+b C \text{Sec}[c+d x])\Big) \Big/ \left(a^4 \sqrt{a^2-b^2} \left(-a^2+b^2\right)^3 d (b C+b B \text{Cos}[c+d x]-a C \text{Cos}[c+d x]) (a+b \text{Sec}[c+d x])^4\right)+$$

$$\Big((b+a \text{Cos}[c+d x]) \text{Sec}[c+d x]^3 (b B-a C+b C \text{Sec}[c+d x]) \Big(36 a^8 b^2 B (c+d x)-84 a^6 b^4 B (c+d x)+36 a^4 b^6 B (c+d x)+36 a^2 b^8 B (c+d x)-24 b^{10} B (c+d x)-36 a^9 b C (c+d x)+84 a^7 b^3 C (c+d x)-36 a^5 b^5 C (c+d x)-36 a^3 b^7 C (c+d x)+24 a b^9 C (c+d x)+18 a^9 b B (c+d x) \text{Cos}[c+d x]+18 a^7 b^3 B (c+d x) \text{Cos}[c+d x]-162 a^5 b^5 B (c+d x) \text{Cos}[c+d x]+198 a^3 b^7 B (c+d x) \text{Cos}[c+d x]-72 a b^9 B (c+d x) \text{Cos}[c+d x]-18 a^{10} C (c+d x) \text{Cos}[c+d x]-18 a^8 b^2 C (c+d x) \text{Cos}[c+d x]+162 a^6 b^4 C (c+d x) \text{Cos}[c+d x]-198 a^4 b^6 C (c+d x) \text{Cos}[c+d x]+72 a^2 b^8 C (c+d x) \text{Cos}[c+d x]+36 a^8 b^2 B (c+d x) \text{Cos}[2 (c+d x)]-108 a^6 b^4 B (c+d x) \text{Cos}[2 (c+d x)]+108 a^4 b^6 B (c+d x) \text{Cos}[2 (c+d x)]-36 a^2 b^8 B (c+d x) \text{Cos}[2 (c+d x)]-36 a^9 b C (c+d x) \text{Cos}[2 (c+d x)]+108 a^7 b^3 C (c+d x) \text{Cos}[2 (c+d x)]-108 a^5 b^5 C (c+d x) \text{Cos}[2 (c+d x)]+36 a^3 b^7 C (c+d x) \text{Cos}[2 (c+d x)]+6 a^9 b B (c+d x) \text{Cos}[3 (c+d x)]-18 a^7 b^3 B (c+d x) \text{Cos}[3 (c+d x)]+18 a^5 b^5 B (c+d x) \text{Cos}[3 (c+d x)]-6 a^3 b^7 B (c+d x) \text{Cos}[3 (c+d x)]-6 a^{10} C (c+d x) \text{Cos}[3 (c+d x)]+18 a^8 b^2 C (c+d x) \text{Cos}[3 (c+d x)]-18 a^6 b^4 C (c+d x) \text{Cos}[3 (c+d x)]+6 a^4 b^6 C (c+d x) \text{Cos}[3 (c+d x)]+36 a^7 b^3 B \text{Sin}[c+d x]+72 a^5 b^5 B \text{Sin}[c+d x]-57 a^3 b^7 B \text{Sin}[c+d x]+24 a b^9 B \text{Sin}[c+d x]-54 a^8 b^2 C \text{Sin}[c+d x]-111 a^6 b^4 C \text{Sin}[c+d x]+39 a^4 b^6 C \text{Sin}[c+d x]-24 a^2 b^8 C \text{Sin}[c+d x]+120 a^6 b^4 B \text{Sin}[2 (c+d x)]-90 a^4 b^6 B \text{Sin}[2 (c+d x)]+30 a^2 b^8 B \text{Sin}[2 (c+d x)]-174 a^7 b^3 C \text{Sin}[2 (c+d x)]+84 a^5 b^5 C \text{Sin}[2 (c+d x)]-30 a^3 b^7 C \text{Sin}[2 (c+d x)]+36 a^7 b^3 B \text{Sin}[3 (c+d x)]-32 a^5 b^5 B \text{Sin}[3 (c+d x)]+11 a^3 b^7 B \text{Sin}[3 (c+d x)]-54 a^8 b^2 C \text{Sin}[3 (c+d x)]+37 a^6 b^4 C \text{Sin}[3 (c+d x)]-13 a^4 b^6 C \text{Sin}[3 (c+d x)]\Big)\Big) \Big/ \left(24 a^4 \left(a^2-b^2\right)^3 d (b C+b B \text{Cos}[c+d x]-a C \text{Cos}[c+d x]) (a+b \text{Sec}[c+d x])^4\right)$$

- **Problem 935: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d x]^3 \sqrt{a+b \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 517 leaves, 7 steps):

$$-\frac{1}{315 b^5 d}2(a-b)\sqrt{a+b}\left(24 a^3 b B+57 a b^3 B-16 a^4 C-6 a^2 b^2(7 A+4 C)+21 b^4(9 A+7 C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$
$$\frac{1}{315 b^4 d}2(a-b)\sqrt{a+b}\left(12 a^2 b(2 B-C)-16 a^3 C-6 a b^2(7 A-3 B+6 C)-3 b^3(63 A-25 B+49 C)\right)\text{Cot}[c+d x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$
$$\frac{2\left(12 a^2 b B-75 b^3 B-8 a^3 C-a b^2(21 A+13 C)\right)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{315 b^3 d}+$$
$$\frac{2\left(63 A b^2+9 a b B-6 a^2 C+49 b^2 C\right)\text{Sec}[c+d x]\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{315 b^2 d}+$$
$$\frac{2(9 b B+a C)\,\text{Sec}[c+d x]^2\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{63 b d}+\frac{2 C\,\text{Sec}[c+d x]^3\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{9 d}$$

Result (type 1, 1 leaves) :

???

■ Problem 936: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d x]^2\sqrt{a+b\,\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 4, 413 leaves, 6 steps) :

$$\frac{1}{105 b^4 d}2(a-b)\sqrt{a+b}\left(14 a^2 b B-63 b^3 B-8 a^3 C-a b^2(35 A+19 C)\right)\text{Cot}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{105 b^3 d}$$
$$2(a-b)\sqrt{a+b}\left(35 A b^2-b^2(63 B-25 C)+8 a^2 C-a(14 b B-6 b C)\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{2\left(35 A b^2-14 a b B+8 a^2 C+25 b^2 C\right)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{105 b^2 d}+$$
$$\frac{2(7 b B-4 a C)(a+b\,\text{Sec}[c+d x])^{3/2}\,\text{Tan}[c+d x]}{35 b^2 d}+\frac{2 C\,\text{Sec}[c+d x](a+b\,\text{Sec}[c+d x])^{3/2}\,\text{Tan}[c+d x]}{7 b d}$$

Result (type 1, 1 leaves) :

???

- **Problem 937: Attempted integration timed out after 120 seconds.**

$$\int \operatorname{Sec}[c+d x] \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 324 leaves, 5 steps) :

$$-\frac{1}{15 b^3 d} 2 (a-b) \sqrt{a+b} \left(3 b^2 (5 A+3 C)+a (5 b B-2 a C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{15 b^2 d} 2 (a-b) \sqrt{a+b} (15 A b-5 b B+2 a C+9 b C) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{2 (5 b B-2 a C) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{15 b d}+\frac{2 C (a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Tan}[c+d x]}{5 b d}$$

Result (type 1, 1 leaves) :

???

- **Problem 938: Result more than twice size of optimal antiderivative.**

$$\int \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 366 leaves, 6 steps) :

$$-\frac{1}{3 b^2 d} 2 (a-b) \sqrt{a+b} (3 b B+a C) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{3 b d} 2 \sqrt{a+b} (3 A b+(a-b) (3 B-C)) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{2 A \sqrt{a+b} \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{d}+\frac{2 C \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 5313 leaves) :

$$\Big(\mathrm{Cos}[c+d x]^2 \sqrt{a+b\,\mathrm{Sec}[c+d x]}\ \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) \left(\frac{4\,(3 b B+a C)\,\mathrm{Sin}[c+d x]}{3 b}+\frac{4}{3} C\,\mathrm{Tan}[c+d x]\right)\Big)\Big/$$

$$(d\,(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]))-$$

$$\Bigg(4\Bigg(\frac{2 a A}{\sqrt{b+a\,\mathrm{Cos}[c+d x]}\ \sqrt{\mathrm{Sec}[c+d x]}}-\frac{2 b B}{\sqrt{b+a\,\mathrm{Cos}[c+d x]}\ \sqrt{\mathrm{Sec}[c+d x]}}-\frac{2 a C}{3 \sqrt{b+a\,\mathrm{Cos}[c+d x]}\ \sqrt{\mathrm{Sec}[c+d x]}}+\frac{2 A b \sqrt{\mathrm{Sec}[c+d x]}}{\sqrt{b+a\,\mathrm{Cos}[c+d x]}}-$$

$$\frac{2 a^2 C \sqrt{\mathrm{Sec}[c+d x]}}{3 b \sqrt{b+a\,\mathrm{Cos}[c+d x]}}+\frac{2 b C \sqrt{\mathrm{Sec}[c+d x]}}{3 \sqrt{b+a\,\mathrm{Cos}[c+d x]}}-\frac{2 a B\,\mathrm{Cos}[2\,(c+d x)] \sqrt{\mathrm{Sec}[c+d x]}}{\sqrt{b+a\,\mathrm{Cos}[c+d x]}}-\frac{2 a^2 C\,\mathrm{Cos}[2\,(c+d x)] \sqrt{\mathrm{Sec}[c+d x]}}{3 b \sqrt{b+a\,\mathrm{Cos}[c+d x]}}\Bigg)$$

$$\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \mathrm{Sec}[c+d x]}\ \sqrt{a+b\,\mathrm{Sec}[c+d x]}\ \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)$$

$$\Bigg(12 a A b \sqrt{\frac{\mathrm{Cos}[c+d x]}{1+\mathrm{Cos}[c+d x]}} \sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{(a+b)\,(1+\mathrm{Cos}[c+d x])}}\ \mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$2\,(a+b)\,(3 b B+a C) \sqrt{\frac{\mathrm{Cos}[c+d x]}{1+\mathrm{Cos}[c+d x]}} \sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{(a+b)\,(1+\mathrm{Cos}[c+d x])}}\ \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right] \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2-$$

$$2 b\,(a\,(-3 A+3 B+C)+b\,(3 A+3 B+C)) \sqrt{\frac{\mathrm{Cos}[c+d x]}{1+\mathrm{Cos}[c+d x]}} \sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{(a+b)\,(1+\mathrm{Cos}[c+d x])}}\ \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2+3 a b B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+3 b^2 B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+a^2 C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+a b C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$12 a A b \sqrt{\frac{\mathrm{Cos}[c+d x]}{1+\mathrm{Cos}[c+d x]}} \sqrt{\frac{b+a\,\mathrm{Cos}[c+d x]}{(a+b)\,(1+\mathrm{Cos}[c+d x])}}\ \mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right] \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-$$

$$6 a b B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^3-2 a^2 C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^3+3 a b B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$3 b^2 B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5+a^2 C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a b C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5\Bigg)\Bigg)\Big/$$

$$\Bigg(3 b d\,(b+a\,\mathrm{Cos}[c+d x])\,(A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]) \left(\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2} \mathrm{Sec}[c+d x]^{5/2}$$

$$\Bigg(-\frac{1}{3\,b\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\left(\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}}\,2\,a\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]$$

$$\Bigg(12\,a\,A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$2\,(a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2-$$

$$2\,b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2+3\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$12\,a\,A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-$$

$$6\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-2\,a^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+3\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-3\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+a^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$a\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5\Bigg)+\frac{1}{b\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\left(\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}}\,2\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\Bigg(12\,a\,A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+$$

$$2\,(a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2-$$

$$2\,b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2+3\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$12\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2-$$

$$6\,a\,b\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3-2\,a^2\,C\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3+3\,a\,b\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-3\,b^2\,B\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+$$

$$a^2\,C\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-a\,b\,C\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5\Bigg)-\frac{1}{3\,b\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}}$$

$$4\,\sqrt{\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Sec}[c+d\,x]}\,\Bigg(\frac{3}{2}\,a\,b\,B\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2+\frac{3}{2}\,b^2\,B\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2+\frac{1}{2}\,a^2\,C\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2+$$

$$\frac{1}{2}\,a\,b\,C\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2+\frac{1}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}\,6\,a\,A\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]$$

$$\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)+\frac{1}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}\,(a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)-\frac{1}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}$$

$$b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]$$

$$\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)+\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}}\,6\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}$$

$$\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{a-b}{a+b}\Big]\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)+$$

$$\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}}\,(a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)-\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}}$$

$$b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)+2\,(a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-2\,b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))$$

$$\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$12\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-9\,a\,b\,B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-3\,a^2\,C\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{1}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}$$

$$6\,a\,A\,b\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{1}{\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}}\,6\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{a-b}{a+b}\right]$$

$$\left(-\frac{a\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{15}{2}\,a\,b\,B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4-$$

$$\frac{15}{2}\,b^2\,B\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+\frac{5}{2}\,a^2\,C\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4-\frac{5}{2}\,a\,b\,C\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4-$$

$$\frac{b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4}{\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}-$$

$$\frac{6\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}-$$

$$\frac{6\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}+\left((a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right.$$

$$\left.\left.\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\,\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Big/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\right)-$$

$$\left(2\left(12\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+\right.\right.$$

$$2\,(a+b)\,(3\,b\,B+a\,C)\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2-$$

$$2\,b\,(a\,(-3\,A+3\,B+C)+b\,(3\,A+3\,B+C))\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+3\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+a^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$12\,a\,A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-$$

$$6\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-2\,a^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+3\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+a^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$a\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5\Big)\left(-\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Big)\Big/$$

$$\left(3\,b\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\right)\Bigg)\Bigg)$$

Problem 939: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 362 leaves, 6 steps):

$$\frac{1}{b\,d}(a-b)\,\sqrt{a+b}\,(A-2\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{b\,d}$$

$$\sqrt{a+b}\,(A\,b+2\,b\,B+2\,a\,C-2\,b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{1}{a\,d}\sqrt{a+b}\,(A\,b+2\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 930 leaves):

$$\frac{2\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}+$$

$$\Bigg(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\Bigg(a\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,A$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+4\,a\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-2\,a\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$4\,a\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-4\,a\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\,(A-2\,C)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,(A\,b+a\,(B-C)-b\,(B+C))\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 940: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^2 \sqrt{a+b\,\text{Sec}[c+d x]}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 435 leaves, 7 steps):

$$\frac{1}{4\,a\,b\,d}\left((a-b)\sqrt{a+b}\,(A b+4 a B)\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}\right)+\frac{1}{4\,a\,d}$$
$$\sqrt{a+b}\,(A b+2 a\,(A+2 B+4 C))\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+$$
$$\frac{1}{4\,a^2\,d}\sqrt{a+b}\,\left(A b^2-4 a b B-4 a^2\,(A+2 C)\right)\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}$$
$$\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{(A b+4 a B)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{4\,a\,d}+\frac{A\,\text{Cos}[c+d x]\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{2\,d}$$

Result (type 4, 1842 leaves):

$$\frac{A\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[2\,(c+d x)]}{4\,d}+$$
$$\left(\sqrt{a+b\,\text{Sec}[c+d x]}\left(-a A b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-A b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-4 a^2\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.\right.$$
$$4 a b\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+2 a A b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+8 a^2\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$
$$a A b\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+A b^2\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-4 a^2\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$
$$4 a b\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+8\,i\,a^2 A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+8\,i\,a\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$16\,i\,a^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+8\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+8\,i\,a\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$16\,i\,a^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+i\,(a-b)\,(A\,b+4\,a\,B)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-$$

$$2\,i\,(a-b)\,(A\,b+2\,a\,(A+2\,C))\,\operatorname{EllipticF}\left[i\operatorname{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(4\,a\sqrt{\frac{-a+b}{a+b}}\;d\sqrt{b+a\operatorname{Cos}[c+d\,x]}\,\sqrt{\operatorname{Sec}[c+d\,x]}\,\sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\,\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 941: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d\,x]^3\sqrt{a+b\operatorname{Sec}[c+d\,x]}\,\left(A+B\operatorname{Sec}[c+d\,x]+C\operatorname{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 538 leaves, 8 steps) :

$$-\frac{1}{24 a^2 b d}(a-b)\sqrt{a+b}\left(3 A b^2-6 a b B-8 a^2 (2 A+3 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{24 a^2 d}\sqrt{a+b}\left(3 A b^2-2 a b (A+3 B)-4 a^2 (4 A+3 B+6 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{8 a^3 d}\sqrt{a+b}\left(A b^3+8 a^3 B-2 a b^2 B+4 a^2 b (A+2 C)\right) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{\left(3 A b^2-6 a b B-8 a^2 (2 A+3 C)\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{24 a^2 d} + \frac{(A b+6 a B) \text{Cos}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{12 a d} + \frac{A \text{Cos}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d}$$

Result (type 4, 4114 leaves):

$$\frac{\sqrt{a+b \text{Sec}[c+d x]} \left(\frac{1}{12} A \text{Sin}[c+d x]+\frac{(A b+6 a B) \text{Sin}[2 (c+d x)]}{24 a}+\frac{1}{12} A \text{Sin}[3 (c+d x)]\right)}{d} +$$

$$\left(\left(\frac{7 A b}{12 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{a B}{2 \sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{b C}{\sqrt{b+a \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{a A \sqrt{\text{Sec}[c+d x]}}{3 \sqrt{b+a \text{Cos}[c+d x]}}-\right.\right.$$

$$\frac{A b^2 \sqrt{\text{Sec}[c+d x]}}{48 a \sqrt{b+a \text{Cos}[c+d x]}}+\frac{3 b B \sqrt{\text{Sec}[c+d x]}}{8 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{a C \sqrt{\text{Sec}[c+d x]}}{2 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{a A \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{3 \sqrt{b+a \text{Cos}[c+d x]}}-$$

$$\left.\frac{A b^2 \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{16 a \sqrt{b+a \text{Cos}[c+d x]}}+\frac{b B \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{8 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{a C \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{2 \sqrt{b+a \text{Cos}[c+d x]}}\right)$$

$$\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\left(\frac{\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}{24\,a^2\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}+\right.$$

$$\left(\left((a+b)\,\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\left(a\,\left(-A\,b^2+12\,a^2\,B+2\,a\,b\,(7\,A-3\,B+12\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$

$$\left.\left.3\,\left(A\,b^3+8\,a^3\,B-2\,a\,b^2\,B+4\,a^2\,b\,(A+2\,C)\right)\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\right)\right)$$

$$\left.\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Big/$$

$$\left.\left(24\,a^2\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)\right)\right)\Big/$$

$$\left(d\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}{48\,a^2\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}-\right.\right.$$

$$\left(\left((a+b)\,\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\left(a\,\left(-A\,b^2+12\,a^2\,B+2\,a\,b\,(7\,A-3\,B+12\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$

$$3\left(A b^3+8 a^3 B-2 a b^2 B+4 a^2 b (A+2 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)\Bigg)$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}$$

$$\left(-2 b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+2 a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Bigg)\Bigg/$$

$$\left(24 a^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)^2\right)-$$

$$\Bigg(\Bigg((a+b)\left(-3 A b^2+6 a b B+8 a^2 (2 A+3 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$2\left(a\left(-A b^2+12 a^2 B+2 a b (7 A-3 B+12 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$

$$3\left(A b^3+8 a^3 B-2 a b^2 B+4 a^2 b (A+2 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)\Bigg) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg)\Bigg/$$

$$\left(24 a^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)+$$

$$\Bigg(\Bigg((a+b)\left(-3 A b^2+6 a b B+8 a^2 (2 A+3 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$2\left(a\left(-A b^2+12 a^2 B+2 a b (7 A-3 B+12 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$

$$3\left(A b^3+8 a^3 B-2 a b^2 B+4 a^2 b (A+2 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)\Bigg)$$

$$\left(-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\right)\Big/\left(48\,a^2\,(a+b)\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right.$$

$$\left.\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)-\frac{1}{48\,a^2\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)}$$

$$\left((a+b)\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-\right.$$

$$2\left(a\left(-A\,b^2+12\,a^2\,B+2\,a\,b\,(7\,A-3\,B+12\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+\right.$$

$$\left.\left.3\left(A\,b^3+8\,a^3\,B-2\,a\,b^2\,B+4\,a^2\,b\,(A+2\,C)\right)\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\right)\right)$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}-$$

$$\left(\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Big/\left(48\,a^2\left(\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\right)+$$

$$\left(\left(-3\,A\,b^2+6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(\frac{-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/$$

$$\left(48 a^2 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+$$

$$\left(\left((a+b)\left(-3 A b^2+6 a b B+8 a^2 (2 A+3 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]-\right.\right.$$

$$2\left(a\left(-A b^2+12 a^2 B+2 a b (7 A-3 B+12 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+3\left(A b^3+8 a^3 B-2 a b^2 B+4 a^2 b (A+2 C)\right)\right.$$

$$\left.\left.\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\left(\frac{-a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/$$

$$\left(48 a^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)+$$

$$\left(\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\left(\frac{(a+b)\left(-3 A b^2+6 a b B+8 a^2(2 A+3 C)\right) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}{2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}-\right.$$

$$2\left(\frac{a\left(-A b^2+12 a^2 B+2 a b(7 A-3 B+12 C)\right) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{1-\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}-\right.$$

$$\left.\left.\left.\frac{3\left(A b^3+8 a^3 B-2 a b^2 B+4 a^2 b(A+2 C)\right) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{2 \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{1-\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}\right)\right)\right) \Big/$$

$$\left.\left.\left(24 a^2 \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(b-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)\right)\right)$$

- **Problem 942: Attempted integration timed out after 120 seconds.**

$$\int \operatorname{Sec}[c+d x]^3 (a+b \operatorname{Sec}[c+d x])^{3/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 628 leaves, 8 steps) :

$$-\frac{1}{3465 b^5 d}2 (a-b) \sqrt{a+b} \left(88 a^4 b B+363 a^2 b^3 B+1617 b^5 B-48 a^5 C-18 a^3 b^2 (11 A+6 C)+6 a b^4 (451 A+348 C)\right)$$

$$\text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{3465 b^4 d}$$

$$2 (a-b) \sqrt{a+b} \left(4 a^3 b (22 B-9 C)-48 a^4 C-6 a^2 b^2 (33 A-11 B+24 C)+3 b^4 (275 A-539 B+225 C)-3 a b^3 (627 A-143 B+471 C)\right)$$

$$\text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} -$$

$$\frac{1}{3465 b^3 d}2 \left(44 a^3 b B-968 a b^3 B-24 a^4 C-75 b^4 (11 A+9 C)-3 a^2 b^2 (33 A+19 C)\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x] +$$

$$\frac{2 \left(33 a^2 b B+539 b^3 B-18 a^3 C+6 a b^2 (132 A+101 C)\right) \text{Sec}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{3465 b^2 d} +$$

$$\frac{2 \left(99 A b^2+110 a b B+3 a^2 C+81 b^2 C\right) \text{Sec}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{693 b d} +$$

$$\frac{2 (11 b B+3 a C) \text{Sec}[c+d x]^3 \sqrt{a+b \text{Sec}[c+d x]} \text{Tan}[c+d x]}{99 d} + \frac{2 C \text{Sec}[c+d x]^3 (a+b \text{Sec}[c+d x])^{3/2} \text{Tan}[c+d x]}{11 d}$$

Result (type 1, 1 leaves) :

???

- **Problem 943: Attempted integration timed out after 120 seconds.**

$$\int \text{Sec}[c+d x]^2 (a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 505 leaves, 7 steps) :

$$\frac{1}{315\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(18\,a^3\,b\,B-246\,a\,b^3\,B-8\,a^4\,C-21\,b^4\,(9\,A+7\,C)-3\,a^2\,b^2\,(21\,A+11\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{1}{315\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(6\,a^2\,b\,(3\,B-C)-8\,a^3\,C-3\,a\,b^2\,(21\,A-57\,B+13\,C)+3\,b^3\,(63\,A-25\,B+49\,C)\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{2\,\left(18\,a^2\,b\,B-75\,b^3\,B-8\,a^3\,C-3\,a\,b^2\,(21\,A+13\,C)\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}+$$
$$\frac{2\,\left(63\,A\,b^2-18\,a\,b\,B+8\,a^2\,C+49\,b^2\,C\right)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{315\,b^2\,d}+$$
$$\frac{2\,(9\,b\,B-4\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{63\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{9\,b\,d}$$

Result (type 1, 1 leaves):

???

■ Problem 944: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 406 leaves, 6 steps):

$$-\frac{1}{105\,b^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(21\,a^2\,b\,B+63\,b^3\,B-6\,a^3\,C+2\,a\,b^2\,(70\,A+41\,C)\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,b^2\,d}$$
$$2\,(a-b)\,\sqrt{a+b}\,\left(6\,a^2\,C+3\,a\,b\,(35\,A-7\,B+19\,C)-b^2\,(35\,A-63\,B+25\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(35\,A\,b^2+21\,a\,b\,B-6\,a^2\,C+25\,b^2\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b\,d}+$$
$$\frac{2\,(7\,b\,B-2\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,b\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 945: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 443 leaves, 7 steps):

$$-\frac{1}{15\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(15\,A\,b^2+20\,a\,b\,B+3\,a^2\,C+9\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,b\,d}2\,\sqrt{a+b}\,\left(3\,a^2\,(5\,B-C)+2\,a\,b\,(15\,A-10\,B+6\,C)-b^2\,(15\,A-5\,B+9\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}2\,a\,A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(5\,b\,B+3\,a\,C)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 4, 1192 leaves):

$$-\left(\left(4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.\right.$$

$$\left(15\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+20\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+20\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+9\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+9\,b^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-30\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-40\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-$$

$$6\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-18\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+15\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-15\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+20\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$20\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+9\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-9\,b^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$30 a^2 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$

$$30 a^2 A b \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} + (a+b)\left(15 A b^2+20 a b B+3 a^2 C+9 b^2 C\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\right.$$

$$\left.\frac{a-b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$

$$b\left(3 a^2(-5 A+5 B+C)+2 a b(15 A+10 B+6 C)+b^2(15 A+5 B+9 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(15 b d (b+a \,\text{Cos}[c+d x])^{3/2} (A+2 C+2 B \,\text{Cos}[c+d x]+A \,\text{Cos}[2 c+2 d x]) \,\text{Sec}[c+d x]^{7/2} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\right.$$

$$\left.\left.\sqrt{\frac{a+b-a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)\right) +$$

$$\left(\text{Cos}[c+d x]^3 (a+b \,\text{Sec}[c+d x])^{3/2} \left(A+B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right)\right.$$

$$\left.\left(\frac{4\left(15 A b^2+20 a b B+3 a^2 C+9 b^2 C\right) \text{Sin}[c+d x]}{15 b}+\frac{4}{15} \text{Sec}[c+d x] (5 b B \,\text{Sin}[c+d x]+6 a C \,\text{Sin}[c+d x])+\frac{4}{5} b C \,\text{Sec}[c+d x] \,\text{Tan}[c+d x]\right)\right) \Big/$$

$$(d (b+a \,\text{Cos}[c+d x]) (A+2 C+2 B \,\text{Cos}[c+d x]+A \,\text{Cos}[2 c+2 d x]))$$

■ Problem 946: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x] (a+b \,\text{Sec}[c+d x])^{3/2} \left(A+B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 426 leaves, 7 steps) :

$$\frac{1}{3 b d}(a-b)\sqrt{a+b}\,(3 a A-6 b B-8 a C)\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 b d}\sqrt{a+b}\,\left(a b\,(3 A+12 B-8 C)+6 a^2 C+2 b^2\,(3 A-3 B+C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{d}$$
$$\sqrt{a+b}\,(3 A b+2 a B)\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+$$
$$\frac{A\,(a+b\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{d}-\frac{b\,(3 A-2 C)\,\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Tan}[c+d x]}{3 d}$$

Result (type 4, 1208 leaves) :

$$\left(2\,(a+b\,\text{Sec}[c+d x])^{3/2}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$
$$\left(3 a^2 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-6 a b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-6 b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-8 a^2 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$
$$8 a b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-6 a^2 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+12 a b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+16 a^2 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+3 a^2 A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$3 a A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-6 a b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+6 b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-8 a^2 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+8 a b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$18 a A b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$
$$12 a^2 B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$
$$18 a A b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-12\,a^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\,(3\,a\,A-6\,b\,B-8\,a\,C)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\left(2\,a\,b\,(3\,A-3\,B-2\,C)+3\,a^2\,(B-C)-b^2\,(3\,A+3\,B+C)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)+$$

$$\left(\text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{4}{3}(3\,b\,B+4\,a\,C)\,\text{Sin}[c+d\,x]+\frac{4}{3}\,b\,C\,\text{Tan}[c+d\,x]\right)\right)\Bigg/$$

$$(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 949: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 650 leaves, 9 steps) :

$$-\frac{1}{192 a^2 b d}(a-b)\sqrt{a+b}\left(9 A b^3-128 a^3 B-24 a b^2 B-12 a^2 b (13 A+20 C)\right)$$

$$\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{1}{192 a^2 d}\sqrt{a+b}\left(9 A b^3-6 a b^2 (A+4 B)-8 a^3 (9 A+16 B+12 C)-4 a^2 b (39 A+28 B+60 C)\right)\text{Cot}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{64 a^3 d}$$

$$\sqrt{a+b}\left(3 A b^4+96 a^3 b B-8 a b^3 B+24 a^2 b^2 (A+2 C)+16 a^4 (3 A+4 C)\right)\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-\frac{\left(9 A b^3-128 a^3 B-24 a b^2 B-12 a^2 b (13 A+20 C)\right)\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{192 a^2 d}+$$

$$\frac{\left(3 A b^2+56 a b B+12 a^2 (3 A+4 C)\right)\text{Cos}[c+d x]\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{96 a d}+$$

$$\frac{(3 A b+8 a B)\,\text{Cos}[c+d x]^2\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{24 d}+\frac{A\,\text{Cos}[c+d x]^3 (a+b\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 4, 4781 leaves) :

$$\left(\text{Cos}[c+d x]^3 (a+b\,\text{Sec}[c+d x])^{3/2}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(\frac{1}{48}(9 A b+8 a B)\,\text{Sin}[c+d x]+\right.\right.$$

$$\left.\left.\frac{\left(48 a^2 A+3 A b^2+56 a b B+48 a^2 C\right)\text{Sin}[2 (c+d x)]}{96 a}+\frac{1}{48}(9 A b+8 a B)\,\text{Sin}[3 (c+d x)]+\frac{1}{16} a A\,\text{Sin}[4 (c+d x)]\right)\right)\Big/$$

$$(d (b+a\,\text{Cos}[c+d x]) (A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]))+$$

$$\left(\left(\frac{3 a^2 A}{4\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}+\frac{19 A b^2}{16\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}+\frac{13 a b B}{6\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}+\right.\right.$$

$$\frac{a^2 C}{\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}+\frac{2 b^2 C}{\sqrt{b+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}+\frac{19 a A b\sqrt{\text{Sec}[c+d x]}}{16\sqrt{b+a\,\text{Cos}[c+d x]}}-\frac{A b^3\sqrt{\text{Sec}[c+d x]}}{64 a\sqrt{b+a\,\text{Cos}[c+d x]}}+$$

$$\frac{2 a^2 B \sqrt{\text{Sec}[c+d x]}}{3 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{17 b^2 B \sqrt{\text{Sec}[c+d x]}}{24 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{7 a b C \sqrt{\text{Sec}[c+d x]}}{4 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{13 a A b \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{16 \sqrt{b+a \text{Cos}[c+d x]}}-$$

$$\frac{3 A b^3 \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{64 a \sqrt{b+a \text{Cos}[c+d x]}}+\frac{2 a^2 B \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{3 \sqrt{b+a \text{Cos}[c+d x]}}+\frac{b^2 B \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{8 \sqrt{b+a \text{Cos}[c+d x]}}+$$

$$\left.\frac{5 a b C \text{Cos}[2 (c+d x)] \sqrt{\text{Sec}[c+d x]}}{4 \sqrt{b+a \text{Cos}[c+d x]}}\right) (a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(\frac{1}{96 a^2 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}}\right.$$

$$\left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b (13 A+20 C)\right) \text{Tan}\left[\frac{1}{2} (c+d x)\right] \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}+$$

$$\left(\left((a+b) \left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b (13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right]-\right.\right.$$

$$2 a \left(-3 A b^3+24 a^3 (3 A+4 C)-4 a^2 b (9 A-52 B+12 C)+2 a b^2 (57 A-28 B+96 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right]-$$

$$\left.6 \left(3 A b^4+96 a^3 b B-8 a b^3 B+24 a^2 b^2 (A+2 C)+16 a^4 (3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)$$

$$\left.\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^4}\right) \Big/$$

$$\left.\left.\left(96 a^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \left(b-b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^4+a \left(-1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)^2\right)\right)\right)\right) \Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right.\left(\frac{1}{192\,a^2\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}}\right.$$

$$\left(-9\,A\,b^3+128\,a^3\,B+24\,a\,b^2\,B+12\,a^2\,b\,(13\,A+20\,C)\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}-$$

$$\left(\left((a+b)\left(-9\,A\,b^3+128\,a^3\,B+24\,a\,b^2\,B+12\,a^2\,b\,(13\,A+20\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\,a\left(-3\,A\,b^3+24\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(9\,A-52\,B+12\,C)+2\,a\,b^2\,(57\,A-28\,B+96\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$\left.6\left(3\,A\,b^4+96\,a^3\,b\,B-8\,a\,b^3\,B+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}$$

$$\left.\left.\left(-2\,b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+2\,a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)\right/$$

$$\left(96\,a^2\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)^2\right)-$$

$$\left(\left((a+b)\left(-9\,A\,b^3+128\,a^3\,B+24\,a\,b^2\,B+12\,a^2\,b\,(13\,A+20\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\,a\left(-3\,A\,b^3+24\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(9\,A-52\,B+12\,C)+2\,a\,b^2\,(57\,A-28\,B+96\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$\left.6\left(3\,A\,b^4+96\,a^3\,b\,B-8\,a\,b^3\,B+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]^3 \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\left.\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right) \Big/$$

$$\left(96 a^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4} \left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)+$$

$$\left(\left((a+b)\left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b(13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]-\right.\right.$$

$$2 a\left(-3 A b^3+24 a^3(3 A+4 C)-4 a^2 b(9 A-52 B+12 C)+2 a b^2(57 A-28 B+96 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]-$$

$$\left.6\left(3 A b^4+96 a^3 b B-8 a b^3 B+24 a^2 b^2(A+2 C)+16 a^4(3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)$$

$$\left(-a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\right) \Big/ \left(192 a^2(a+b) \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right.$$

$$\left.\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)-\frac{1}{192 a^2\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)}$$

$$\left((a+b)\left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b(13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]-\right.$$

$$2 a\left(-3 A b^3+24 a^3(3 A+4 C)-4 a^2 b(9 A-52 B+12 C)+2 a b^2(57 A-28 B+96 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]-$$

$$\left.6\left(3 A b^4+96 a^3 b B-8 a b^3 B+24 a^2 b^2(A+2 C)+16 a^4(3 A+4 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4} -$$

$$\left(\left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b (13 A+20 C)\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}+\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/$$

$$\left(192 a^2 \left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}\right) + \left(\left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b (13 A+20 C)\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left(\frac{-a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} -\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] \left(a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/$$

$$\left(192 a^2 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right) +$$

$$\left(\left((a+b) \left(-9 A b^3+128 a^3 B+24 a b^2 B+12 a^2 b (13 A+20 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] -\right.\right.$$

$$2 a \left(-3 A b^3+24 a^3 (3 A+4 C)-4 a^2 b (9 A-52 B+12 C)+2 a b^2 (57 A-28 B+96 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right] -$$

$$\left.6 \left(3 A b^4+96 a^3 b B-8 a b^3 B+24 a^2 b^2 (A+2 C)+16 a^4 (3 A+4 C)\right) \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}$$

$$\left(\frac{-a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Big/$$

$$\left(192\,a^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\;\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)+$$

$$\left(\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\;\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\right.$$

$$\left(-\left(a\left(-3\,A\,b^3+24\,a^3\,(3\,A+4\,C)-4\,a^2\,b\,(9\,A-52\,B+12\,C)+2\,a\,b^2\,(57\,A-28\,B+96\,C)\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Big/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right.\right.$$

$$\left.\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)+\frac{3\left(3\,A\,b^4+96\,a^3\,b\,B-8\,a\,b^3\,B+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+$$

$$\left((a+b)\left(-9\,A\,b^3+128\,a^3\,B+24\,a\,b^2\,B+12\,a^2\,b\,(13\,A+20\,C)\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\Big/$$

$$\left.\left.\left(2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\right)\right) \Big/ \left(96\,a^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)$$

Problem 950: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 610 leaves, 8 steps):

$$\frac{1}{3465\,b^4\,d}2\,(a-b)\sqrt{a+b}\,\left(110\,a^4\,b\,B-3069\,a^2\,b^3\,B-1617\,b^5\,B-40\,a^5\,C-15\,a^3\,b^2\,(33\,A+17\,C)-15\,a\,b^4\,(319\,A+247\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3465\,b^3\,d}$$
$$2\,(a-b)\sqrt{a+b}\,\left(10\,a^3\,b\,(11\,B-3\,C)-40\,a^4\,C-15\,a^2\,b^2\,(33\,A-121\,B+19\,C)-3\,b^4\,(275\,A-539\,B+225\,C)+6\,a\,b^3\,(660\,A-209\,B+505\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$
$$\frac{1}{3465\,b^2\,d}2\,\left(110\,a^3\,b\,B-1254\,a\,b^3\,B-40\,a^4\,C-75\,b^4\,(11\,A+9\,C)-15\,a^2\,b^2\,(33\,A+19\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]-$$
$$\frac{2\left(110\,a^2\,b\,B-539\,b^3\,B-40\,a^3\,C-5\,a\,b^2\,(99\,A+67\,C)\right)(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{3465\,b^2\,d}+$$
$$\frac{2\left(99\,A\,b^2-22\,a\,b\,B+8\,a^2\,C+81\,b^2\,C\right)(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{693\,b^2\,d}+$$
$$\frac{2\,(11\,b\,B-4\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{99\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{7/2}\,\text{Tan}[c+d\,x]}{11\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 951: Attempted integration timed out after 120 seconds.

$$\int \text{Sec}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 502 leaves, 7 steps):

$$-\frac{1}{315\, b^3\, d} 2\, (a-b)\, \sqrt{a+b}\, \left(45\, a^3\, b\, B + 435\, a\, b^3\, B - 10\, a^4\, C + 21\, b^4\, (9\, A + 7\, C) + 3\, a^2\, b^2\, (161\, A + 93\, C)\right)$$

$$\text{Cot}[c+d\,x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\ \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}} +$$

$$\frac{1}{315\, b^2\, d} 2\, (a-b)\, \sqrt{a+b}\, \left(10\, a^3\, C + 15\, a^2\, b\, (21\, A - 3\, B + 11\, C) - 6\, a\, b^2\, (28\, A - 60\, B + 19\, C) + 3\, b^3\, (63\, A - 25\, B + 49\, C)\right)$$

$$\text{Cot}[c+d\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\ \frac{a+b}{a-b}\right] \sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}} +$$

$$\frac{2\left(45\, a^2\, b\, B + 75\, b^3\, B - 10\, a^3\, C + 6\, a\, b^2\, (28\, A + 19\, C)\right) \sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Tan}[c+d\,x]}{315\, b\, d} +$$

$$\frac{2\left(63\, A\, b^2 + 45\, a\, b\, B - 10\, a^2\, C + 49\, b^2\, C\right)\, (a+b\,\text{Sec}[c+d\,x])^{3/2}\ \text{Tan}[c+d\,x]}{315\, b\, d} +$$

$$\frac{2\,(9\, b\, B - 2\, a\, C)\, (a+b\,\text{Sec}[c+d\,x])^{5/2}\ \text{Tan}[c+d\,x]}{63\, b\, d} + \frac{2\, C\, (a+b\,\text{Sec}[c+d\,x])^{7/2}\ \text{Tan}[c+d\,x]}{9\, b\, d}$$

Result (type 1, 1 leaves) :

???

- **Problem 952: Result more than twice size of optimal antiderivative.**

$$\int (a+b\,\text{Sec}[c+d\,x])^{5/2}\, \left(A + B\,\text{Sec}[c+d\,x] + C\,\text{Sec}[c+d\,x]^2\right)\, dx$$

Optimal (type 4, 521 leaves, 8 steps) :

$$-\frac{1}{105\,b^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(161\,a^2\,b\,B+63\,b^3\,B+15\,a^3\,C+5\,a\,b^2\,(49\,A+29\,C)\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,b\,d}$$

$$2\,\sqrt{a+b}\,\left(15\,a^3\,(7\,B-C)+b^3\,(35\,A-63\,B+25\,C)+a^2\,b\,(315\,A-161\,B+135\,C)-a\,b^2\,(245\,A-119\,B+145\,C)\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$

$$2\,a^2\,A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\,\left(35\,A\,b^2+56\,a\,b\,B+15\,a^2\,C+25\,b^2\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,d}+$$

$$\frac{2\,(7\,b\,B+5\,a\,C)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{35\,d}+\frac{2\,C\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{7\,d}$$

Result (type 4, 1405 leaves) :

$$-\left(\left(4\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.\right.$$

$$\left(245\,a^2\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+245\,a\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+161\,a^3\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+161\,a^2\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$63\,a\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+63\,b^4\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,a^4\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,a^3\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$145\,a^2\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+145\,a\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-490\,a^2\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-322\,a^3\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$126\,a\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-30\,a^4\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-290\,a^2\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+245\,a^2\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$245\,a\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+161\,a^3\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-161\,a^2\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+63\,a\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$63\,b^4\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+15\,a^4\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-15\,a^3\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+145\,a^2\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$145\,a\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+210\,a^3\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+210\,a^3\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(161\,a^2\,b\,B+63\,b^3\,B+15\,a^3\,C+5\,a\,b^2\,(49\,A+29\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$b\left(-15\,a^3\,(7\,A-7\,B-C)+b^3\,(35\,A+63\,B+25\,C)+a^2\,b\,(315\,A+161\,B+135\,C)+a\,b^2\,(245\,A+119\,B+145\,C)\right)\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Big],\frac{a-b}{a+b}\Big]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(105\,b\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\Bigg)\Bigg)+$$

$$\frac{1}{d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}$$

$$\mathrm{Cos}[c+d\,x]^4$$

$$(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\frac{4\left(245\,a\,A\,b^2+161\,a^2\,b\,B+63\,b^3\,B+15\,a^3\,C+145\,a\,b^2\,C\right)\mathrm{Sin}[c+d\,x]}{105\,b}+$$

$$\frac{4}{35}\,\mathrm{Sec}[c+d\,x]^2\left(7\,b^2\,B\,\mathrm{Sin}[c+d\,x]+15\,a\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\frac{4}{105}\operatorname{Sec}[c+d\,x]\left(35\,A\,b^2\operatorname{Sin}[c+d\,x]+77\,a\,b\,B\operatorname{Sin}[c+d\,x]+45\,a^2\,C\operatorname{Sin}[c+d\,x]+25\,b^2\,C\operatorname{Sin}[c+d\,x]\right)+\frac{4}{7}\,b^2\,C\operatorname{Sec}[c+d\,x]^2\operatorname{Tan}[c+d\,x]\Bigg)$$

- **Problem 953: Result more than twice size of optimal antiderivative.**

$$\int\operatorname{Cos}[c+d\,x]\,(a+b\operatorname{Sec}[c+d\,x])^{5/2}\left(A+B\operatorname{Sec}[c+d\,x]+C\operatorname{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 505 leaves, 8 steps):

$$-\frac{1}{15\,b\,d}(a-b)\,\sqrt{a+b}\,\left(70\,a\,b\,B-a^2\,(15\,A-46\,C)+6\,b^2\,(5\,A+3\,C)\right)\operatorname{Cot}[c+d\,x]$$
$$\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\operatorname{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\operatorname{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{1}{15\,b\,d}\sqrt{a+b}\,\left(a^2\,b\,(15\,A+90\,B-46\,C)+30\,a^3\,C-2\,b^3\,(15\,A-5\,B+9\,C)+2\,a\,b^2\,(45\,A-35\,B+17\,C)\right)\operatorname{Cot}[c+d\,x]$$
$$\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\operatorname{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\operatorname{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$
$$a\,\sqrt{a+b}\,(5\,A\,b+2\,a\,B)\operatorname{Cot}[c+d\,x]\operatorname{EllipticPi}\left[\frac{a+b}{a},\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\operatorname{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\operatorname{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{A\,(a+b\operatorname{Sec}[c+d\,x])^{5/2}\operatorname{Sin}[c+d\,x]}{d}-\frac{b\,(15\,a\,A-10\,b\,B-16\,a\,C)\,\sqrt{a+b\operatorname{Sec}[c+d\,x]}\,\operatorname{Tan}[c+d\,x]}{15\,d}-\frac{b\,(5\,A-2\,C)\,(a+b\operatorname{Sec}[c+d\,x])^{3/2}\operatorname{Tan}[c+d\,x]}{5\,d}$$

Result (type 4, 1498 leaves):

$$\Bigg(2\,(a+b\operatorname{Sec}[c+d\,x])^{5/2}\left(A+B\operatorname{Sec}[c+d\,x]+C\operatorname{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$
$$\Bigg(15\,a^3\,A\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+15\,a^2\,A\,b\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-30\,a\,A\,b^2\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-30\,A\,b^3\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-70\,a^2\,b\,B\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$
$$70\,a\,b^2\,B\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-46\,a^3\,C\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-46\,a^2\,b\,C\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-18\,a\,b^2\,C\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-18\,b^3\,C\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$
$$30\,a^3\,A\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+60\,a\,A\,b^2\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+140\,a^2\,b\,B\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+92\,a^3\,C\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+36\,a\,b^2\,C\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$
$$15\,a^3\,A\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-15\,a^2\,A\,b\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-30\,a\,A\,b^2\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+30\,A\,b^3\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-70\,a^2\,b\,B\operatorname{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$70\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-46\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+46\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-18\,a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+18\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$150\,a^2\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$60\,a^3\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$150\,a^2\,A\,b\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-60\,a^3\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(-70\,a\,b\,B+a^2\,(15\,A-46\,C)-6\,b^2\,(5\,A+3\,C)\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\left(a^2\,b\,(45\,A-45\,B-23\,C)+15\,a^3\,(B-C)-b^3\,(15\,A+5\,B+9\,C)-a\,b^2\,(45\,A+35\,B+17\,C)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(15\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{4}{15}\left(15\,A\,b^2+35\,a\,b\,B+23\,a^2\,C+9\,b^2\,C\right)\text{Sin}[c+d\,x]+\frac{4}{15}\,\text{Sec}[c+d\,x]\,\left(5\,b^2\,B\,\text{Sin}[c+d\,x]+11\,a\,b\,C\,\text{Sin}[c+d\,x]\right)+\frac{4}{5}\,b^2\,C\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 955: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^3\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 549 leaves, 8 steps):

$$\frac{1}{24\,b\,d}(a-b)\,\sqrt{a+b}\,\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,d}\sqrt{a+b}\,\left(3\,b^2\,(11\,A+16\,(B-C))+4\,a^2\,(4\,A+3\,B+6\,C)+2\,a\,b\,(13\,A+27\,B+72\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,a\,d}\sqrt{a+b}\,\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(15\,A\,b^2+42\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{(5\,A\,b+6\,a\,B)\,\text{Cos}[c+d\,x]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{12\,d}+\frac{A\,\text{Cos}[c+d\,x]^2\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 2922 leaves):

$$\left(\text{Cos}[c+d\,x]^4\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{1}{6}\left(a^2\,A+24\,b^2\,C\right)\text{Sin}[c+d\,x]+\frac{1}{12}\,a\,(13\,A\,b+6\,a\,B)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{6}\,a^2\,A\,\text{Sin}[3\,(c+d\,x)]\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(\text{Cos}[c+d\,x]^5\left(\frac{19\,a^2\,A\,b}{6\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,b^3}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^3\,B}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\right.\right.$$

$$\frac{6\,a\,b^2\,B}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{6\,a^2\,b\,C}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{2\,b^3\,C}{\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a^3\,A\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\frac{59\,a\,A\,b^2\,\sqrt{\text{Sec}[c+d\,x]}}{24\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{11\,a^2\,b\,B\,\sqrt{\text{Sec}[c+d\,x]}}{4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\,b^3\,B\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{a^3\,C\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{4\,a\,b^2\,C\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\frac{2\,a^3\,A\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{11\,a\,A\,b^2\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{9\,a^2\,b\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{4\,\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left.\frac{a^3\,C\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\frac{2\,a\,b^2\,C\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}\right)\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{1}{\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\left((a+b)\,\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\,\left(12\,a^3\,B+a\,b^2\,(-13\,A+72\,(B-C))+24\,b^3\,(A-B-C)+2\,a^2\,b\,(19\,A-3\,B+36\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-$$

$$\left.6\,\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\right)$$

$$\left.\left.\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(12\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)\left(\frac{1}{24\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}}\,a\,\text{Sin}[c+d\,x]\right.$$

$$\left(\frac{1}{\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\left((a+b)\,\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-\right.\right.$$

$$2\,\left(12\,a^3\,B+a\,b^2\,(-13\,A+72\,(B-C))+24\,b^3\,(A-B-C)+2\,a^2\,b\,(19\,A-3\,B+36\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]-$$

$$6\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)-$$

$$\frac{1}{24\sqrt{b+a\,\text{Cos}[c+d\,x]}}\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]\left(\frac{1}{\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\Bigg((a+b)\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$2\left(12\,a^3\,B+a\,b^2\,(-13\,A+72\,(B-C))+24\,b^3\,(A-B-C)+2\,a^2\,b\,(19\,A-3\,B+36\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$6\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\Bigg)+$$

$$\frac{1}{12\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}\left(\frac{1}{2}\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2-\right.$$

$$a\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,\text{Sin}[c+d\,x]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\frac{1}{2\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}}$$

$$\Bigg((a+b)\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$2\left(12\,a^3\,B+a\,b^2\,(-13\,A+72\,(B-C))+24\,b^3\,(A-B-C)+2\,a^2\,b\,(19\,A-3\,B+36\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$6\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\left(-\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]+\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{2\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}$$

$$\Bigg((a+b)\left(54\,a\,b\,B+3\,b^2(11\,A-16\,C)+8\,a^2(2\,A+3\,C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$2\left(12\,a^3\,B+a\,b^2(-13\,A+72(B-C))+24\,b^3(A-B-C)+2\,a^2\,b\,(19\,A-3\,B+36\,C)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]-$$

$$6\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\Bigg)$$

$$\left(-\frac{a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sin}[c+d\,x]}{a+b}+\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{a+b}\right)+$$

$$\Bigg(\sqrt{\frac{(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg(-\Bigg(\left(12\,a^3\,B+a\,b^2(-13\,A+72(B-C))+24\,b^3(A-B-C)+2\,a^2\,b\,(19\,A-3\,B+36\,C)\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg)\Big/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)+$$

$$\frac{3\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}+\Bigg((a+b)\left(54\,a\,b\,B+3\,b^2(11\,A-16\,C)+8\,a^2(2\,A+3\,C)\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Big/\left(2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Bigg)\Bigg)\Big/\left(\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Bigg)\Bigg)\Bigg)$$

- **Problem 957: Result unnecessarily involves imaginary or complex numbers.**

$$\int \text{Cos}[c+d x]^5 (a+b \text{Sec}[c+d x])^{5/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 774 leaves, 10 steps):

$$-\frac{1}{1920 a^2 b d}(a-b) \sqrt{a+b} \left(45 A b^4-2840 a^3 b B-150 a b^3 B-256 a^4 (4 A+5 C)-12 a^2 b^2 (141 A+220 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{1920 a^2 d} \sqrt{a+b} \left(45 A b^4-30 a b^3 (A+5 B)-16 a^4 (64 A+45 B+80 C)-8 a^3 b (193 A+355 B+260 C)-4 a^2 b^2 (423 A+295 B+660 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{128 a^3 d}\sqrt{a+b} \left(3 A b^5+96 a^5 B+240 a^3 b^2 B-10 a b^4 B+40 a^2 b^3 (A+2 C)+80 a^4 b (3 A+4 C)\right) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{1920 a^2 d}\left(45 A b^4-2840 a^3 b B-150 a b^3 B-256 a^4 (4 A+5 C)-12 a^2 b^2 (141 A+220 C)\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]+\frac{\left(15 A b^3+360 a^3 B+590 a b^2 B+4 a^2 b (193 A+260 C)\right) \text{Cos}[c+d x] \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{960 a d}+\frac{\left(15 A b^2+110 a b B+16 a^2 (4 A+5 C)\right) \text{Cos}[c+d x]^2 \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{240 d}+\frac{(A b+2 a B) \text{Cos}[c+d x]^3 (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{8 d}+\frac{A \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^{5/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 4, 942 leaves):

$$\frac{1}{d (b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} \text{Cos}[c+d x]^4 (a+b \text{Sec}[c+d x])^{5/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(\frac{1}{480}\left(88 a^2 A+93 A b^2+170 a b B+80 a^2 C\right) \text{Sin}[c+d x]+\frac{\left(1024 a^2 A b+15 A b^3+480 a^3 B+590 a b^2 B+1040 a^2 b C\right) \text{Sin}[2 (c+d x)]}{960 a}+\frac{1}{480}\left(100 a^2 A+93 A b^2+170 a b B+80 a^2 C\right) \text{Sin}[3 (c+d x)]+\frac{1}{160} a (21 A b+10 a B) \text{Sin}[4 (c+d x)]+\frac{1}{40} a^2 A \text{Sin}[5 (c+d x)]\right)-$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(-\left(-45\,A\,b^4+2840\,a^3\,b\,B+150\,a\,b^3\,B+256\,a^4\,(4\,A+5\,C)+12\,a^2\,b^2\,(141\,A+220\,C)\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$\frac{1}{\sqrt{\frac{-a+b}{a+b}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)}\,\mathrm{i}$$

$$\left((a-b)\left(-45\,A\,b^4+2840\,a^3\,b\,B+150\,a\,b^3\,B+256\,a^4\,(4\,A+5\,C)+12\,a^2\,b^2\,(141\,A+220\,C)\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.\right.$$

$$\left.\frac{a+b}{a-b}\right]-2\,(a-b)\left(-45\,A\,b^4-30\,a\,b^3\,(A-5\,B)+720\,a^4\,B+4\,a^2\,b^2\,(129\,A+185\,B+180\,C)+8\,a^3\,b\,(161\,A+45\,B+220\,C)\right)$$

$$\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]+30\left(3\,A\,b^5+96\,a^5\,B+240\,a^3\,b^2\,B-10\,a\,b^4\,B+\right.$$

$$\left.\left.40\,a^2\,b^3\,(A+2\,C)+80\,a^4\,b\,(3\,A+4\,C)\right)\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\right)$$

$$\left.\left.\left(-1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(960\,a^2\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 958: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d\,x]^3 \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 429 leaves, 6 steps):

$$-\frac{1}{105\,b^5\,d}2\,(a-b)\,\sqrt{a+b}\,\left(56\,a^2\,b\,B+63\,b^3\,B-48\,a^3\,C-2\,a\,b^2\,(35\,A+22\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,b^4\,d}2\,\sqrt{a+b}\,\left(48\,a^3\,C-4\,a^2\,b\,(14\,B+3\,C)+2\,a\,b^2\,(35\,A+7\,B+22\,C)+b^3\,(35\,A-63\,B+25\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\left(35\,A\,b^2-28\,a\,b\,B+24\,a^2\,C+25\,b^2\,C\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{105\,b^3\,d}+\frac{2\,(7\,b\,B-6\,a\,C)\,\text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{35\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]^2\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{7\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 959: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d\,x]^2 \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 342 leaves, 5 steps):

$$-\frac{1}{15\,b^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(15\,A\,b^2-10\,a\,b\,B+8\,a^2\,C+9\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{15\,b^3\,d}2\,\sqrt{a+b}\,\left(15\,A\,b^2-b^2\,(5\,B-9\,C)+8\,a^2\,C-2\,a\,b\,(5\,B+C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(5\,b\,B-4\,a\,C)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,b^2\,d}+\frac{2\,C\,\text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{5\,b\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 960: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 267 leaves, 4 steps) :

$$-\frac{1}{3\,b^3\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,(3\,b\,B-2\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{3\,b^2\,d}2\,\sqrt{a+b}\,(3\,A\,b-b\,(3\,B-C)+2\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{3\,b\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 961: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 317 leaves, 5 steps) :

$$-\frac{1}{b^2\,d}2\,(a-b)\,\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\,\sqrt{a+b}\,(B-C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{b\,d}-$$

$$\frac{2\,A\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a\,d}$$

Result (type 4, 762 leaves) :

$$\frac{4\,C\,\mathrm{Cos}[c+d\,x]\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sin}[c+d\,x]}{b\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}-$$

$$\Bigg(4\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\Bigg(a\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-2\,a\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+a\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$2\,A\,b\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,A\,b\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+(a+b)\,C\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+b\,(A-B-C)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(b\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\Bigg)$$

Problem 962: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 358 leaves, 6 steps):

$$\frac{A\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a\,b\,d}+\frac{1}{a\,b\,d}$$

$$\sqrt{a+b}\,(A\,b+2\,a\,C)\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{a^2\,d}$$

$$\sqrt{a+b}\,(A\,b-2\,a\,B)\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{A\,\sqrt{a+b\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{a\,d}$$

Result (type 4, 861 leaves):

$$\left(2\,\sqrt{b+a\,\text{Cos}[c+d x]}\,(B+A\,\text{Cos}[c+d x]+C\,\text{Sec}[c+d x])\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(a\,A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+A\,b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-2\,a\,A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+a\,A\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-A\,b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+\right.$$

$$2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$4\,a\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-4\,a\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;+$$

$$A\,(a+b)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\;-2\,a\,(B-C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

- **Problem 963: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 439 leaves, 7 steps) :

$$-\frac{1}{4\,a^2\,b\,d}$$

$$(a-b)\,\sqrt{a+b}\,\,(3\,A\,b-4\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{4\,a^2\,d}\sqrt{a+b}\,\,(3\,A\,b-2\,a\,(A+2\,B))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{4\,a^3\,d}\sqrt{a+b}\,\left(3\,A\,b^2-4\,a\,b\,B+4\,a^2\,(A+2\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-\,\frac{(3\,A\,b-4\,a\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{4\,a^2\,d}+\frac{A\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{2\,a\,d}$$

Result (type 4, 1905 leaves) :

$$\frac{A\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]\,\text{Sin}[2\,(c+d\,x)]}{4\,a\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\Bigg(\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\,\Bigg(-3\,a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$3\,A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+6\,a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$8\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-3\,a\,A\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+3\,A\,b^2\,\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$4\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-4\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,i\,a^2\,A\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$6\,i\,A\,b^2\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+8\,\mathrm{i}\,a\,b\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$16\,\mathrm{i}\,a^2\,C\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-8\,\mathrm{i}\,a^2\,A\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$6\,\mathrm{i}\,A\,b^2\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+8\,\mathrm{i}\,a\,b\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$16\,\mathrm{i}\,a^2\,C\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-\mathrm{i}\,(a-b)\,(-3\,A\,b+4\,a\,B)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,\left(3\,A\,b^2-a\,b\,(A+4\,B)+2\,a^2\,(A+2\,C)\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(4\,a^2\,\sqrt{\frac{-a+b}{a+b}}\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 964: Attempted integration timed out after 120 seconds.**

$$\int\frac{\text{Sec}[c+d\,x]^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 510 leaves, 6 steps):

$$\frac{1}{15\,b^5\,\sqrt{a+b}\,d}2\,\left(40\,a^3\,b\,B-25\,a\,b^3\,B-6\,a^2\,b^2\,(5\,A-4\,C)-48\,a^4\,C+3\,b^4\,(5\,A+3\,C)\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$

$$\frac{1}{15\,b^4\,\sqrt{a+b}\,d}2\,\left(a^2\,b\,(40\,B-36\,C)-48\,a^3\,C-6\,a\,b^2\,(5\,A-5\,B+2\,C)-b^3\,(15\,A-5\,B+9\,C)\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\,\frac{a+b}{a-b}\right]\,\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,\left(20\,a^2\,b\,B-5\,b^3\,B-3\,a\,b^2\,(5\,A-3\,C)-24\,a^3\,C\right)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{15\,b^3\,\left(a^2-b^2\right)\,d}+$$

$$\frac{2\,\left(5\,A\,b^2-5\,a\,b\,B+6\,a^2\,C-b^2\,C\right)\,\text{Sec}[c+d\,x]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Tan}[c+d\,x]}{5\,b^2\,\left(a^2-b^2\right)\,d}$$

Result (type 1, 1 leaves):

???

Problem 965: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 352 leaves, 5 steps):

$$-\frac{1}{3 b^4 \sqrt{a+b}\, d} 2 \left(6 a^2 b B-3 b^3 B-a b^2 (3 A-5 C)-8 a^3 C\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 b^3 \sqrt{a+b}\, d} 2 \left(3 A b^2-(2 a+b) (b (3 B-C)-4 a C)\right) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a \left(A b^2-a (b B-a C)\right) \text{Tan}[c+d x]}{b^2 \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 C \sqrt{a+b \text{Sec}[c+d x]}\, \text{Tan}[c+d x]}{3 b^2 d}$$

Result (type 1, 1 leaves):

???

Problem 966: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 293 leaves, 4 steps):

$$-\frac{1}{b^3 \sqrt{a+b}\, d} 2 \left(A b^2-a b B+2 a^2 C-b^2 C\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{b^2 \sqrt{a+b}\, d} 2 (A b+b (B-C)-2 a C) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}-\frac{2 \left(A b^2-a (b B-a C)\right) \text{Tan}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves):

???

Problem 967: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 395 leaves, 6 steps):

$$\frac{1}{a\,b^2\sqrt{a+b}\,d}2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{a\,b\sqrt{a+b}\,d}2\,(A\,b-a\,(B+C))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,A\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d\,x])}{a-b}}}{a^2\,d}+\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Tan}[c+d\,x]}{a\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 4, 1275 leaves):

$$\left((b+a\,\text{Cos}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{4\left(A\,b^2-a\,b\,B+a^2\,C\right)\text{Sin}[c+d\,x]}{a\,b\left(-a^2+b^2\right)}+\frac{4\left(A\,b^2\,\text{Sin}[c+d\,x]-a\,b\,B\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]\right)}{a\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d\,x])}\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)-$$

$$\left(4\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+\right.$$

$$a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+2\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-2\,a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+a^3\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$2\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+2\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$(a+b)\,\left(A\,b^2+a\,(-b\,B+a\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-a\,b\,(a+b)\,(A-B+C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\,\left(-a^2\,b+b^3\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right.$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

- **Problem 968: Result more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 451 leaves, 7 steps) :

$$-\frac{1}{a^2 b \sqrt{a+b}\, d}\left(3 A b^2-2 a b B-a^2 (A-2 C)\right) \text{Cot}[c+d x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{a^2 b \sqrt{a+b}\, d}$$

$$\left(3 A b^2+a b (A-2 B)+2 a^2 C\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{1}{a^3 d}\sqrt{a+b}\, (3 A b-2 a B) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{A \text{Sin}[c+d x]}{a d \sqrt{a+b \text{Sec}[c+d x]}}-\frac{b \left(3 A b^2-2 a b B-a^2 (A-2 C)\right) \text{Tan}[c+d x]}{a^2 \left(a^2-b^2\right) d \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 4, 1814 leaves) :

$$\left((b+a \text{Cos}[c+d x])^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left.\left(\frac{4 \left(A b^2-a b B+a^2 C\right) \text{Sin}[c+d x]}{a^2 \left(a^2-b^2\right)}-\frac{4 \left(A b^3 \text{Sin}[c+d x]-a b^2 B \text{Sin}[c+d x]+a^2 b C \text{Sin}[c+d x]\right)}{a^2 \left(a^2-b^2\right) (b+a \text{Cos}[c+d x])}\right)\right)\Big/$$

$$\left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+b \text{Sec}[c+d x])^{3/2}\right)-$$

$$\left(2 (b+a \text{Cos}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(a^3 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]+a^2 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]-3 a A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]-3 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]+2 a^2 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]+\right.$$

$$2 a b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]-2 a^3 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]-2 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]-2 a^3 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+6 a A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3-$$

$$4 a^2 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+4 a^3 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^3+a^3 A \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-a^2 A b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-3 a A b^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+$$

$$3 A b^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+2 a^2 b B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-2 a b^2 B \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5-2 a^3 C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+2 a^2 b C \text{Tan}\left[\frac{1}{2} (c+d x)\right]^5+$$

$$6\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$4\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$4\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$6\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-6\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-4\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+4\,a\,b^2\,B\,\text{EllipticPi}\Big[-1,$$

$$-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\Big]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$(a+b)\,\left(-3\,A\,b^2+2\,a\,b\,B+a^2\,(A-2\,C)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-2\,a\,(a+b)\,(-A\,b+a\,(B-C))\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(a^2\left(a^2-b^2\right)d\left(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x]\right)\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])^{3/2}\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 969: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+d x]^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{(a+b\,\text{Sec}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 552 leaves, 8 steps):

$$\frac{1}{4a^3 b\sqrt{a+b}\,d}\left(15Ab^3+4a^3B-12ab^2B-a^2(7Ab-8bC)\right)\text{Cot}[c+d x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4a^3\sqrt{a+b}\,d}$$

$$\left(15Ab^2+ab(5A-12B)-2a^2(A+2B-4C)\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4a^4 d}\sqrt{a+b}\left(15Ab^2-12abB+4a^2(A+2C)\right)\text{Cot}[c+d x]$$

$$\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{(5Ab-4aB)\,\text{Sin}[c+d x]}{4a^2 d\sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{A\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2ad\sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{b\left(15Ab^3+4a^3B-12ab^2B-a^2(7Ab-8bC)\right)\text{Tan}[c+d x]}{4a^3\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 746 leaves):

$$\frac{1}{2}\left(\frac{1}{d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\right.$$

$$\left(\frac{4\,b\,\left(A\,b^2-a\,b\,B+a^2\,C\right)\,\text{Sin}[c+d\,x]}{a^3\,\left(-a^2+b^2\right)}+\frac{4\,\left(A\,b^4\,\text{Sin}[c+d\,x]-a\,b^3\,B\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{a^3\,\left(a^2-b^2\right)\,(b+a\,\text{Cos}[c+d\,x])}+\frac{A\,\text{Sin}[2\,(c+d\,x)]}{2\,a^2}\right)+$$

$$\frac{1}{2\,a^3\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left(\left(15\,A\,b^3+4\,a^3\,B-12\,a\,b^2\,B+a^2\,(-7\,A\,b+8\,b\,C)\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\frac{1}{\sqrt{\frac{-a+b}{a+b}}\,\left(b-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4+a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)}\right.$$

$$i\,(a-b)\,\left(\left(-15\,A\,b^3-4\,a^3\,B+12\,a\,b^2\,B+a^2\,b\,(7\,A-8\,C)\right)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]+\right.$$

$$2\,\left(15\,A\,b^3+2\,a\,b^2\,(5\,A-6\,B)+2\,a^3\,(A+2\,C)+a^2\,b\,(A-8\,B+8\,C)\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]-$$

$$\left.2\,(a+b)\,\left(15\,A\,b^2-12\,a\,b\,B+4\,a^2\,(A+2\,C)\right)\,\text{EllipticPi}\left[-\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{a+b}{a-b}\right]\right)$$

$$\left.\left.\left(-1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)$$

Problem 970: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^3 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 549 leaves, 6 steps):

$$-\frac{1}{3 b^5 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(8 a^4 b B-15 a^2 b^3 B+3 b^5 B-2 a^3 b^2 (A-14 C)+2 a b^4 (3 A-4 C)-16 a^5 C\right)$$
$$\text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} -$$
$$\frac{1}{3 b^4 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(a^3 b (8 B-12 C)-2 a^2 b^2 (A-3 B-8 C)-3 a b^3 (A+3 B-3 C)-16 a^4 C+b^4 (3 A-3 B+C)\right)$$
$$\text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} -$$
$$\frac{2 \left(A b^2-a (b B-a C)\right) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}} - \frac{2 a \left(4 A b^4+a \left(3 a^2 b B-7 b^3 B-6 a^3 C+10 a b^2 C\right)\right) \text{Tan}[c+d x]}{3 b^3 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}} +$$
$$\frac{2 \left(A b^2-a b B+2 a^2 C-b^2 C\right) \sqrt{a+b \text{Sec}[c+d x]} \, \text{Tan}[c+d x]}{3 b^3 \left(a^2-b^2\right) d}$$

Result (type 1, 1 leaves):

???

Problem 971: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x]^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 449 leaves, 5 steps):

$$\frac{1}{3 b^4 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^3 b B - 6 a b^3 B + 3 b^4 (A-C) - 8 a^4 C + a^2 b^2 (A+15 C)\right)$$

$$\text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{1}{3 b^3 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(2 a^2 b (B-3 C) - 3 b^3 (A+B-C) - 8 a^3 C + a b^2 (A+3 B+9 C)\right) \text{Cot}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} +$$

$$\frac{2 a \left(A b^2 - a (b B - a C)\right) \text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right) d (a+b \, \text{Sec}[c+d x])^{3/2}} + \frac{2 \left(3 A b^4 + 2 a^3 b B - 6 a b^3 B - 5 a^4 C + a^2 b^2 (A+9 C)\right) \text{Tan}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \, \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves) :

???

Problem 972: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sec}[c+d x] \left(A + B \, \text{Sec}[c+d x] + C \, \text{Sec}[c+d x]^2\right)}{(a+b \, \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 416 leaves, 5 steps) :

$$-\frac{1}{3 (a-b) b^3 (a+b)^{3/2} d} 2 \left(4 a A b^2 - a^2 b B - 3 b^3 B - 2 a^3 C + 6 a b^2 C\right) \text{Cot}[c+d x]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 b^2 \sqrt{a+b} \left(a^2-b^2\right) d}$$

$$2 \left(2 a^2 C + a b (3 A + B + 3 C) - b^2 (A + 3 (B+C))\right) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\text{Sec}[c+d x])}{a+b}}$$

$$\sqrt{-\frac{b (1+\text{Sec}[c+d x])}{a-b}} - \frac{2 \left(A b^2 - a (b B - a C)\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \, \text{Sec}[c+d x])^{3/2}} + \frac{2 \left(a^2 b B + 3 b^3 B + 2 a^3 C - 2 a b^2 (2 A + 3 C)\right) \text{Tan}[c+d x]}{3 b \left(a^2-b^2\right)^2 d \sqrt{a+b \, \text{Sec}[c+d x]}}$$

Result (type 1, 1 leaves) :

???

Problem 973: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2}{(a + b \operatorname{Sec}[c + d x])^{5/2}} \, dx$$

Optimal (type 4, 541 leaves, 7 steps):

$$\frac{1}{3 a^2 (a - b) b^2 (a + b)^{3/2} d} 2 \left(7 a^2 A b^2 - 3 A b^4 - 4 a^3 b B + a^4 C + 3 a^2 b^2 C\right) \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} + \frac{1}{3 a^2 b \sqrt{a + b} \left(a^2 - b^2\right) d} 2 \left(a A b^2 + 3 A b^3 + a^3 (3 B + C) - a^2 b (6 A + B + 3 C)\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Sec}[c + d x]}}{\sqrt{a + b}}\right], \frac{a + b}{a - b}\right] \sqrt{\frac{b (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{-\frac{b (1 + \operatorname{Sec}[c + d x])}{a - b}} - \frac{2 A \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticPi}\left[\frac{a+b}{a}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\operatorname{Sec}[c+d x])}{a-b}}}{a^3 d} + \frac{2 \left(A b^2 - a (b B - a C)\right) \operatorname{Tan}[c + d x]}{3 a \left(a^2 - b^2\right) d (a + b \operatorname{Sec}[c + d x])^{3/2}} - \frac{2 \left(3 A b^4 + 4 a^3 b B - a^4 C - a^2 b^2 (7 A + 3 C)\right) \operatorname{Tan}[c + d x]}{3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{a + b \operatorname{Sec}[c + d x]}}$$

Result (type 4, 1919 leaves):

$$\left((b + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}[c + d x] \left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \left(\frac{4 \left(-7 a^2 A b^2 + 3 A b^4 + 4 a^3 b B - a^4 C - 3 a^2 b^2 C\right) \operatorname{Sin}[c + d x]}{3 a^2 b \left(-a^2 + b^2\right)^2} - \frac{4 \left(A b^3 \operatorname{Sin}[c + d x] - a b^2 B \operatorname{Sin}[c + d x] + a^2 b C \operatorname{Sin}[c + d x]\right)}{3 a^2 \left(a^2 - b^2\right) (b + a \operatorname{Cos}[c + d x])^2} + \left(4 \left(8 a^2 A b^2 \operatorname{Sin}[c + d x] - 4 A b^4 \operatorname{Sin}[c + d x] - 5 a^3 b B \operatorname{Sin}[c + d x] + a b^3 B \operatorname{Sin}[c + d x] + 2 a^4 C \operatorname{Sin}[c + d x] + 2 a^2 b^2 C \operatorname{Sin}[c + d x]\right)\right) \Big/ \left(3 a^2 \left(a^2 - b^2\right)^2 (b + a \operatorname{Cos}[c + d x])\right)\right)\right) \Big/ \left(d (A + 2 C + 2 B \operatorname{Cos}[c + d x] + A \operatorname{Cos}[2 c + 2 d x]) (a + b \operatorname{Sec}[c + d x])^{5/2}\right) -$$

$$\left(4 (b + a \operatorname{Cos}[c + d x])^{5/2} \sqrt{\operatorname{Sec}[c + d x]} \left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \sqrt{\frac{1}{1 - \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}} \sqrt{\frac{a + b - a \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2 + b \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}{1 + \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}}\right.$$

$$\Bigg(7 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+7 a^2 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-3 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-3 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-4 a^4 b B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$4 a^3 b^2 B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a^2 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$14 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+6 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+8 a^4 b B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-2 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-6 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$

$$7 a^3 A b^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-7 a^2 A b^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+3 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-4 a^4 b B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$4 a^3 b^2 B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+3 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 a^2 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$6 a^4 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$12 a^2 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$6 A b^5 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$6 a^4 A b \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+12 a^2 A b^3 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-6 A b^5 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b-a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$(a+b)\left(-3 A b^4-4 a^3 b B+a^4 C+a^2 b^2 (7 A+3 C)\right) \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$a b (a+b)\left(-2 A b^2+a^2 (3 A-3 B+C)+a b (3 A-B+3 C)\right) \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(3 a^2 b\left(a^2-b^2\right)^2 d\,(A+2 C+2 B \mathrm{Cos}[c+d x]+A \mathrm{Cos}[2 c+2 d x])\,(a+b \mathrm{Sec}[c+d x])^{5/2}\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left.\left(a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 974: Result more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d x]\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)}{(a+b\,\mathrm{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 618 leaves, 8 steps):

$$-\frac{1}{3 a^3 (a-b) b (a+b)^{3/2} d}\left(26 a^2 A b^2-15 A b^4-14 a^3 b B+6 a b^3 B-a^4 (3 A-8 C)\right)$$

$$\mathrm{Cot}[c+d x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}-$$

$$\frac{1}{3 a^3 b\sqrt{a+b}\left(a^2-b^2\right) d}\left(15 A b^4+a b^3 (5 A-6 B)-a^2 b^2 (21 A+2 B)-6 a^4 C-a^3 b (3 A-2 (6 B+C))\right)\mathrm{Cot}[c+d x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}+\frac{1}{a^4 d}$$

$$\sqrt{a+b}\,(5 A b-2 a B)\,\mathrm{Cot}[c+d x]\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b(1+\mathrm{Sec}[c+d x])}{a-b}}+$$

$$\frac{A\,\mathrm{Sin}[c+d x]}{a d (a+b\,\mathrm{Sec}[c+d x])^{3/2}}-\frac{b\left(5 A b^2-2 a b B-a^2 (3 A-2 C)\right)\mathrm{Tan}[c+d x]}{3 a^2\left(a^2-b^2\right) d (a+b\,\mathrm{Sec}[c+d x])^{3/2}}-\frac{b\left(26 a^2 A b^2-15 A b^4-14 a^3 b B+6 a b^3 B-a^4 (3 A-8 C)\right)\mathrm{Tan}[c+d x]}{3 a^3\left(a^2-b^2\right)^2 d\sqrt{a+b\,\mathrm{Sec}[c+d x]}}$$

Result (type 4, 2631 leaves):

$$\Bigg((b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-\frac{4\left(-10\,a^2\,A\,b^2+6\,A\,b^4+7\,a^3\,b\,B-3\,a\,b^3\,B-4\,a^4\,C\right)\text{Sin}[c+d\,x]}{3\,a^3\left(-a^2+b^2\right)^2}+\frac{4\left(A\,b^4\,\text{Sin}[c+d\,x]-a\,b^3\,B\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^3\left(a^2-b^2\right)(b+a\,\text{Cos}[c+d\,x])^2}+$$

$$\left(4\left(-11\,a^2\,A\,b^3\,\text{Sin}[c+d\,x]+7\,A\,b^5\,\text{Sin}[c+d\,x]+8\,a^3\,b^2\,B\,\text{Sin}[c+d\,x]-4\,a\,b^4\,B\,\text{Sin}[c+d\,x]-5\,a^4\,b\,C\,\text{Sin}[c+d\,x]+a^2\,b^3\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(3\,a^3\left(a^2-b^2\right)^2(b+a\,\text{Cos}[c+d\,x])\right)\Bigg)\Bigg)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\right)-$$

$$\Bigg(2\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\Bigg(3\,a^5\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+3\,a^4\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-26\,a^3\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-26\,a^2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+15\,a\,A\,b^4\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$15\,A\,b^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+14\,a^4\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+14\,a^3\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,a^2\,b^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,a\,b^4\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$8\,a^5\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-8\,a^4\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-6\,a^5\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+52\,a^3\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-30\,a\,A\,b^4\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-$$

$$28\,a^4\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+12\,a^2\,b^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+16\,a^5\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+3\,a^5\,A\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-3\,a^4\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$26\,a^3\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+26\,a^2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+15\,a\,A\,b^4\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-15\,A\,b^5\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+14\,a^4\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$14\,a^3\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-6\,a^2\,b^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+6\,a\,b^4\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-8\,a^5\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+8\,a^4\,b\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$30\,a^4\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$60\,a^2\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$30\,A\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a^5\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,a^3\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a\,b^4\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,+$$

$$30\,a^4\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-60\,a^2\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+30\,A\,b^5\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$12\,a^5\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+24\,a^3\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-12\,a\,b^4\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$(a+b)\left(-26 a^2 A b^2+15 A b^4+14 a^3 b B-6 a b^3 B+a^4 (3 A-8 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2 a (a+b)\left(5 A b^3-a b^2 (3 A+2 B)+3 a^3 (B-C)-a^2 b (6 A-3 B+C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(3 a\left(a^3-a b^2\right)^2 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])(a+b \text{Sec}[c+d x])^{5/2} \sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left.\left(a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-b\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

- **Problem 977: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{a b B-a^2 C+b^2 B \text{Sec}[c+d x]+b^2 C \text{Sec}[c+d x]^2}{\sqrt{a+b \text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 316 leaves, 6 steps):

$$-\frac{1}{d} 2 (a-b) \sqrt{a+b}\, C \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{d}$$

$$2 b \sqrt{a+b}\,(B-C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{d}$$

$$2 \sqrt{a+b}\,(b B-a C) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{a}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b(1-\text{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b(1+\text{Sec}[c+d x])}{a-b}}$$

Result (type 4, 1232 leaves):

$$\frac{2\,b\,C\,\mathrm{Cos}[c+d\,x]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(b\,B-a\,C+b\,C\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{d\,\left(b\,C+b\,B\,\mathrm{Cos}[c+d\,x]-a\,C\,\mathrm{Cos}[c+d\,x]\right)}+$$

$$\Bigg(2\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(b\,B-a\,C+b\,C\,\mathrm{Sec}[c+d\,x]\right)\,\Bigg(a\,b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b^2\,\sqrt{\frac{-a+b}{a+b}}\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$2\,a\,b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+a\,b\,\sqrt{\frac{-a+b}{a+b}}\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-b^2\,\sqrt{\frac{-a+b}{a+b}}\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$2\,i\,a\,b\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-2\,i\,a^2\,C\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,i\,a\,b\,B\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-2\,i\,a^2\,C\,\mathrm{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$i\,(a-b)\,b\,C\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+i\,(a-b)\,(a\,C+b\,(-B+C))\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$

$$\left(\sqrt{\frac{-a+b}{a+b}}\,d\sqrt{b+a\,\text{Cos}[c+d x]}\,(b\,C+b\,B\,\text{Cos}[c+d x]-a\,C\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{3/2}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

- **Problem 979: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{a\,b\,B-a^2\,C+b^2\,B\,\text{Sec}[c+d x]+b^2\,C\,\text{Sec}[c+d x]^2}{(a+b\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 379 leaves, 7 steps):

$$\frac{2\,(b\,B-2\,a\,C)\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a\sqrt{a+b}\,d}-$$

$$\frac{2\,(b\,B-2\,a\,C)\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}}{a\sqrt{a+b}\,d}-\frac{1}{a^2\,d}$$

$$2\sqrt{a+b}\,(b\,B-a\,C)\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{a},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Sec}[c+d x]}}{\sqrt{a+b}}\right],\frac{a+b}{a-b}\right]\sqrt{\frac{b\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{-\frac{b\,(1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{2\,b^2\,(b\,B-2\,a\,C)\,\text{Tan}[c+d x]}{a\,(a^2-b^2)\,d\sqrt{a+b\,\text{Sec}[c+d x]}}$$

Result (type 4, 2090 leaves):

$$\left((b+a\,\text{Cos}[c+d x])^2\,\text{Sec}[c+d x]\,(b\,B-a\,C+b\,C\,\text{Sec}[c+d x])\left(\frac{2\,b\,(b\,B-2\,a\,C)\,\text{Sin}[c+d x]}{a\,(-a^2+b^2)}-\frac{2\,(-b^3\,B\,\text{Sin}[c+d x]+2\,a\,b^2\,C\,\text{Sin}[c+d x])}{a\,(a^2-b^2)\,(b+a\,\text{Cos}[c+d x])}\right)\right)\Big/$$

$$\left(d\,(b\,C+b\,B\,\text{Cos}[c+d x]-a\,C\,\text{Cos}[c+d x])\,(a+b\,\text{Sec}[c+d x])^{3/2}\right)-$$

$$\Bigg(2\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}\,(b\,B-a\,C+b\,C\,\text{Sec}[c+d\,x])\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\Bigg(-a\,b^2\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-b^3\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+2\,a^2\,b\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+2\,a\,b^2\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+$$

$$2\,a\,b^2\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-4\,a^2\,b\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-a\,b^2\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$b^3\sqrt{\frac{-a+b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+2\,a^2\,b\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-2\,a\,b^2\sqrt{\frac{-a+b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$2\,i\,a^2\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,i\,b^3\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-2\,i\,a^3\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\right.$$

$$\left.i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,i\,a\,b^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+2\,i\,a^2\,b\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}-$$

$$2\,i\,b^3\,B\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-2\,i\,a^3\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,i\,a\,b^2\,C\,\text{EllipticPi}\left[-\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-i\,(a-b)\,b\,(-b\,B+2\,a\,C)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$i\,(a-b)\,\left(-2\,b^2\,B-a\,b\,(B-3\,C)+a^2\,C\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{-a+b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2+b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(a\,\sqrt{\frac{-a+b}{a+b}}\,\left(a^2-b^2\right)\,d\,(b\,C+b\,B\,\text{Cos}[c+d\,x]-a\,C\,\text{Cos}[c+d\,x])\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(a\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-b\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

- **Problem 980: Result more than twice size of optimal antiderivative.**

$$\int\frac{a\,b\,B-a^2\,C+b^2\,B\,\text{Sec}[c+d\,x]+b^2\,C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 4, 519 leaves, 8 steps) :

$$\frac{1}{3 a^2 (a-b) (a+b)^{3/2} d} 2 \left(7 a^2 b B - 3 b^3 B - 11 a^3 C + 3 a b^2 C\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{1}{3 a^2 \sqrt{a+b} \left(a^2-b^2\right) d} 2 \left(3 b^3 B + a b^2 (B-3 C) + 9 a^3 C - 2 a^2 b (3 B + C)\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} - \frac{1}{a^3 d} 2 \sqrt{a+b} (b B - a C) \mathrm{Cot}[c+d x]\, \mathrm{EllipticPi}\left[\frac{a+b}{a}, \mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[c+d x]}}{\sqrt{a+b}}\right], \frac{a+b}{a-b}\right] \sqrt{\frac{b (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{-\frac{b (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{2 b^2 (b B - 2 a C) \mathrm{Tan}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b\,\mathrm{Sec}[c+d x])^{3/2}} + \frac{2 b^2 \left(7 a^2 b B - 3 b^3 B - 11 a^3 C + 3 a b^2 C\right) \mathrm{Tan}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{a+b\,\mathrm{Sec}[c+d x]}}$$

Result (type 4, 4657 leaves) :

$$\left((b + a \mathrm{Cos}[c+d x])^3 \mathrm{Sec}[c+d x]^2 (b B - a C + b C \mathrm{Sec}[c+d x]) \left(\frac{2 b \left(-7 a^2 b B + 3 b^3 B + 11 a^3 C - 3 a b^2 C\right) \mathrm{Sin}[c+d x]}{3 a^2 \left(-a^2+b^2\right)^2} - \frac{2 \left(b^4 B \mathrm{Sin}[c+d x] - 2 a b^3 C \mathrm{Sin}[c+d x]\right)}{3 a^2 \left(a^2-b^2\right) (b + a \mathrm{Cos}[c+d x])^2} - \frac{2 \left(-8 a^2 b^3 B \mathrm{Sin}[c+d x] + 4 b^5 B \mathrm{Sin}[c+d x] + 13 a^3 b^2 C \mathrm{Sin}[c+d x] - 5 a b^4 C \mathrm{Sin}[c+d x]\right)}{3 a^2 \left(a^2-b^2\right)^2 (b + a \mathrm{Cos}[c+d x])}\right)\right) \Big/$$

$$\left(d (b C + b B \mathrm{Cos}[c+d x] - a C \mathrm{Cos}[c+d x]) (a + b \mathrm{Sec}[c+d x])^{5/2}\right) + \Bigg((b + a \mathrm{Cos}[c+d x])^{5/2}$$

$$\Bigg(\frac{a^2 b B}{\left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]} \sqrt{\mathrm{Sec}[c+d x]}} + \frac{b^3 B}{3 \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]} \sqrt{\mathrm{Sec}[c+d x]}} - \frac{a^3 C}{\left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]} \sqrt{\mathrm{Sec}[c+d x]}} - \frac{5 a b^2 C}{3 \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]} \sqrt{\mathrm{Sec}[c+d x]}} + \frac{a b^2 B \sqrt{\mathrm{Sec}[c+d x]}}{3 \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]}} - \frac{b^4 B \sqrt{\mathrm{Sec}[c+d x]}}{3 a \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]}} - \frac{2 a^2 b C \sqrt{\mathrm{Sec}[c+d x]}}{3 \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]}} + \frac{2 b^3 C \sqrt{\mathrm{Sec}[c+d x]}}{3 \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]}} + \frac{7 a b^2 B \mathrm{Cos}[2 (c+d x)] \sqrt{\mathrm{Sec}[c+d x]}}{3 \left(a^2-b^2\right)^2 \sqrt{b + a \mathrm{Cos}[c+d x]}} -$$

$$\frac{b^4 B \text{Cos}[2(c+dx)]\sqrt{\text{Sec}[c+dx]}}{a(a^2-b^2)^2\sqrt{b+a\text{Cos}[c+dx]}}-\frac{11a^2 b C \text{Cos}[2(c+dx)]\sqrt{\text{Sec}[c+dx]}}{3(a^2-b^2)^2\sqrt{b+a\text{Cos}[c+dx]}}+\frac{b^3 C\text{Cos}[2(c+dx)]\sqrt{\text{Sec}[c+dx]}}{(a^2-b^2)^2\sqrt{b+a\text{Cos}[c+dx]}}\Bigg)\text{Sec}[c+dx]^{3/2}$$

$$(b B-a C+b C\text{Sec}[c+dx])\left(-\frac{2b\left(-7a^2 b B+3b^3 B+11a^3 C-3ab^2 C\right)\text{Tan}\left[\frac{1}{2}(c+dx)\right]\sqrt{\frac{a+b-a\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}{3a^2(a^2-b^2)^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}+\Bigg(2(a+b)\right.$$

$$\left(-b\left(-7a^2 b B+3b^3 B+11a^3 C-3ab^2 C\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]+a\left(2b^3 B-3a^2 b(B-2C)+3a^3 C-ab^2(3B+C)\right)\right.$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]+6(a-b)^2(a+b)(-bB+aC)\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{a-b}{a+b}\right]\right)$$

$$\left.\sqrt{\frac{a+b-a\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\sqrt{\frac{a+b-a\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^4}\right)\Bigg/$$

$$\left.\left.\left(3a^2(a^2-b^2)^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\left(b-b\text{Tan}\left[\frac{1}{2}(c+dx)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2\right)\right)\right)\right)\Bigg/$$

$$\left(d\left(bC+bB\text{Cos}[c+dx]-aC\text{Cos}[c+dx]\right)(a+b\text{Sec}[c+dx])^{5/2}\right.$$

$$\left(-\frac{b\left(-7a^2 b B+3b^3 B+11a^3 C-3ab^2 C\right)\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\sqrt{\frac{a+b-a\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}{3a^2(a^2-b^2)^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}-\Bigg(2(a+b)\right.$$

$$\Big(-b\left(-7a^2bB+3b^3B+11a^3C-3ab^2C\right)\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]+a\left(2b^3B-3a^2b(B-2C)+3a^3C-ab^2(3B+C)\right)$$
$$\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]+6(a-b)^2(a+b)(-bB+aC)\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]\Big)$$
$$\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^4}$$
$$\Big(-2b\,\text{Sec}\Big[\frac{1}{2}(c+dx)\Big]^2\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^3+2a\,\text{Sec}\Big[\frac{1}{2}(c+dx)\Big]^2\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big(-1+\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2\Big)\Big)\Big)\Big/$$
$$\left(3a^2\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\left(b-b\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^4+a\left(-1+\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2\right)^2\right)^2\right)-$$
$$\Big(2(a+b)\Big(-b\left(-7a^2bB+3b^3B+11a^3C-3ab^2C\right)\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]+$$
$$a\left(2b^3B-3a^2b(B-2C)+3a^3C-ab^2(3B+C)\right)\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]+$$
$$6(a-b)^2(a+b)(-bB+aC)\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}(c+dx)\Big]^2$$
$$\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^3\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\sqrt{\frac{a+b-a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2+b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\Big)\Big/$$
$$\left(3a^2\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^4}\left(b-b\,\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^4+a\left(-1+\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]^2\right)^2\right)\right)+$$
$$\Big(\Big(-b\left(-7a^2bB+3b^3B+11a^3C-3ab^2C\right)\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]+a\left(2b^3B-3a^2b(B-2C)+3a^3C-ab^2(3B+C)\right)$$
$$\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]+6(a-b)^2(a+b)(-bB+aC)\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+dx)\Big]\Big],\frac{a-b}{a+b}\Big]\Big)$$

$$\left(-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\left.\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\right)\Bigg/\left(3\,a^2\,(a^2-b^2)^2\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right.$$

$$\left.\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)-\frac{1}{3\,a^2\,(a^2-b^2)^2\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)}(a+b)$$

$$\left(-b\left(-7\,a^2\,b\,B+3\,b^3\,B+11\,a^3\,C-3\,a\,b^2\,C\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+a\left(2\,b^3\,B-3\,a^2\,b\,(B-2\,C)+3\,a^3\,C-a\,b^2\,(3\,B+C)\right)\right.$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]+6\,(a-b)^2\,(a+b)\,(-b\,B+a\,C)\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{a-b}{a+b}\right]\right)$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}+$$

$$\left(b\left(-7\,a^2\,b\,B+3\,b^3\,B+11\,a^3\,C-3\,a\,b^2\,C\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{a+b-a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2+b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left.\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}{\left(1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}\right)\right)\Bigg/$$

$$\left(3\,a^2\,(a^2-b^2)^2\left(\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\right)-\left(b\left(-7\,a^2\,b\,B+3\,b^3\,B+11\,a^3\,C-3\,a\,b^2\,C\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right.$$

$$\left(\frac{-a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/$$

$$\left(3 a^2 \left(a^2-b^2\right)^2 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+$$

$$\left((a+b)\left(-b\left(-7 a^2 b B+3 b^3 B+11 a^3 C-3 a b^2 C\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+\right.\right.$$

$$a\left(2 b^3 B-3 a^2 b (B-2 C)+3 a^3 C-a b^2 (3 B+C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]+$$

$$\left.6 (a-b)^2 (a+b)(-b B+a C) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{a-b}{a+b}\right]\right) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\left(\frac{-a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]+b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\right.$$

$$\left.\left.\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}{\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}\right)\right) \Big/ \left(3 a^2\left(a^2-b^2\right)^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left.\sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^4+a\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right)+$$

$$\left(2 (a+b) \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} \sqrt{\frac{a+b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2+b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\left(\frac{a\left(2\,b^3\,B-3\,a^2\,b\,(B-2\,C)+3\,a^3\,C-a\,b^2\,(3\,B+C)\right)\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\sqrt{1-\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}-\right.$$

$$\frac{3\,(a-b)^2\,(a+b)\,(-b\,B+a\,C)\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}{\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}-$$

$$\left.\left.\frac{b\left(-7\,a^2\,b\,B+3\,b^3\,B+11\,a^3\,C-3\,a\,b^2\,C\right)\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{1-\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}}{2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\right)\Big/$$

$$\left(3\,a^2\left(a^2-b^2\right)^2\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(b-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4+a\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\Bigg)\Bigg)$$

- **Problem 981: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Sec}[c+d\,x]^{5/2}\,(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 266 leaves, 10 steps):

$$-\frac{2\,(9\,A\,b+9\,a\,B+7\,b\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),\,2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{15\,d}+$$

$$\frac{2\,(7\,a\,A+5\,b\,B+5\,a\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\,2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{21\,d}+$$

$$\frac{2\,(9\,A\,b+9\,a\,B+7\,b\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d}+\frac{2\,(7\,a\,A+5\,b\,B+5\,a\,C)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{21\,d}+$$

$$\frac{2\,(9\,A\,b+9\,a\,B+7\,b\,C)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{45\,d}+\frac{2\,(b\,B+a\,C)\,\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{7\,d}+\frac{2\,b\,C\,\mathrm{Sec}[c+d\,x]^{9/2}\,\mathrm{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 1232 leaves):

$$-\left(6\sqrt{2}\ A\ b\ e^{-i\ (2c+d x)}\sqrt{\frac{e^{i\ (c+d x)}}{1+e^{2 i\ (c+d x)}}}\ \text{Cos}[c+d x]^3\ \text{Csc}[c]\right.$$

$$\left(1+e^{2 i\ (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\ (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\ (c+d x)}\right]\right)(a+b\,\text{Sec}[c+d x])$$

$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\ (5\ d\ (b+a\,\text{Cos}[c+d x])\ (A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]))\ -$$

$$\left(6\sqrt{2}\ a\ B\ e^{-i\ (2c+d x)}\sqrt{\frac{e^{i\ (c+d x)}}{1+e^{2 i\ (c+d x)}}}\ \text{Cos}[c+d x]^3\ \text{Csc}[c]\ \left(1+e^{2 i\ (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\ (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\ (c+d x)}\right]\right)\right.$$

$$\left.(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(5\ d\ (b+a\,\text{Cos}[c+d x])\ (A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]))\ -\left(14\sqrt{2}\ b\ C\ e^{-i\ (2c+d x)}\sqrt{\frac{e^{i\ (c+d x)}}{1+e^{2 i\ (c+d x)}}}\ \text{Cos}[c+d x]^3\right.$$

$$\text{Csc}[c]\ \left(1+e^{2 i\ (c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\ (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\ (c+d x)}\right]\right)(a+b\,\text{Sec}[c+d x])$$

$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\ (15\ d\ (b+a\,\text{Cos}[c+d x])\ (A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]))\ +$$

$$\left(4\ a\ A\ \text{Cos}[c+d x]^{7/2}\ \text{EllipticF}\left[\frac{1}{2}\ (c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\ (a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(3\ d\ (b+a\,\text{Cos}[c+d x])\ (A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]))\ +$$

$$\left(20\ b\ B\ \text{Cos}[c+d x]^{7/2}\ \text{EllipticF}\left[\frac{1}{2}\ (c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\ (a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(21\ d\ (b+a\,\text{Cos}[c+d x])\ (A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]))\ +$$

$$\left(20\ a\ C\ \text{Cos}[c+d x]^{7/2}\ \text{EllipticF}\left[\frac{1}{2}\ (c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\ (a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$

$$(21\ d\ (b+a\,\text{Cos}[c+d x])\ (A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]))\ +$$

$$\left((a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(\frac{4\ (9\,A\,b+9\,a\,B+7\,b\,C)\ \text{Cos}[d x]\ \text{Csc}[c]}{15\ d}+\right.\right.$$

$$\frac{4\ b\ C\ \text{Sec}[c]\ \text{Sec}[c+d x]^4\ \text{Sin}[d x]}{9\ d}+\frac{4\ \text{Sec}[c]\ \text{Sec}[c+d x]^3\ (7\,b\,C\,\text{Sin}[c]+9\,b\,B\,\text{Sin}[d x]+9\,a\,C\,\text{Sin}[d x])}{63\ d}+\frac{1}{315\ d}$$

$$4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(63\,A\,b\,\text{Sin}[c]+63\,a\,B\,\text{Sin}[c]+49\,b\,C\,\text{Sin}[c]+105\,a\,A\,\text{Sin}[d\,x]+75\,b\,B\,\text{Sin}[d\,x]+75\,a\,C\,\text{Sin}[d\,x])+\frac{1}{315\,d}$$

$$4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(45\,b\,B\,\text{Sin}[c]+45\,a\,C\,\text{Sin}[c]+63\,A\,b\,\text{Sin}[d\,x]+63\,a\,B\,\text{Sin}[d\,x]+49\,b\,C\,\text{Sin}[d\,x])+\frac{4\,(7\,a\,A+5\,b\,B+5\,a\,C)\,\text{Tan}[c]}{21\,d}\Bigg)\Bigg)\Big/$$

$$\left((b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 982: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 230 leaves, 9 steps):

$$-\frac{2\,(5\,a\,A+3\,b\,B+3\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+$$

$$\frac{2\,(7\,A\,b+7\,a\,B+5\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,(5\,a\,A+3\,b\,B+3\,a\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}+$$

$$\frac{2\,(7\,A\,b+7\,a\,B+5\,b\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,(b\,B+a\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,b\,C\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 1170 leaves):

$$-\Bigg(2\,\sqrt{2}\,a\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]$$

$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\,(a+b\,\text{Sec}[c+d\,x])$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Bigg)\Big/\,(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\Bigg(6\,\sqrt{2}\,b\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$

$$(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\Bigg)\Big/\,(5\,d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\Bigg(6\,\sqrt{2}\,a\,C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$

$$(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\Bigg)\Big/\ (5\,d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ +$$

$$\left(4\,A\,b\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ +$$

$$\left(4\,a\,B\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ +$$

$$\left(20\,b\,C\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$(21\,d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ +$$

$$\Bigg((a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\Bigg(\frac{4\,(5\,a\,A+3\,b\,B+3\,a\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]}{5\,d}+\frac{4\,b\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}[d\,x]}{7\,d}\ +$$
$$\frac{4\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(5\,b\,C\,\mathrm{Sin}[c]+7\,b\,B\,\mathrm{Sin}[d\,x]+7\,a\,C\,\mathrm{Sin}[d\,x])}{35\,d}+1\,/\,(105\,d)\,4\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]$$
$$(21\,b\,B\,\mathrm{Sin}[c]+21\,a\,C\,\mathrm{Sin}[c]+35\,A\,b\,\mathrm{Sin}[d\,x]+35\,a\,B\,\mathrm{Sin}[d\,x]+25\,b\,C\,\mathrm{Sin}[d\,x])+\frac{4\,(7\,A\,b+7\,a\,B+5\,b\,C)\,\mathrm{Tan}[c]}{21\,d}\Bigg)\Bigg)\Big/$$
$$\left((b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 983: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\mathrm{Sec}[c+d\,x]}\,\,(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 192 leaves, 8 steps):

$$-\frac{2\,(5\,A\,b+5\,a\,B+3\,b\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,d}\ +$$
$$\frac{2\,(b\,B+a\,(3\,A+C))\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,d}\ +$$
$$\frac{2\,(5\,A\,b+5\,a\,B+3\,b\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,\mathrm{Sin}[c+d\,x]}{5\,d}+\frac{2\,(b\,B+a\,C)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d}+\frac{2\,b\,C\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 1106 leaves):

$$-\left(2\sqrt{2}\,A\,b\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\right.$$
$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)(a+b\,\text{Sec}[c+d x])$$
$$\left.\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)-$$
$$\left(2\sqrt{2}\,a\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)-$$
$$\left(6\sqrt{2}\,b\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$
$$\left.(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(5\,d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$
$$\left(4\,a\,A\,\text{Cos}[c+d x]^{7/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$
$$\left(4\,b\,B\,\text{Cos}[c+d x]^{7/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$
$$\left(4\,a\,C\,\text{Cos}[c+d x]^{7/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$
$$\left((a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(\frac{4\,(5Ab+5aB+3bC)\,\text{Cos}[d x]\,\text{Csc}[c]}{5\,d}+\frac{4\,b\,C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5\,d}+\right.\right.$$
$$\left.\left.\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,(3\,b\,C\,\text{Sin}[c]+5\,b\,B\,\text{Sin}[d x]+5\,a\,C\,\text{Sin}[d x])}{15\,d}+\frac{4\,(b\,B+a\,C)\,\text{Tan}[c]}{3\,d}\right)\right)\Big/$$
$$\left((b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\right)$$

- **Problem 984: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a + b\,\text{Sec}[c + d\,x])\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)}{\sqrt{\text{Sec}[c + d\,x]}}\,dx$$

Optimal (type 4, 152 leaves, 7 steps):

$$-\frac{2\,(b\,B - a\,(A - C))\,\sqrt{\text{Cos}[c + d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{d} + \frac{2\,(3\,A\,b + 3\,a\,B + b\,C)\,\sqrt{\text{Cos}[c + d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,d} + \frac{2\,(b\,B + a\,C)\,\sqrt{\text{Sec}[c + d\,x]}\;\text{Sin}[c + d\,x]}{d} + \frac{2\,b\,C\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{3\,d}$$

Result (type 5, 1074 leaves):

$$\left(2\sqrt{2}\,a\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)-$$

$$\left(2\sqrt{2}\,b\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)-$$

$$\left(2\sqrt{2}\,a\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}[c+d x]^3\,\text{Csc}[c]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\right.$$

$$\left.(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$

$$\left(4\,A\,b\,\text{Cos}[c+d x]^{7/2}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$
$$\left(4\,a\,B\,\text{Cos}[c+d x]^{7/2}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+$$
$$\left(4\,b\,C\,\text{Cos}[c+d x]^{7/2}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\,(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\right)+\left((a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right.$$
$$\left.\left(-\frac{2\,(a A-2 b B-2 a C+a A\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}[c]}{d}+\frac{4\,a\,A\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+\frac{4\,b\,C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{3\,d}+\frac{4\,b\,C\,\text{Tan}[c]}{3\,d}\right)\right)\Big/$$
$$\left((b+a\,\text{Cos}[c+d x])\,(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\,\text{Sec}[c+d x]^{5/2}\right)$$

- **Problem 985: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+b\,\text{Sec}[c+d x])\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 146 leaves, 7 steps) :

$$\frac{2\,(A\,b+a\,B-b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{2\,(3\,b\,B+a\,(A+3\,C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,b\,C\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 5, 176 leaves) :

$$\frac{1}{3\,d}\sqrt{\text{Sec}[c+d\,x]}\,\Big(-6\,i\,A\,b\,\text{Cos}[c+d\,x]-6\,i\,a\,B\,\text{Cos}[c+d\,x]+6\,i\,b\,C\,\text{Cos}[c+d\,x]+2\,(3\,b\,B+a\,(A+3\,C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+6\,i\,(A\,b+a\,B-b\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+6\,b\,C\,\text{Sin}[c+d\,x]+a\,A\,\text{Sin}[2\,(c+d\,x)]\Big)$$

- **Problem 986: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 156 leaves, 7 steps) :

$$\frac{2\,(3\,a\,A+5\,b\,B+5\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{2\,(A\,b+a\,B+3\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,(A\,b+a\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 173 leaves) :

$$\frac{1}{30\,d}\sqrt{\text{Sec}[c+d\,x]}\,\Big(20\,(A\,b+a\,B+3\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+12\,i\,(3\,a\,A+5\,b\,B+5\,a\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-6\,i\,(3\,a\,A+5\,b\,B+5\,a\,C)+10\,(A\,b+a\,B)\,\text{Sin}[c+d\,x]+3\,a\,A\,\text{Sin}[2\,(c+d\,x)])\Big)$$

- **Problem 987: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 194 leaves, 8 steps) :

$$\frac{2\,(3\,A\,b+3\,a\,B+5\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+$$
$$\frac{2\,(5\,a\,A+7\,b\,B+7\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+$$
$$\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,(A\,b+a\,B)\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,(5\,a\,A+7\,b\,B+7\,a\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 198 leaves) :

$$\frac{1}{420\,d}\sqrt{\text{Sec}[c+d\,x]}\,\left(40\,(5\,a\,A+7\,b\,B+7\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+\right.$$
$$168\,i\,(3\,A\,b+3\,a\,B+5\,b\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.2\,\text{Cos}[c+d\,x]\,(-84\,i\,(3\,A\,b+3\,a\,B+5\,b\,C)+5\,(23\,a\,A+28\,b\,B+28\,a\,C)\,\text{Sin}[c+d\,x]+42\,(A\,b+a\,B)\,\text{Sin}[2\,(c+d\,x)]+15\,a\,A\,\text{Sin}[3\,(c+d\,x)])\right)$$

- **Problem 988: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 230 leaves, 9 steps) :

$$\frac{2\,(7\,a\,A+9\,b\,B+9\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,d}+$$
$$\frac{2\,(5\,A\,b+5\,a\,B+7\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+$$
$$\frac{2\,(A\,b+a\,B)\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,(7\,a\,A+9\,b\,B+9\,a\,C)\,\text{Sin}[c+d\,x]}{45\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,(5\,A\,b+5\,a\,B+7\,b\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 229 leaves) :

$$\frac{1}{2520\,d}\sqrt{\text{Sec}[c+d\,x]}\,\left(240\,(5\,A\,b+5\,a\,B+7\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+\right.$$
$$336\,i\,(7\,a\,A+9\,b\,B+9\,a\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$2\,\text{Cos}[c+d\,x]\,(-1176\,i\,a\,A-1512\,i\,b\,B-1512\,i\,a\,C+30\,(23\,A\,b+23\,a\,B+28\,b\,C)\,\text{Sin}[c+d\,x]+14\,(19\,a\,A+18\,b\,B+18\,a\,C)\,\text{Sin}[2\,(c+d\,x)]+$$
$$\left.90\,A\,b\,\text{Sin}[3\,(c+d\,x)]+90\,a\,B\,\text{Sin}[3\,(c+d\,x)]+35\,a\,A\,\text{Sin}[4\,(c+d\,x)])\right)$$

Problem 989: Result unnecessarily involves higher level functions.

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Sec}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 266 leaves, 10 steps):

$$\frac{2\,(7\,A\,b+7\,a\,B+9\,b\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{15\,d}+\frac{10\,(9\,a\,A+11\,b\,B+11\,a\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{231\,d}+\frac{2\,a\,A\,\mathrm{Sin}[c+d\,x]}{11\,d\,\mathrm{Sec}[c+d\,x]^{9/2}}+\frac{2\,(A\,b+a\,B)\,\mathrm{Sin}[c+d\,x]}{9\,d\,\mathrm{Sec}[c+d\,x]^{7/2}}+\frac{2\,(9\,a\,A+11\,b\,B+11\,a\,C)\,\mathrm{Sin}[c+d\,x]}{77\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}+\frac{2\,(7\,A\,b+7\,a\,B+9\,b\,C)\,\mathrm{Sin}[c+d\,x]}{45\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{10\,(9\,a\,A+11\,b\,B+11\,a\,C)\,\mathrm{Sin}[c+d\,x]}{231\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 265 leaves):

$$\frac{1}{55\,440\,d}\sqrt{\mathrm{Sec}[c+d\,x]}\,\Bigg(2400\,(9\,a\,A+11\,b\,B+11\,a\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]+7392\,i\,(7\,A\,b+7\,a\,B+9\,b\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+2\,\mathrm{Cos}[c+d\,x]\,\big(-25\,872\,i\,A\,b-25\,872\,i\,a\,B-33\,264\,i\,b\,C+30\,(435\,a\,A+506\,b\,B+506\,a\,C)\,\mathrm{Sin}[c+d\,x]+308\,(19\,A\,b+19\,a\,B+18\,b\,C)\,\mathrm{Sin}[2\,(c+d\,x)]+2565\,a\,A\,\mathrm{Sin}[3\,(c+d\,x)]+1980\,b\,B\,\mathrm{Sin}[3\,(c+d\,x)]+1980\,a\,C\,\mathrm{Sin}[3\,(c+d\,x)]+770\,A\,b\,\mathrm{Sin}[4\,(c+d\,x)]+770\,a\,B\,\mathrm{Sin}[4\,(c+d\,x)]+315\,a\,A\,\mathrm{Sin}[5\,(c+d\,x)]\big)\Bigg)$$

Problem 1012: Attempted integration timed out after 120 seconds.

$$\int \frac{\mathrm{Sec}[c+d\,x]^{5/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{a+b\,\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 296 leaves, 11 steps):

$$-\frac{2\,\left(5\,A\,b^2-5\,a\,b\,B+5\,a^2\,C+3\,b^2\,C\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,b^3\,d}+\frac{2\,(b\,B-a\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,b^2\,d}-\frac{2\,a\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{b^3\,(a+b)\,d}+\frac{2\,\left(5\,A\,b^2-5\,a\,b\,B+5\,a^2\,C+3\,b^2\,C\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{5\,b^3\,d}+\frac{2\,(b\,B-a\,C)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,b^2\,d}+\frac{2\,C\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,b\,d}$$

Result (type 1, 1 leaves):

???

Problem 1013: Unable to integrate problem.

$$\int \frac{\text{Sec}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 218 leaves, 10 steps):

$$-\frac{2 (b B-a C) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{b^2 d}+\frac{2 C \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 b d}+\frac{2 \left(A b^2-a (b B-a C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{b^2 (a+b) d}+\frac{2 (b B-a C) \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{b^2 d}+\frac{2 C \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 b d}$$

Result (type 8, 45 leaves):

$$\int \frac{\text{Sec}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Problem 1014: Unable to integrate problem.

$$\int \frac{\sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 178 leaves, 9 steps):

$$-\frac{2 C \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{b d}+\frac{2 A \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a d}-\frac{2 \left(A b^2-a (b B-a C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a b (a+b) d}+\frac{2 C \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{b d}$$

Result (type 8, 45 leaves):

$$\int \frac{\sqrt{\text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+b \text{Sec}[c+d x]} \, dx$$

Problem 1015: Unable to integrate problem.

$$\int \frac{A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2}{\sqrt{\text{Sec}[c+d x]} (a+b \text{Sec}[c+d x])} \, dx$$

Optimal (type 4, 157 leaves, 8 steps):

$$\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d}-\frac{2\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,(a+b)\,d}$$

Result (type 8, 45 leaves) :

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\;(a+b\,\text{Sec}[c+d\,x])}\,dx$$

- **Problem 1016: Unable to integrate problem.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 207 leaves, 9 steps) :

$$-\frac{2\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{2\,\left(3\,A\,b^2-3\,a\,b\,B+a^2\,(A+3\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^3\,d}-\frac{2\,b\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^3\,(a+b)\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 8, 45 leaves) :

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])}\,dx$$

- **Problem 1017: Unable to integrate problem.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 269 leaves, 10 steps) :

$$\frac{2\,\left(5\,A\,b^2-5\,a\,b\,B+a^2\,(3\,A+5\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,a^3\,d}-\frac{2\,\left(3\,A\,b^3-a^3\,B-3\,a\,b^2\,B+a^2\,b\,(A+3\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^4\,d}+\frac{2\,b^2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a^4\,(a+b)\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{5\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{2\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 8, 45 leaves):

$$\int \frac{A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2}{\text{Sec}[c + d\,x]^{5/2}\,(a + b\,\text{Sec}[c + d\,x])}\,dx$$

Problem 1018: Attempted integration timed out after 120 seconds.

$$\int \frac{A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2}{\text{Sec}[c + d\,x]^{7/2}\,(a + b\,\text{Sec}[c + d\,x])}\,dx$$

Optimal (type 4, 342 leaves, 11 steps):

$$-\frac{2\left(5\,A\,b^3 - 3\,a^3\,B - 5\,a\,b^2\,B + a^2\,b\,(3\,A + 5\,C)\right)\sqrt{\text{Cos}[c + d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\sqrt{\text{Sec}[c + d\,x]}}{5\,a^4\,d} + \frac{1}{21\,a^5\,d}$$

$$2\left(21\,A\,b^4 - 7\,a^3\,b\,B - 21\,a\,b^3\,B + 7\,a^2\,b^2\,(A + 3\,C) + a^4\,(5\,A + 7\,C)\right)\sqrt{\text{Cos}[c + d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\sqrt{\text{Sec}[c + d\,x]} -$$

$$\frac{2\,b^3\left(A\,b^2 - a\,(b\,B - a\,C)\right)\sqrt{\text{Cos}[c + d\,x]}\ \text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c + d\,x),\,2\right]\sqrt{\text{Sec}[c + d\,x]}}{a^5\,(a + b)\,d} +$$

$$\frac{2\,A\,\text{Sin}[c + d\,x]}{7\,a\,d\,\text{Sec}[c + d\,x]^{5/2}} - \frac{2\,(A\,b - a\,B)\,\text{Sin}[c + d\,x]}{5\,a^2\,d\,\text{Sec}[c + d\,x]^{3/2}} + \frac{2\left(7\,A\,b^2 - 7\,a\,b\,B + a^2\,(5\,A + 7\,C)\right)\text{Sin}[c + d\,x]}{21\,a^3\,d\,\sqrt{\text{Sec}[c + d\,x]}}$$

Result (type 1, 1 leaves):

???

Problem 1019: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c + d\,x]^{5/2}\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)}{(a + b\,\text{Sec}[c + d\,x])^2}\,dx$$

Optimal (type 4, 447 leaves, 11 steps):

$$-\frac{\left(3 a^2 b B-2 b^3 B-a b^2 (A-4 C)-5 a^3 C\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{b^3 \left(a^2-b^2\right) d}+$$

$$\frac{\left(3 A b^2-3 a b B+5 a^2 C-2 b^2 C\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 b^2 \left(a^2-b^2\right) d}-\frac{1}{(a-b) b^3 (a+b)^2 d}$$

$$\left(3 A b^4+3 a^3 b B-5 a b^3 B-a^2 b^2 (A-7 C)-5 a^4 C\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+$$

$$\frac{\left(3 a^2 b B-2 b^3 B-a b^2 (A-4 C)-5 a^3 C\right) \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c+d x]}{b^3 \left(a^2-b^2\right) d}+$$

$$\frac{\left(3 A b^2-3 a b B+5 a^2 C-2 b^2 C\right) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 b^2 \left(a^2-b^2\right) d}-\frac{\left(A b^2-a (b B-a C)\right) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])}$$

Result (type 4, 931 leaves) :

$$\Big((b+a\,\mathrm{Cos}[c+d\,x])^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Big(-\Big(2\,\left(12\,a\,A\,b^3-24\,a^2\,b^2\,B+12\,b^4\,B+40\,a^3\,b\,C-28\,a\,b^3\,C\right)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\,\mathrm{Sin}[c+d\,x]\Big)\Big/\,\left(a\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)+$$

$$\Big(2\,\left(9\,a^2\,A\,b^2-12\,A\,b^4-27\,a^3\,b\,B+30\,a\,b^3\,B+45\,a^4\,C-44\,a^2\,b^2\,C-4\,b^4\,C\right)\,\mathrm{Cos}[c+d\,x]^2$$

$$\Big(\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]+\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)$$

$$(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\,\mathrm{Sin}[c+d\,x]\Big)\Big/\,\left(b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)-$$

$$\Big(2\,\left(3\,a^2\,A\,b^2-9\,a^3\,b\,B+6\,a\,b^3\,B+15\,a^4\,C-12\,a^2\,b^2\,C\right)\,\mathrm{Cos}[2\,(c+d\,x)]\,\,(a+b\,\mathrm{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\mathrm{Sec}[c+d\,x]^2+$$

$$2\,a\,b\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,+a\,(a-2\,b)\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$\sqrt{\mathrm{Sec}[c+d\,x]}\,\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,+a^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,-$$

$$2\,b^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\Big)\,\mathrm{Sin}[c+d\,x]\Big)\Big/$$

$$\Big(a^2\,b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\,\left(2-\mathrm{Sec}[c+d\,x]^2\right)\Big)\Big)\Big)\Big/$$

$$\left(6\,(a-b)\,b^3\,(a+b)\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\,(a+b\,\mathrm{Sec}[c+d\,x])^2\right)+$$

$$\Big((b+a\,\mathrm{Cos}[c+d\,x])^2$$

$$\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{2\,\left(a\,A\,b^2-3\,a^2\,b\,B+2\,b^3\,B+5\,a^3\,C-4\,a\,b^2\,C\right)\,\mathrm{Sin}[c+d\,x]}{b^3\,\left(-a^2+b^2\right)}-\frac{2\,\left(a\,A\,b^2\,\mathrm{Sin}[c+d\,x]-a^2\,b\,B\,\mathrm{Sin}[c+d\,x]+a^3\,C\,\mathrm{Sin}[c+d\,x]\right)}{b^2\,\left(-a^2+b^2\right)\,(b+a\,\mathrm{Cos}[c+d\,x])}+\frac{4\,C\,\mathrm{Tan}[c+d\,x]}{3\,b^2}\right)\Big)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\,(a+b\,\mathrm{Sec}[c+d\,x])^2\right)$$

Problem 1020: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+b\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 363 leaves, 10 steps):

$$-\frac{\left(A\,b^2-a\,b\,B+3\,a^2\,C-2\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\,\left(a^2-b^2\right)\,d}-$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,b\,\left(a^2-b^2\right)\,d}+\frac{1}{a\,(a-b)\,b^2\,(a+b)^2\,d}$$

$$\left(A\,b^4+a^3\,b\,B-3\,a\,b^3\,B-3\,a^4\,C+a^2\,b^2\,(A+5\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}+$$

$$\frac{\left(A\,b^2-a\,b\,B+3\,a^2\,C-2\,b^2\,C\right)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d}-\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 865 leaves) :

$$\Big((b + a\,\text{Cos}[c + d\,x])^2\,(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2)$$
$$\Big(-\Big(2\,(4\,A\,b^3 - 4\,a\,b^2\,B + 8\,a^2\,b\,C - 4\,b^3\,C)\,\text{Cos}[c + d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a}, -\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big]$$
$$(a + b\,\text{Sec}[c + d\,x])\,\sqrt{1 - \text{Sec}[c + d\,x]^2}\,\text{Sin}[c + d\,x]\Big)\Big/\,\big(a\,(b + a\,\text{Cos}[c + d\,x])\,(1 - \text{Cos}[c + d\,x]^2)\big) +$$
$$\Big(2\,(-a\,A\,b^2 - 3\,a^2\,b\,B + 4\,b^3\,B + 9\,a^3\,C - 10\,a\,b^2\,C)\,\text{Cos}[c + d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big] +$$
$$\text{EllipticPi}\Big[-\frac{b}{a}, -\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big]\Big)\,(a + b\,\text{Sec}[c + d\,x])\,\sqrt{1 - \text{Sec}[c + d\,x]^2}\,\text{Sin}[c + d\,x]\Big)\Big/$$
$$\big(b\,(b + a\,\text{Cos}[c + d\,x])\,(1 - \text{Cos}[c + d\,x]^2)\big) - \Big(2\,(a\,A\,b^2 - a^2\,b\,B + 3\,a^3\,C - 2\,a\,b^2\,C)\,\text{Cos}[2\,(c + d\,x)]\,(a + b\,\text{Sec}[c + d\,x])$$
$$\Big(2\,a\,b - 2\,a\,b\,\text{Sec}[c + d\,x]^2 + 2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big]\,\sqrt{\text{Sec}[c + d\,x]}\,\sqrt{1 - \text{Sec}[c + d\,x]^2} + a\,(a - 2\,b)$$
$$\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big]\,\sqrt{\text{Sec}[c + d\,x]}\,\sqrt{1 - \text{Sec}[c + d\,x]^2} + a^2\,\text{EllipticPi}\Big[-\frac{b}{a}, -\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big]$$
$$\sqrt{\text{Sec}[c + d\,x]}\,\sqrt{1 - \text{Sec}[c + d\,x]^2} - 2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a}, -\text{ArcSin}\Big[\sqrt{\text{Sec}[c + d\,x]}\Big], -1\Big]\,\sqrt{\text{Sec}[c + d\,x]}\,\sqrt{1 - \text{Sec}[c + d\,x]^2}\Big)$$
$$\text{Sin}[c + d\,x]\Big)\Big/\,\Big(a^2\,b\,(b + a\,\text{Cos}[c + d\,x])\,(1 - \text{Cos}[c + d\,x]^2)\,\sqrt{\text{Sec}[c + d\,x]}\,(2 - \text{Sec}[c + d\,x]^2)\Big)\Big)\Big)\Big/$$
$$\big(2\,b^2\,(-a + b)\,(a + b)\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + b\,\text{Sec}[c + d\,x])^2\big) +$$
$$\Big((b + a\,\text{Cos}[c + d\,x])^2$$
$$\sqrt{\text{Sec}[c + d\,x]}$$
$$(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2)$$
$$\Big(-\frac{2\,(A\,b^2 - a\,b\,B + 3\,a^2\,C - 2\,b^2\,C)\,\text{Sin}[c + d\,x]}{b^2\,(-a^2 + b^2)} + \frac{2\,(A\,b^2\,\text{Sin}[c + d\,x] - a\,b\,B\,\text{Sin}[c + d\,x] + a^2\,C\,\text{Sin}[c + d\,x])}{b\,(-a^2 + b^2)\,(b + a\,\text{Cos}[c + d\,x])}\Big)\Big)\Big/$$
$$\big(d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + b\,\text{Sec}[c + d\,x])^2\big)$$

- **Problem 1021: Result more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Sec}[c + d\,x]}\,(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2)}{(a + b\,\text{Sec}[c + d\,x])^2}\,dx$$

Optimal (type 4, 299 leaves, 9 steps) :

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,b\,\left(a^2-b^2\right)\,d}-$$

$$\frac{\left(A\,b^2+a\,b\,B-a^2\,(2\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,\left(a^2-b^2\right)\,d}+\frac{1}{a^2\,(a-b)\,b\,(a+b)^2\,d}$$

$$\left(A\,b^4+a^3\,b\,B+a\,b^3\,B+a^4\,C-3\,a^2\,b^2\,(A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}\ -$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 829 leaves) :

$$\Big((b+a\,\text{Cos}[c+d\,x])^2\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Big(-\Big(2\,\big(4\,a\,A\,b-4\,b^2\,B+4\,a\,b\,C\big)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\Big(a\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)+$$

$$\Big(2\,\big(-A\,b^2+a\,b\,B+3\,a^2\,C-4\,b^2\,C\big)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\Big(b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)-$$

$$\Big(2\,\big(A\,b^2-a\,b\,B+a^2\,C\big)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$

$$a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$

$$2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Big)\Big/$$

$$\Big(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\,\sqrt{\text{Sec}[c+d\,x]}\,\big(2-\text{Sec}[c+d\,x]^2\big)\Big)\Big)\Big)\Big/$$

$$\Big(2\,(a-b)\,b\,(a+b)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^2\Big)+$$

$$\Big((b+a\,\text{Cos}[c+d\,x])^2$$

$$\sqrt{\text{Sec}[c+d\,x]}$$

$$\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\left(\frac{2\,\big(A\,b^2-a\,b\,B+a^2\,C\big)\,\text{Sin}[c+d\,x]}{a\,b\,\big(-a^2+b^2\big)}+\frac{2\,\big(A\,b^2\,\text{Sin}[c+d\,x]-a\,b\,B\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]\big)}{a\,\big(a^2-b^2\big)\,(b+a\,\text{Cos}[c+d\,x])}\right)\Big)\Big/$$

$$\Big(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^2\Big)$$

- **Problem 1022: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 317 leaves, 9 steps) :

$$-\frac{\left(3\,A\,b^2-a\,b\,B-a^2\,(2\,A-C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,\left(a^2-b^2\right)\,d}+$$

$$\frac{\left(3\,A\,b^3+2\,a^3\,B-a\,b^2\,B-a^2\,b\,(4\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^3\,\left(a^2-b^2\right)\,d}-\frac{1}{a^3\,(a-b)\,(a+b)^2\,d}$$

$$\left(3\,A\,b^4+3\,a^3\,b\,B-a\,b^3\,B-a^4\,C-a^2\,b^2\,(5\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}+$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 835 leaves) :

$$\Big((b+a\,\text{Cos}[c+d\,x])^2\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Big(-\Big(2\,\big(4\,a\,A\,b-4\,a^2\,B+4\,a\,b\,C\big)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\,\text{Sin}[c+d\,x]\Big)\Big/\,\big(a\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\big)\,+$$

$$\Big(2\,\big(-2\,a^2\,A+A\,b^2+a\,b\,B-a^2\,C\big)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\,\text{Sin}[c+d\,x]\Big)\Big/\,\big(b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\big)\,-$$

$$\Big(2\,\big(-2\,a^2\,A+3\,A\,b^2-a\,b\,B+a^2\,C\big)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+$$

$$2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,+a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,-$$

$$2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\Big)\,\text{Sin}[c+d\,x]\Big)\Big/$$

$$\Big(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\big(2-\text{Sec}[c+d\,x]^2\big)\Big)\Big)\Big)\Big/$$

$$\big(2\,a\,(-a+b)\,(a+b)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^2\big)\,+$$

$$\Big((b+a\,\text{Cos}[c+d\,x])^2$$

$$\sqrt{\text{Sec}[c+d\,x]}$$

$$\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\left(\frac{2\,\big(A\,b^2-a\,b\,B+a^2\,C\big)\,\text{Sin}[c+d\,x]}{a^2\,\big(a^2-b^2\big)}-\frac{2\,\big(A\,b^3\,\text{Sin}[c+d\,x]-a\,b^2\,B\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]\big)}{a^2\,\big(a^2-b^2\big)\,(b+a\,\text{Cos}[c+d\,x])}\right)\Big)\Big/$$

$$\big(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^2\big)$$

- **Problem 1023: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 406 leaves, 10 steps):

$$\frac{\left(5\,A\,b^3+2\,a^3\,B-3\,a\,b^2\,B-a^2\,b\,(4\,A-C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^3\left(a^2-b^2\right)d}-\frac{1}{3\,a^4\left(a^2-b^2\right)d}$$

$$\left(15\,A\,b^4+12\,a^3\,b\,B-9\,a\,b^3\,B-a^2\,b^2\,(16\,A-3\,C)-2\,a^4\,(A+3\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}\,+$$

$$\frac{1}{a^4\,(a-b)\,(a+b)^2\,d}b\left(5\,A\,b^4+5\,a^3\,b\,B-3\,a\,b^3\,B-a^2\,b^2\,(7\,A-C)-3\,a^4\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}\,-$$

$$\frac{\left(5\,A\,b^2-3\,a\,b\,B-a^2\,(2\,A-3\,C)\right)\text{Sin}[c+d\,x]}{3\,a^2\left(a^2-b^2\right)d\sqrt{\text{Sec}[c+d\,x]}}+\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)d\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 887 leaves) :

$$\Big((b+a\,\mathrm{Cos}[c+d\,x])^2\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Big(-\Big(2\,\big(4\,a^3\,A+8\,a\,A\,b^2-12\,a^2\,b\,B+12\,a^3\,C\big)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Big)\Big/\,\big(a\,(b+a\,\mathrm{Cos}[c+d\,x])\,\big(1-\mathrm{Cos}[c+d\,x]^2\big)\big)+$$

$$\Big(2\,\big(-8\,a^2\,A\,b+5\,A\,b^3+6\,a^3\,B-3\,a\,b^2\,B-3\,a^2\,b\,C\big)\,\mathrm{Cos}[c+d\,x]^2\,\Big(\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]+\mathrm{EllipticPi}\Big[-\frac{b}{a},$$

$$-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,(a+b\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Big)\Big/\,\big(b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\big(1-\mathrm{Cos}[c+d\,x]^2\big)\big)-$$

$$\Big(2\,\big(-12\,a^2\,A\,b+15\,A\,b^3+6\,a^3\,B-9\,a\,b^2\,B+3\,a^2\,b\,C\big)\,\mathrm{Cos}[2\,(c+d\,x)]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\mathrm{Sec}[c+d\,x]^2+$$

$$2\,a\,b\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+a^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}-$$

$$2\,b^2\,\mathrm{EllipticPi}\Big[-\frac{b}{a},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\Big)\,\mathrm{Sin}[c+d\,x]\Big)\Big/$$

$$\Big(a^2\,b\,(b+a\,\mathrm{Cos}[c+d\,x])\,\big(1-\mathrm{Cos}[c+d\,x]^2\big)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\big(2-\mathrm{Sec}[c+d\,x]^2\big)\Big)\Big)\Big)\Big/$$

$$\big(6\,a^2\,(a-b)\,(a+b)\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^2\big)+$$

$$\Big((b+a\,\mathrm{Cos}[c+d\,x])^2$$

$$\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Big(\frac{2\,b\,\big(A\,b^2-a\,b\,B+a^2\,C\big)\,\mathrm{Sin}[c+d\,x]}{a^3\,\big(-a^2+b^2\big)}+\frac{2\,\big(A\,b^4\,\mathrm{Sin}[c+d\,x]-a\,b^3\,B\,\mathrm{Sin}[c+d\,x]+a^2\,b^2\,C\,\mathrm{Sin}[c+d\,x]\big)}{a^3\,\big(a^2-b^2\big)\,(b+a\,\mathrm{Cos}[c+d\,x])}+\frac{2\,A\,\mathrm{Sin}[2\,(c+d\,x)]}{3\,a^2}\Big)\Big)\Big/$$

$$\big(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^2\big)$$

Problem 1027: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Sec}[c+d\,x]^{3/2}\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)}{(a+b\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 469 leaves, 10 steps):

$$-\frac{1}{4\,a\,b^2\,\left(a^2-b^2\right)^2\,d}\left(A\,b^4-a^3\,b\,B-5\,a\,b^3\,B-3\,a^4\,C+a^2\,b^2\,(5\,A+9\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}\,+$$

$$\frac{\left(A\,b^4+3\,a^3\,b\,B+3\,a\,b^3\,B+a^4\,C-7\,a^2\,b^2\,(A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,a^2\,b\,\left(a^2-b^2\right)^2\,d}-\frac{1}{4\,a^2\,(a-b)^2\,b^2\,(a+b)^3\,d}$$

$$\left(A\,b^6-a^5\,b\,B+10\,a^3\,b^3\,B+3\,a\,b^5\,B-3\,a^4\,b^2\,(A-2\,C)-3\,a^6\,C-5\,a^2\,b^4\,(2\,A+3\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,a}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}\,-$$

$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^2}+\frac{\left(A\,b^4-a^3\,b\,B-5\,a\,b^3\,B-3\,a^4\,C+a^2\,b^2\,(5\,A+9\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,b^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Sec}[c+d\,x])}$$

Result (type 4, 1051 leaves) :

$$\Big((b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(-\Big(2\left(-24\,a\,A\,b^3+8\,a^2\,b^2\,B+16\,b^4\,B+8\,a^3\,b\,C-32\,a\,b^3\,C\right)\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\left(a\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$

$$\Big(2\left(a^2\,A\,b^2+5\,A\,b^4+3\,a^3\,b\,B-9\,a\,b^3\,B+9\,a^4\,C-19\,a^2\,b^2\,C+16\,b^4\,C\right)\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+$$

$$\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/$$

$$\left(b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)-\Big(2\left(-5\,a^2\,A\,b^2-A\,b^4+a^3\,b\,B+5\,a\,b^3\,B+3\,a^4\,C-9\,a^2\,b^2\,C\right)\text{Cos}[2\,(c+d\,x)]$$

$$(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$

$$a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],$$

$$-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)$$

$$\text{Sin}[c+d\,x]\Big)\Big/\left(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\,\left(2-\text{Sec}[c+d\,x]^2\right)\right)\Big)\Big)\Big/$$

$$\left(8\,(a-b)^2\,b^2\,(a+b)^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Big((b+a\,\text{Cos}[c+d\,x])^3$$

$$\text{Sec}[c+d\,x]^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(\frac{\left(5\,a^2\,A\,b^2+A\,b^4-a^3\,b\,B-5\,a\,b^3\,B-3\,a^4\,C+9\,a^2\,b^2\,C\right)\text{Sin}[c+d\,x]}{2\,a\,b^2\,\left(-a^2+b^2\right)^2}+\frac{A\,b^2\,\text{Sin}[c+d\,x]-a\,b\,B\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,(b+a\,\text{Cos}[c+d\,x])^2}+$$

$$\left(-7\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+A\,b^4\,\text{Sin}[c+d\,x]+3\,a^3\,b\,B\,\text{Sin}[c+d\,x]+3\,a\,b^3\,B\,\text{Sin}[c+d\,x]+a^4\,C\,\text{Sin}[c+d\,x]-7\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(2\,a\,b\,\left(-a^2+b^2\right)^2\,(b+a\,\text{Cos}[c+d\,x])\right)\Big)\Big)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 1028: Result more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 478 leaves, 10 steps):

$$-\frac{1}{4 a^2 b \left(a^2-b^2\right)^2 d}\left(3 A b^4+5 a^3 b B+a b^3 B-a^4 C-a^2 b^2 (9 A+5 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+\frac{1}{4 a^3 \left(a^2-b^2\right)^2 d}$$

$$\left(3 A b^4-7 a^3 b B+a b^3 B-a^2 b^2 (5 A-3 C)+a^4 (8 A+3 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}-\frac{1}{4 a^3 (a-b)^2 b (a+b)^3 d}$$

$$\left(3 A b^6-3 a^5 b B-10 a^3 b^3 B+a b^5 B-3 a^2 b^4 (2 A-C)-a^6 C+5 a^4 b^2 (3 A+2 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}-$$

$$\frac{\left(A b^2-a (b B-a C)\right) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{2 b \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^2}+\frac{\left(A b^4+3 a^3 b B+3 a b^3 B+a^4 C-7 a^2 b^2 (A+C)\right) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{4 a b \left(a^2-b^2\right)^2 d (a+b \text{Sec}[c+d x])}$$

Result (type 4, 1051 leaves):

$$\Big((b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Big(-\Big(2\,\big(16\,a^3\,A\,b+8\,a\,A\,b^3-24\,a^2\,b^2\,B+8\,a^3\,b\,C+16\,a\,b^3\,C\big)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\big(a\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\big)+$$

$$\Big(2\,\big(-5\,a^2\,A\,b^2-A\,b^4+a^3\,b\,B+5\,a\,b^3\,B+3\,a^4\,C-9\,a^2\,b^2\,C\big)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{b}{a},$$

$$-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,(a+b\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\big(b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\big)-$$

$$\Big(2\,\big(9\,a^2\,A\,b^2-3\,A\,b^4-5\,a^3\,b\,B-a\,b^3\,B+a^4\,C+5\,a^2\,b^2\,C\big)\,\text{Cos}[2\,(c+d\,x)]\,(a+b\,\text{Sec}[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,\text{Sec}[c+d\,x]^2+$$

$$2\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a\,(a-2\,b)\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+a^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$

$$2\,b^2\,\text{EllipticPi}\Big[-\frac{b}{a},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Big)\Big/$$

$$\Big(a^2\,b\,(b+a\,\text{Cos}[c+d\,x])\,\big(1-\text{Cos}[c+d\,x]^2\big)\,\sqrt{\text{Sec}[c+d\,x]}\,\big(2-\text{Sec}[c+d\,x]^2\big)\Big)\Big)\Big)\Big/$$

$$\big(8\,a\,(a-b)^2\,b\,(a+b)^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])$$

$$(a+b\,\text{Sec}[c+d\,x])^3\big)+$$

$$\Big((b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^{3/2}\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Big(\frac{\big(-9\,a^2\,A\,b^2+3\,A\,b^4+5\,a^3\,b\,B+a\,b^3\,B-a^4\,C-5\,a^2\,b^2\,C\big)\,\text{Sin}[c+d\,x]}{2\,a^2\,b\,\big(-a^2+b^2\big)^2}-\frac{A\,b^3\,\text{Sin}[c+d\,x]-a\,b^2\,B\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]}{a^2\,\big(a^2-b^2\big)\,(b+a\,\text{Cos}[c+d\,x])^2}+$$

$$\big(11\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]-5\,A\,b^4\,\text{Sin}[c+d\,x]-7\,a^3\,b\,B\,\text{Sin}[c+d\,x]+a\,b^3\,B\,\text{Sin}[c+d\,x]+3\,a^4\,C\,\text{Sin}[c+d\,x]+3\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\big)\Big/$$

$$\Big(2\,a^2\,\big(a^2-b^2\big)^2\,(b+a\,\text{Cos}[c+d\,x])\Big)\Big)\Big)\Big/$$

$$\big(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+b\,\text{Sec}[c+d\,x])^3\big)$$

- **Problem 1029: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 486 leaves, 10 steps):

$$\frac{1}{4 a^3 \left(a^2-b^2\right)^2 d}\left(15 A b^4+9 a^3 b B-3 a b^3 B+a^4 (8 A-5 C)-a^2 b^2 (29 A+C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}-$$

$$\frac{1}{4 a^4 \left(a^2-b^2\right)^2 d}\left(15 A b^5-8 a^5 B+5 a^3 b^2 B-3 a b^4 B-a^2 b^3 (33 A+C)+a^4 b (24 A+7 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+$$

$$\frac{1}{4 a^4 (a-b)^2 (a+b)^3 d}\left(15 A b^6-15 a^5 b B+6 a^3 b^3 B-3 a b^5 B+3 a^6 C-a^2 b^4 (38 A+C)+5 a^4 b^2 (7 A+2 C)\right)$$

$$\sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[\frac{2 a}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+\frac{\left(A b^2-a (b B-a C)\right) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{2 a \left(a^2-b^2\right) d (a+b\,\text{Sec}[c+d x])^2}-$$

$$\frac{\left(5 A b^4+7 a^3 b B-a b^3 B-3 a^4 C-a^2 b^2 (11 A+3 C)\right) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{4 a^2 \left(a^2-b^2\right)^2 d (a+b\,\text{Sec}[c+d x])}$$

Result (type 4, 1064 leaves) :

$$\Big((b+a\,Cos[c+d\,x])^3\,Sec[c+d\,x]\,\big(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\big)$$

$$\Big(-\Big(2\,(-32\,a^3\,A\,b+8\,a\,A\,b^3+16\,a^4\,B+8\,a^2\,b^2\,B-24\,a^3\,b\,C)\,Cos[c+d\,x]^2\,EllipticPi\Big[-\frac{b}{a},\,-ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],\,-1\Big]$$

$$(a+b\,Sec[c+d\,x])\,\sqrt{1-Sec[c+d\,x]^2}\,Sin[c+d\,x]\Big)\Big/\Big(a\,(b+a\,Cos[c+d\,x])\,\big(1-Cos[c+d\,x]^2\big)\Big)+$$

$$\Big(2\,(8\,a^4\,A-7\,a^2\,A\,b^2+5\,A\,b^4-5\,a^3\,b\,B-a\,b^3\,B+a^4\,C+5\,a^2\,b^2\,C)\,Cos[c+d\,x]^2\,\Big(EllipticF\Big[ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],\,-1\Big]+$$

$$EllipticPi\Big[-\frac{b}{a},\,-ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],\,-1\Big]\Big)\,(a+b\,Sec[c+d\,x])\,\sqrt{1-Sec[c+d\,x]^2}\,Sin[c+d\,x]\Big)\Big/$$

$$\Big(b\,(b+a\,Cos[c+d\,x])\,\big(1-Cos[c+d\,x]^2\big)\Big)-\Big(2\,\big(8\,a^4\,A-29\,a^2\,A\,b^2+15\,A\,b^4+9\,a^3\,b\,B-3\,a\,b^3\,B-5\,a^4\,C-a^2\,b^2\,C\big)\,Cos[2\,(c+d\,x)]$$

$$(a+b\,Sec[c+d\,x])\,\Big(2\,a\,b-2\,a\,b\,Sec[c+d\,x]^2+2\,a\,b\,EllipticE\Big[ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],\,-1\Big]\,\sqrt{Sec[c+d\,x]}\,\sqrt{1-Sec[c+d\,x]^2}+$$

$$a\,(a-2\,b)\,EllipticF\Big[ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],\,-1\Big]\,\sqrt{Sec[c+d\,x]}\,\sqrt{1-Sec[c+d\,x]^2}+a^2\,EllipticPi\Big[-\frac{b}{a},\,-ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],$$

$$-1\Big]\,\sqrt{Sec[c+d\,x]}\,\sqrt{1-Sec[c+d\,x]^2}-2\,b^2\,EllipticPi\Big[-\frac{b}{a},\,-ArcSin\Big[\sqrt{Sec[c+d\,x]}\Big],\,-1\Big]\,\sqrt{Sec[c+d\,x]}\,\sqrt{1-Sec[c+d\,x]^2}\Big)$$

$$Sin[c+d\,x]\Big)\Big/\Big(a^2\,b\,(b+a\,Cos[c+d\,x])\,\big(1-Cos[c+d\,x]^2\big)\,\sqrt{Sec[c+d\,x]}\,\big(2-Sec[c+d\,x]^2\big)\Big)\Big)\Big)\Big/$$

$$\Big(8\,a^2\,(a-b)^2\,(a+b)^2\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^3\Big)+$$

$$\Big((b+a\,Cos[c+d\,x])^3$$

$$Sec[c+d\,x]^{3/2}$$

$$\big(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\big)$$

$$\Big(-\frac{\big(-13\,a^2\,A\,b^2+7\,A\,b^4+9\,a^3\,b\,B-3\,a\,b^3\,B-5\,a^4\,C-a^2\,b^2\,C\big)\,Sin[c+d\,x]}{2\,a^3\,\big(-a^2+b^2\big)^2}-\frac{-A\,b^4\,Sin[c+d\,x]+a\,b^3\,B\,Sin[c+d\,x]-a^2\,b^2\,C\,Sin[c+d\,x]}{a^3\,\big(a^2-b^2\big)\,(b+a\,Cos[c+d\,x])^2}+$$

$$\big(-15\,a^2\,A\,b^3\,Sin[c+d\,x]+9\,A\,b^5\,Sin[c+d\,x]+11\,a^3\,b^2\,B\,Sin[c+d\,x]-5\,a\,b^4\,B\,Sin[c+d\,x]-7\,a^4\,b\,C\,Sin[c+d\,x]+a^2\,b^3\,C\,Sin[c+d\,x]\big)\Big/$$

$$\Big(2\,a^3\,\big(a^2-b^2\big)^2\,(b+a\,Cos[c+d\,x])\Big)\Big)\Big)\Big/$$

$$\Big(d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+b\,Sec[c+d\,x])^3\Big)$$

- **Problem 1031: Result unnecessarily involves imaginary or complex numbers.**

$$\int Sec[c+d\,x]^{3/2}\,\sqrt{a+b\,Sec[c+d\,x]}\,\big(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\big)\,dx$$

Optimal (type 4, 447 leaves, 14 steps) :

$$\frac{\left(24 A b^2+18 a b B-a^2 C+16 b^2 C\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{24 b d \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\frac{\left(2 a^2 b B-8 b^3 B-a^3 C-4 a b^2 (2 A+C)\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{8 b^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\frac{\left(24 A b^2+6 a b B-3 a^2 C+16 b^2 C\right) \text{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{24 b^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(24 A b^2+6 a b B-3 a^2 C+16 b^2 C\right) \sqrt{\operatorname{Sec}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{24 b^2 d}+$$

$$\frac{(6 b B+a C) \operatorname{Sec}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{12 b d}+\frac{C \operatorname{Sec}[c+d x]^{5/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{3 d}$$

Result (type 4, 782 leaves) :

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{2\left(24\,a\,b^2\,B+4\,a^2\,b\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{2\left(24\,a\,A\,b^2-18\,a^2\,b\,B+48\,b^3\,B+9\,a^3\,C+8\,a\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,\left(-24\,a\,A\,b^2-6\,a^2\,b\,B+3\,a^3\,C-16\,a\,b^2\,C\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(48\,b^2\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{\text{Sec}[c+d\,x]^2\,(6\,b\,B\,\text{Sin}[c+d\,x]+a\,C\,\text{Sin}[c+d\,x])}{6\,b}+\right.$$

$$\left.\left.\frac{\text{Sec}[c+d\,x]\,\left(24\,A\,b^2\,\text{Sin}[c+d\,x]+6\,a\,b\,B\,\text{Sin}[c+d\,x]-3\,a^2\,C\,\text{Sin}[c+d\,x]+16\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{12\,b^2}+\frac{2}{3}\,C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 1032: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 346 leaves, 13 steps) :

$$\frac{(8\,a\,A+4\,b\,B+3\,a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(8\,A\,b^2+4\,a\,b\,B-a^2\,C+4\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{(4\,b\,B+a\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{(4\,b\,B+a\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d}+\frac{C\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 683 leaves) :

$$-\left(\left(\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{2\,(-16\,a\,A\,b-4\,a\,b\,C)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.\right.\right.$$

$$\frac{2\,\left(-16\,A\,b^2-4\,a\,b\,B+3\,a^2\,C-8\,b^2\,C\right)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,\left(4\,a\,b\,B+a^2\,C\right)\,\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left.\left(8\,b\,d\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{5/2}\right)\right)+$$

$$\left(\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left.\left(\frac{\mathrm{Sec}[c+d\,x]\,(4\,b\,B\,\mathrm{Sin}[c+d\,x]+a\,C\,\mathrm{Sin}[c+d\,x])}{2\,b}+C\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 1033: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 258 leaves, 12 steps):

$$\frac{(2\,a\,B+b\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(2\,b\,B+a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(2\,A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 624 leaves):

$$\frac{2\,C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[c+d\,x]}{d\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{2\,(4\,A\,b+4\,a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{2\,(2\,a\,A+4\,b\,B+a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\left(2\,i\,(2\,a\,A-a\,C)\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

$$\text{Cos}[2\,(c+d\,x)]\,\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(2\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 1034: Unable to integrate problem.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 277 leaves, 12 steps) :

$$-\frac{2\left(A b^2-a^2(A+3C)\right)\sqrt{\frac{b+a\operatorname{Cos}[c+d x]}{a+b}}\operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{\operatorname{Sec}[c+d x]}}{3 a d\sqrt{a+b\operatorname{Sec}[c+d x]}}+$$

$$\frac{2 b C\sqrt{\frac{b+a\operatorname{Cos}[c+d x]}{a+b}}\operatorname{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{\operatorname{Sec}[c+d x]}}{d\sqrt{a+b\operatorname{Sec}[c+d x]}}+$$

$$\frac{2(A b+3 a B)\operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{a+b\operatorname{Sec}[c+d x]}}{3 a d\sqrt{\frac{b+a\operatorname{Cos}[c+d x]}{a+b}}\sqrt{\operatorname{Sec}[c+d x]}}+\frac{2A\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{3 d\sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{3/2}}\,dx$$

- **Problem 1035: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+b\operatorname{Sec}[c+d x]}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 273 leaves, 9 steps):

$$-\frac{2\left(a^2-b^2\right)(2 A b-5 a B)\sqrt{\frac{b+a\operatorname{Cos}[c+d x]}{a+b}}\operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{\operatorname{Sec}[c+d x]}}{15 a^2 d\sqrt{a+b\operatorname{Sec}[c+d x]}}-$$

$$\frac{2\left(2 A b^2-5 a b B-3 a^2(3A+5C)\right)\operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2a}{a+b}\right]\sqrt{a+b\operatorname{Sec}[c+d x]}}{15 a^2 d\sqrt{\frac{b+a\operatorname{Cos}[c+d x]}{a+b}}\sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{2A\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{5 d\operatorname{Sec}[c+d x]^{3/2}}+\frac{2(A b+5 a B)\sqrt{a+b\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{15 a d\sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 6, 3426 leaves):

$$\left(\sqrt{a+b\operatorname{Sec}[c+d x]}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\right.$$

$$\left(-\frac{4\left(9 a^2 A-2 A b^2+5 a b B+15 a^2 C\right)\operatorname{Cot}[c]}{15 a^2 d}+\frac{4(A b+5 a B)\operatorname{Cos}[d x]\operatorname{Sin}[c]}{15 a d}+\frac{2 A\operatorname{Cos}[2 d x]\operatorname{Sin}[2 c]}{5 d}+\right.$$

$$\left.\left.\frac{4\,(A\,b+5\,a\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{15\,a\,d}+\frac{2\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\right)\right)\Big/\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(28\,A\,b\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(15\,a\,d\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(4\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\;\sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Bigg(4\,b\,C\,\mathrm{AppellF1}\Big[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)},$$

$$\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\Big]\,\mathrm{Csc}[c]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}-b\,\mathrm{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\;\sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(a\,d\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Bigg(6\,a\,A\,\mathrm{Csc}[c]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\mathrm{AppellF1}\Big[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\mathrm{Sec}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a\sqrt{1+\mathrm{Tan}[c]^2}\left(1-\frac{b\,\mathrm{Sec}[c]}{a\sqrt{1+\mathrm{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Bigg/$$

$$\left(5\,d\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\Bigg(4\,A\,b^2\,\text{Csc}[c]\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\,\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(15\,a\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(2\,b\,B\,\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Bigg/$$

$$\left(3\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Bigg(2\,a\,C\,\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Bigg[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\;\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(d\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 1036: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 360 leaves, 10 steps):

$$\frac{2\left(a^2-b^2\right)\left(25\,a^2\,A+8\,A\,b^2-14\,a\,b\,B+35\,a^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{105\,a^3\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\left(8\,A\,b^3+63\,a^3\,B-14\,a\,b^2\,B+a^2\,b\,(19\,A+35\,C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{105\,a^3\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$

$$\frac{2\,(A\,b+7\,a\,B)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{35\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{2\left(4\,A\,b^2-7\,a\,b\,B-5\,a^2\,(5\,A+7\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,a^2\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 6, 4441 leaves):

$$\left(\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(-\frac{4\left(19\,a^2\,A\,b+8\,A\,b^3+63\,a^3\,B-14\,a\,b^2\,B+35\,a^2\,b\,C\right)\text{Cot}[c]}{105\,a^3\,d}+\frac{\left(115\,a^2\,A-16\,A\,b^2+28\,a\,b\,B+140\,a^2\,C\right)\text{Cos}[d\,x]\,\text{Sin}[c]}{105\,a^2\,d}+\right.$$

$$\frac{2\,(A\,b+7\,a\,B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{35\,a\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+\frac{\left(115\,a^2\,A-16\,A\,b^2+28\,a\,b\,B+140\,a^2\,C\right)\text{Cos}[c]\,\text{Sin}[d\,x]}{105\,a^2\,d}+$$

$$\left.\left.\frac{2\,(A\,b+7\,a\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{35\,a\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\right)\right)\Big/\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(20\,A\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\,\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$

$$\left(21\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\left(8\,A\,b^2\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\,\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$

$$\left(105\, a^2\, d\, \sqrt{b + a\, \text{Cos}[c + d\, x]}\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])\, \sqrt{1 + \text{Cot}[c]^2}\, \text{Sec}[c + d\, x]^{5/2}\right) -$$

$$\left(28\, b\, B\, \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{3}{2}, \frac{\text{Csc}[c]\left(b - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1 + \text{Cot}[c]^2}\left(1 + \frac{b\, \text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1 + \text{Cot}[c]^2}\left(-1 + \frac{b\, \text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\, \sqrt{a + b\, \text{Sec}[c + d\, x]}$$

$$\left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)\text{Sec}[d\, x - \text{ArcTan}[\text{Cot}[c]]]\, \sqrt{\frac{a\sqrt{1 + \text{Cot}[c]^2} - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1 + \text{Cot}[c]^2} - b\, \text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1 + \text{Cot}[c]^2} + a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1 + \text{Cot}[c]^2} + b\, \text{Csc}[c]}}\, \sqrt{b - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(15\, a\, d\, \sqrt{b + a\, \text{Cos}[c + d\, x]}\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])\, \sqrt{1 + \text{Cot}[c]^2}\, \text{Sec}[c + d\, x]^{5/2}\right) -$$

$$\left(4\, C\, \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{3}{2}, \frac{\text{Csc}[c]\left(b - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1 + \text{Cot}[c]^2}\left(1 + \frac{b\, \text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1 + \text{Cot}[c]^2}\left(-1 + \frac{b\, \text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\, \sqrt{a + b\, \text{Sec}[c + d\, x]}$$

$$\left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)\text{Sec}[d\, x - \text{ArcTan}[\text{Cot}[c]]]\, \sqrt{\frac{a\sqrt{1 + \text{Cot}[c]^2} - a\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1 + \text{Cot}[c]^2} - b\, \text{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\,\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Bigg(38\,A\,b\,\text{Csc}[c]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\,\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(105\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Bigg(16\,A\,b^3\,Csc[c]\,\sqrt{a+b\,Sec[c+d\,x]}\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\Bigg(AppellF1\Big[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{Sec[c]\left(b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}\right)}{a\,\sqrt{1+Tan[c]^2}\,\left(1-\frac{b\,Sec[c]}{a\,\sqrt{1+Tan[c]^2}}\right)},$$

$$-\frac{Sec[c]\left(b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}\right)}{a\,\sqrt{1+Tan[c]^2}\,\left(-1-\frac{b\,Sec[c]}{a\,\sqrt{1+Tan[c]^2}}\right)}\Big]\,Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+Tan[c]^2}\,\sqrt{\frac{a\,\sqrt{1+Tan[c]^2}-a\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}{b\,Sec[c]+a\,\sqrt{1+Tan[c]^2}}}$$

$$\sqrt{\frac{a\,\sqrt{1+Tan[c]^2}+a\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}{-b\,Sec[c]+a\,\sqrt{1+Tan[c]^2}}}\,\sqrt{b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}\Bigg)-$$

$$\frac{\frac{Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]}{\sqrt{1+Tan[c]^2}}+\frac{2\,a\,Cos[c]\left(b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}\right)}{a^2\,Cos[c]^2+a^2\,Sin[c]^2}}{\sqrt{b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(105\,a^2\,d\,\sqrt{b+a\,Cos[c+d\,x]}\,\left(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x]\right)\,Sec[c+d\,x]^{5/2}\right)-$$

$$\Bigg(6\,a\,B\,Csc[c]\,\sqrt{a+b\,Sec[c+d\,x]}\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)+$$

$$\left(4\,b^2\,B\,\text{Csc}[c]\sqrt{a+b\,\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Bigg/$$

$$\left(15\,a\,d\sqrt{b+a\,\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{5/2}\right)-$$

$$\Bigg(2\,b\,C\,\text{Csc}[c]\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\,\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(3\,d\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\right)$$

- **Problem 1037: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 457 leaves, 11 steps):

$$-\left(2\left(a^2-b^2\right)\left(16\,A\,b^3-75\,a^3\,B-24\,a\,b^2\,B+6\,a^2\,b\,(6\,A+7\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/$$

$$\left(315\,a^4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\left(16\,A\,b^4-57\,a^3\,b\,B-24\,a\,b^3\,B+6\,a^2\,b^2\,(4\,A+7\,C)-21\,a^4\,(7\,A+9\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/$$

$$\left(315\,a^4\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}+$$

$$\frac{2\,(A\,b+9\,a\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{63\,a\,d\,\text{Sec}[c+d\,x]^{5/2}}-\frac{2\left(6\,A\,b^2-9\,a\,b\,B-7\,a^2\,(7\,A+9\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{2\left(8\,A\,b^3+75\,a^3\,B-12\,a\,b^2\,B+a^2\,b\,(13\,A+21\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 6, 5993 leaves): Display of huge result suppressed!

Problem 1038: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Sec}[c+d x]^{3/2} (a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 551 leaves, 15 steps):

$$\left(\left(136 a^2 b B+128 b^3 B-3 a^3 C+12 a b^2 (28 A+19 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\text{Sec}[c+d x]}\right) \Big/ \left(192 b d \sqrt{a+b \text{Sec}[c+d x]}\right) - \left(\left(8 a^3 b B-96 a b^3 B-3 a^4 C-24 a^2 b^2 (2 A+C)-16 b^4 (4 A+3 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\text{Sec}[c+d x]}\right) \Big/ \left(64 b^2 d \sqrt{a+b \text{Sec}[c+d x]}\right) - \frac{\left(24 a^2 b B+128 b^3 B-9 a^3 C+12 a b^2 (20 A+13 C)\right) \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{192 b^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \sqrt{\text{Sec}[c+d x]}} + \frac{\left(24 a^2 b B+128 b^3 B-9 a^3 C+12 a b^2 (20 A+13 C)\right) \sqrt{\text{Sec}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{192 b^2 d} + \frac{\left(48 A b^2+56 a b B+3 a^2 C+36 b^2 C\right) \text{Sec}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{96 b d} + \frac{(8 b B+3 a C) \text{Sec}[c+d x]^{5/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{24 d} + \frac{C \text{Sec}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{4 d}$$

Result (type 4, 916 leaves):

$$\left((a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(\frac{2 \left(192 a A b^3+224 a^2 b^2 B+12 a^3 b C+144 a b^3 C\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{\sqrt{b+a \text{Cos}[c+d x]}} + \frac{1}{\sqrt{b+a \text{Cos}[c+d x]}} 2 \left(48 a^2 A b^2+384 A b^4-72 a^3 b B+448 a b^3 B+27 a^4 C-12 a^2 b^2 C+288 b^4 C\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] + \right.\right.$$

$$\left(2\,i\,\left(-240\,a^2\,A\,b^2-24\,a^3\,b\,B-128\,a\,b^3\,B+9\,a^4\,C-156\,a^2\,b^2\,C\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(384\,b^2\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{1}{12}\,\mathrm{Sec}[c+d\,x]^3\,(8\,b\,B\,\mathrm{Sin}[c+d\,x]+9\,a\,C\,\mathrm{Sin}[c+d\,x])+\right.$$

$$\frac{\mathrm{Sec}[c+d\,x]^2\,\left(48\,A\,b^2\,\mathrm{Sin}[c+d\,x]+56\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+3\,a^2\,C\,\mathrm{Sin}[c+d\,x]+36\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)}{48\,b}+\frac{1}{96\,b^2}$$

$$\mathrm{Sec}[c+d\,x]\,\left(240\,a\,A\,b^2\,\mathrm{Sin}[c+d\,x]+24\,a^2\,b\,B\,\mathrm{Sin}[c+d\,x]+128\,b^3\,B\,\mathrm{Sin}[c+d\,x]-9\,a^3\,C\,\mathrm{Sin}[c+d\,x]+156\,a\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\left.\left.\frac{1}{2}\,b\,C\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)$$

- **Problem 1039: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 446 leaves, 14 steps):

$$\frac{\left(42\,a\,b\,B+8\,b^2\,(3\,A+2\,C)+a^2\,(48\,A+17\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{24\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(6\,a^2\,b\,B+8\,b^3\,B-a^3\,C+12\,a\,b^2\,(2\,A+C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{8\,b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(24\,A\,b^2+30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(24\,A\,b^2+30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\sqrt{\text{Sec}[c+d\,x]}\ \sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{24\,b\,d}+$$

$$\frac{(2\,b\,B+a\,C)\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{4\,d}+\frac{C\,\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 800 leaves) :

$$-\left(\left((a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{2\left(-96\,a^2\,A\,b-24\,a\,b^2\,B-28\,a^2\,b\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.\right.\right.$$

$$\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}2\left(-120\,a\,A\,b^2-6\,a^2\,b\,B-48\,b^3\,B+9\,a^3\,C-56\,a\,b^2\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]+$$

$$\left(2\,\mathrm{i}\left(24\,a\,A\,b^2+30\,a^2\,b\,B+3\,a^3\,C+16\,a\,b^2\,C\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left.\left(48\,b\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)\right)+$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{1}{6}\,\mathrm{Sec}[c+d\,x]^2\,(6\,b\,B\,\mathrm{Sin}[c+d\,x]+7\,a\,C\,\mathrm{Sin}[c+d\,x])+\right.$$

$$\left.\left.\frac{\mathrm{Sec}[c+d\,x]\left(24\,A\,b^2\,\mathrm{Sin}[c+d\,x]+30\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+3\,a^2\,C\,\mathrm{Sin}[c+d\,x]+16\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)}{12\,b}+\frac{2}{3}\,b\,C\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)$$

- **Problem 1040: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 353 leaves, 13 steps):

$$\frac{\left(8\,a^2\,B+4\,b^2\,B+a\,b\,(8\,A+7\,C)\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{\left(8\,A\,b^2+12\,a\,b\,B+3\,a^2\,C+4\,b^2\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{(8\,a\,A-4\,b\,B-5\,a\,C)\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{4\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{(4\,b\,B+3\,a\,C)\sqrt{\mathrm{Sec}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{4\,d}+\frac{C\sqrt{\mathrm{Sec}[c+d\,x]}\;(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 709 leaves):

$$\left((a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{2\left(32\,a\,A\,b+16\,a^2\,B+4\,a\,b\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{2\left(8\,a^2\,A+16\,A\,b^2+20\,a\,b\,B+a^2\,C+8\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\left(8\,a^2\,A-4\,a\,b\,B-5\,a^2\,C\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(8\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left((a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left.\left(\frac{1}{2}\,\text{Sec}[c+d\,x]\,(4\,b\,B\,\text{Sin}[c+d\,x]+5\,a\,C\,\text{Sin}[c+d\,x])+b\,C\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)$$

- **Problem 1041: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 340 leaves, 13 steps):

$$\frac{\left(6\,a\,b\,B-b^{2}\,(2\,A-3\,C)+2\,a^{2}\,(A+3\,C)\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{b\,(2\,b\,B+3\,a\,C)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{(8\,A\,b+6\,a\,B-3\,b\,C)\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{3\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{b\,(2\,A-3\,C)\sqrt{\mathrm{Sec}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 685 leaves) :

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{2\left(4\,a^2\,A+12\,A\,b^2+24\,a\,b\,B+12\,a^2\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{2\left(8\,a\,A\,b+6\,a^2\,B+12\,b^2\,B+15\,a\,b\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+$$

$$\left(2\,i\left(8\,a\,A\,b+6\,a^2\,B-3\,a\,b\,C\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)\right)\Bigg/$$

$$\left(6\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)+$$

$$\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{4}{3}\,a\,A\,\mathrm{Sin}[c+d\,x]+2\,b\,C\,\mathrm{Tan}[c+d\,x]\right)}{d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}}$$

- **Problem 1042: Unable to integrate problem.**

$$\int\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 356 leaves, 13 steps):

$$-\frac{2\left(3 A b^3-5 a^3 B+5 a b^2 B-3 a^2 b (A+5 C)\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{15 a d \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{2 b^2 C \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{d \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{2\left(3 A b^2+20 a b B+3 a^2 (3 A+5 C)\right) \text{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{15 a d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{2 (3 A b+5 a B) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{15 d \sqrt{\operatorname{Sec}[c+d x]}}+\frac{2 A (a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{5 d \operatorname{Sec}[c+d x]^{3/2}}$$

Result (type 8, 47 leaves) :

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{3/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{5/2}} \, dx$$

- **Problem 1043: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{3/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{7/2}} \, dx$$

Optimal (type 4, 359 leaves, 10 steps) :

$$\frac{2\left(a^2-b^2\right)\left(25 a^2 A-6 A b^2+21 a b B+35 a^2 C\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{105 a^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}-$$

$$\frac{2\left(6 A b^3-63 a^3 B-21 a b^2 B-2 a^2 b (41 A+70 C)\right) \text{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{105 a^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{2 (3 A b+7 a B) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{35 d \operatorname{Sec}[c+d x]^{3/2}}+$$

$$\frac{2\left(3 A b^2+42 a b B+5 a^2 (5 A+7 C)\right) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{105 a d \sqrt{\operatorname{Sec}[c+d x]}}+\frac{2 A (a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{7 d \operatorname{Sec}[c+d x]^{5/2}}$$

Result (type 6, 4862 leaves) :

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(-\frac{4\left(82\,a^2\,A\,b-6\,A\,b^3+63\,a^3\,B+21\,a\,b^2\,B+140\,a^2\,b\,C\right)\mathrm{Cot}[c]}{105\,a^2\,d}+\right.\right.$$

$$\frac{\left(115\,a^2\,A+12\,A\,b^2+168\,a\,b\,B+140\,a^2\,C\right)\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{105\,a\,d}+\frac{2\,(8\,A\,b+7\,a\,B)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{35\,d}+\frac{a\,A\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{7\,d}+$$

$$\left.\left.\frac{\left(115\,a^2\,A+12\,A\,b^2+168\,a\,b\,B+140\,a^2\,C\right)\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{105\,a\,d}+\frac{2\,(8\,A\,b+7\,a\,B)\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{35\,d}+\frac{a\,A\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{7\,d}\right)\right)\Big/$$

$$\left((b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(20\,a\,A\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\right]\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}-b\,\mathrm{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(68\,A\,b^2\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\right]\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(35\,a\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(16\,b\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(4\,a\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\Bigg]\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\Bigg(4\,b^2\,C\,\text{AppellF1}\Big[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},$$

$$\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\Bigg]\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$

$$\left(a\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(164\,a\,A\,b\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\left(\mathrm{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},\right.\right.\right.\right.$$

$$\left.-\frac{\mathrm{Sec}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a\sqrt{1+\mathrm{Tan}[c]^2}\left(1-\frac{b\,\mathrm{Sec}[c]}{a\sqrt{1+\mathrm{Tan}[c]^2}}\right)},-\frac{\mathrm{Sec}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a\sqrt{1+\mathrm{Tan}[c]^2}\left(-1-\frac{b\,\mathrm{Sec}[c]}{a\sqrt{1+\mathrm{Tan}[c]^2}}\right)}\right]$$

$$\left.\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1+\mathrm{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\mathrm{Tan}[c]^2}-a\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{b\,\mathrm{Sec}[c]+a\sqrt{1+\mathrm{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\mathrm{Tan}[c]^2}+a\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{-b\,\mathrm{Sec}[c]+a\sqrt{1+\mathrm{Tan}[c]^2}}}\sqrt{b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,a\,\mathrm{Cos}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a^2\,\mathrm{Cos}[c]^2+a^2\,\mathrm{Sin}[c]^2}}{\sqrt{b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(105\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\right)+$$

$$\left(4\,A\,b^3\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\mathrm{Sec}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a\sqrt{1+\mathrm{Tan}[c]^2}\left(1-\frac{b\,\mathrm{Sec}[c]}{a\sqrt{1+\mathrm{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Bigg/$$

$$\left(35\,a\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(6\,a^2\,B\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\operatorname{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\operatorname{Tan}[c]^2}-a\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}}{b\operatorname{Sec}[c]+a\sqrt{1+\operatorname{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\operatorname{Tan}[c]^2}+a\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}}{-b\operatorname{Sec}[c]+a\sqrt{1+\operatorname{Tan}[c]^2}}}\ \sqrt{b+a\operatorname{Cos}[c]\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\operatorname{Sin}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\operatorname{Tan}[c]}{\sqrt{1+\operatorname{Tan}[c]^2}}+\frac{2\,a\operatorname{Cos}[c]\left(b+a\operatorname{Cos}[c]\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}\right)}{a^2\operatorname{Cos}[c]^2+a^2\operatorname{Sin}[c]^2}}{\sqrt{b+a\operatorname{Cos}[c]\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\operatorname{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\operatorname{Cos}[c+d\,x]+A\operatorname{Cos}[2\,c+2\,d\,x])\operatorname{Sec}[c+d\,x]^{7/2}\right)-$$

$$\left(2\,b^2\,B\operatorname{Csc}[c]\,(a+b\operatorname{Sec}[c+d\,x])^{3/2}\left(A+B\operatorname{Sec}[c+d\,x]+C\operatorname{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\operatorname{AppellF1}\left[-\frac{1}{2},\ -\frac{1}{2},\ -\frac{1}{2},\ \frac{1}{2},\ -\frac{\operatorname{Sec}[c]\left(b+a\operatorname{Cos}[c]\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}\right)}{a\sqrt{1+\operatorname{Tan}[c]^2}\left(1-\frac{b\operatorname{Sec}[c]}{a\sqrt{1+\operatorname{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\operatorname{Sec}[c]\left(b+a\operatorname{Cos}[c]\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}\right)}{a\sqrt{1+\operatorname{Tan}[c]^2}\left(-1-\frac{b\operatorname{Sec}[c]}{a\sqrt{1+\operatorname{Tan}[c]^2}}\right)}\right]\operatorname{Sin}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\operatorname{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\operatorname{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\operatorname{Tan}[c]^2}-a\operatorname{Cos}[d\,x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]\sqrt{1+\operatorname{Tan}[c]^2}}{b\operatorname{Sec}[c]+a\sqrt{1+\operatorname{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg) -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right) -$$

$$\Bigg(8\,a\,b\,C\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},\,-\frac{1}{2},\,-\frac{1}{2},\,\frac{1}{2},\,-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg) -$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{7/2}\right)$$

- **Problem 1044: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 455 leaves, 11 steps):

$$\left(2\,(a^2-b^2)\,\left(8\,A\,b^3+75\,a^3\,B-18\,a\,b^2\,B+a^2\,(39\,A\,b+63\,b\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/$$
$$\left(315\,a^3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$
$$\left(2\,\left(8\,A\,b^4+246\,a^3\,b\,B-18\,a\,b^3\,B+21\,a^4\,(7\,A+9\,C)+3\,a^2\,b^2\,(11\,A+21\,C)\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/$$
$$\left(315\,a^3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,(A\,b+3\,a\,B)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{2\,\left(3\,A\,b^2+72\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}-$$
$$\frac{2\,\left(4\,A\,b^3-75\,a^3\,B-9\,a\,b^2\,B-2\,a^2\,b\,(44\,A+63\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}$$

Result (type 6, 5997 leaves): Display of huge result suppressed!

- **Problem 1045: Result unnecessarily involves imaginary or complex numbers.**

$$\int\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 550 leaves, 15 steps):

$$\frac{1}{192\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\left(472\,a^2\,b\,B+128\,b^3\,B+4\,a\,b^2\,(132\,A+89\,C)+a^3\,(384\,A+133\,C)\right)$$
$$\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{64\,b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$
$$\left(40\,a^3\,b\,B+160\,a\,b^3\,B-5\,a^4\,C+120\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}-$$
$$\frac{\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(108\,A+71\,C)\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{192\,b\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(108\,A+71\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,b\,d}+$$
$$\frac{\left(16\,A\,b^2+24\,a\,b\,B+5\,a^2\,C+12\,b^2\,C\right)\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d}+$$
$$\frac{(8\,b\,B+5\,a\,C)\,\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{C\,\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 925 leaves) :

$$-\left(\left((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}\right.\right.\right.$$

$$2\left(-768\,a^3\,A\,b-192\,a\,A\,b^3-416\,a^2\,b^2\,B-236\,a^3\,b\,C-144\,a\,b^3\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]+\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}$$

$$2\left(-1008\,a^2\,A\,b^2-384\,A\,b^4+24\,a^3\,b\,B-832\,a\,b^3\,B+45\,a^4\,C-436\,a^2\,b^2\,C-288\,b^4\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]+$$

$$\left(2\,i\left(432\,a^2\,A\,b^2+264\,a^3\,b\,B+128\,a\,b^3\,B+15\,a^4\,C+284\,a^2\,b^2\,C\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,i\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left.\left(384\,b\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\right)\right)+$$

$$\left((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{1}{12}\mathrm{Sec}[c+d\,x]^3\left(8\,b^2\,B\,\mathrm{Sin}[c+d\,x]+17\,a\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\frac{1}{48}\mathrm{Sec}[c+d\,x]^2\left(48\,A\,b^2\,\mathrm{Sin}[c+d\,x]+104\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+59\,a^2\,C\,\mathrm{Sin}[c+d\,x]+36\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{1}{96\,b}$$

$$\mathrm{Sec}[c+d\,x]\left(432\,a\,A\,b^2\,\mathrm{Sin}[c+d\,x]+264\,a^2\,b\,B\,\mathrm{Sin}[c+d\,x]+128\,b^3\,B\,\mathrm{Sin}[c+d\,x]+15\,a^3\,C\,\mathrm{Sin}[c+d\,x]+284\,a\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\left.\left.\frac{1}{2}\,b^2\,C\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)\right)\Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\right)$$

- **Problem 1046: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 453 leaves, 14 steps):

$$\frac{1}{24\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}\left(48\,a^3\,B+66\,a\,b^2\,B+8\,b^3\,(3\,A+2\,C)+a^2\,b\,(96\,A+59\,C)\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,+$$
$$\frac{1}{8\,d\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}\left(30\,a^2\,b\,B+8\,b^3\,B+5\,a^3\,C+20\,a\,b^2\,(2\,A+C)\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{\mathrm{Sec}[c+d\,x]}\,-$$
$$\frac{\left(54\,a\,b\,B-a^2\,(48\,A-33\,C)+8\,b^2\,(3\,A+2\,C)\right)\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{24\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{\mathrm{Sec}[c+d\,x]}}\,+$$
$$\frac{\left(24\,A\,b^2+42\,a\,b\,B+15\,a^2\,C+16\,b^2\,C\right)\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,d}\,+$$
$$\frac{(6\,b\,B+5\,a\,C)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{12\,d}+\frac{C\,\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 817 leaves):

$$\Bigg((a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{2\left(288\,a^2 A\,b+96\,a^3 B+24\,a\,b^2 B+52\,a^2 b\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{1}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}\right.$$

$$2\left(48\,a^3 A+216\,a\,A\,b^2+126\,a^2 b\,B+48\,b^3 B-3\,a^3 C+104\,a\,b^2 C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]+$$

$$\Bigg(2\,i\left(48\,a^3 A-24\,a\,A\,b^2-54\,a^2 b\,B-33\,a^3 C-16\,a\,b^2 C\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\;b\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\Bigg)\Bigg/$$

$$\left(48\,d\,(b+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)+$$

$$\Bigg((a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{1}{6}\,\text{Sec}[c+d\,x]^2\left(6\,b^2 B\,\text{Sin}[c+d\,x]+13\,a\,b\,C\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\left.\frac{1}{12}\,\text{Sec}[c+d\,x]\left(24\,A\,b^2\,\text{Sin}[c+d\,x]+54\,a\,b\,B\,\text{Sin}[c+d\,x]+33\,a^2 C\,\text{Sin}[c+d\,x]+16\,b^2 C\,\text{Sin}[c+d\,x]\right)+\frac{2}{3}\,b^2 C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{9/2}\right)$$

Problem 1047: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 427 leaves, 14 steps):

$$\frac{1}{12\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\left(48\,a^2\,b\,B+12\,b^3\,B+8\,a^3\,(A+3\,C)+a\,b^2\,(16\,A+33\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}+$$

$$\frac{b\left(8\,A\,b^2+20\,a\,b\,B+15\,a^2\,C+4\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(24\,a^2\,B-12\,b^2\,B+a\,b\,(56\,A-27\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{12\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{b\,(8\,a\,A-12\,b\,B-21\,a\,C)\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d}-$$

$$\frac{b\,(4\,A-3\,C)\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{6\,d}+\frac{2\,A\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 766 leaves):

$$\Bigg((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\frac{2\left(16\,a^3\,A+144\,a\,A\,b^2+144\,a^2\,b\,B+48\,a^3\,C+12\,a\,b^2\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}$$

$$\Bigg(2\left(56\,a^2\,A\,b+48\,A\,b^3+24\,a^3\,B+108\,a\,b^2\,B+63\,a^2\,b\,C+24\,b^3\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]+$$

$$\Bigg(2\,\mathrm{i}\,\left(56\,a^2\,A\,b+24\,a^3\,B-12\,a\,b^2\,B-27\,a^2\,b\,C\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]$$

$$\Bigg(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\Bigg(2\,b\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\;\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\Bigg)\Bigg)\,\mathrm{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\;\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\;\left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\Bigg)\Bigg)\Bigg/$$

$$\left(24\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\right)+$$

$$\Bigg((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{4}{3}\,a^2\,A\,\mathrm{Sin}[c+d\,x]+\frac{1}{2}\,\mathrm{Sec}[c+d\,x]\,\left(4\,b^2\,B\,\mathrm{Sin}[c+d\,x]+9\,a\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+b^2\,C\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\right)$$

Problem 1048: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 419 leaves, 14 steps):

$$\frac{1}{15\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\left(10\,a^3\,B+20\,a\,b^2\,B-b^3\,(16\,A-15\,C)+4\,a^2\,b\,(4\,A+15\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}+$$

$$\frac{b^2\,(2\,b\,B+5\,a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(70\,a\,b\,B+b^2\,(46\,A-15\,C)+6\,a^2\,(3\,A+5\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{15\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{b\,(16\,A\,b+10\,a\,B-15\,b\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+$$

$$\frac{2\,(A\,b+a\,B)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}$$

Result (type 4, 755 leaves):

$$\Bigg((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\frac{2\,\big(68\,a^2\,A\,b+60\,A\,b^3+20\,a^3\,B+180\,a\,b^2\,B+180\,a^2\,b\,C\big)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\Big]}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}+\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}$$

$$2\,\big(18\,a^3\,A+46\,a\,A\,b^2+70\,a^2\,b\,B+60\,b^3\,B+30\,a^3\,C+135\,a\,b^2\,C\big)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\Big[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\Big]+$$

$$\Bigg(2\,\mathrm{i}\,\big(18\,a^3\,A+46\,a\,A\,b^2+70\,a^2\,b\,B+30\,a^3\,C-15\,a\,b^2\,C\big)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]$$

$$\Bigg(-2\,b\,(a+b)\,\mathrm{EllipticE}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\Big],\frac{-a+b}{a+b}\Big]+a\,\Bigg(2\,b\,\mathrm{EllipticF}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\Big],$$

$$\frac{-a+b}{a+b}\Big]+a\,\mathrm{EllipticPi}\Big[1-\frac{a}{b},\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\Big],\frac{-a+b}{a+b}\Big]\Bigg)\Bigg)\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/$$

$$\Bigg(\sqrt{\frac{1}{a-b}}\;b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\,\big(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\big)\Bigg)\Bigg)\Bigg)\Big/$$

$$\big(30\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\big)+$$

$$\Bigg((a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\frac{4}{15}\,a\,(11\,A\,b+5\,a\,B)\,\mathrm{Sin}[c+d\,x]+\frac{2}{5}\,a^2\,A\,\mathrm{Sin}[2\,(c+d\,x)]+2\,b^2\,C\,\mathrm{Tan}[c+d\,x]\Bigg)\Bigg)\Big/$$

$$\big(d\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\mathrm{Sec}[c+d\,x]^{9/2}\big)$$

- **Problem 1049: Unable to integrate problem.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 441 leaves, 14 steps):

$$-\left(2\left(15\,A\,b^4-56\,a^3\,b\,B+56\,a\,b^3\,B+10\,a^2\,b^2\,(A-7\,C)-5\,a^4\,(5\,A+7\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/$$
$$\left(105\,a\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+\frac{2\,b^3\,C\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\frac{2\left(15\,A\,b^3+63\,a^3\,B+161\,a\,b^2\,B+5\,a^2\,b\,(29\,A+49\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{105\,a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{2\left(15\,A\,b^2+56\,a\,b\,B+5\,a^2\,(5\,A+7\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{105\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{2\,(5\,A\,b+7\,a\,B)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{35\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,A\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}$$

Result (type 8, 47 leaves):

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{7/2}}\,dx$$

- **Problem 1050: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 452 leaves, 11 steps):

$$-\left(2\left(a^2-b^2\right)\left(10\,A\,b^3-75\,a^3\,B-45\,a\,b^2\,B-6\,a^2\,b\,(19\,A+28\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/$$

$$\left(315\,a^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\left(10\,A\,b^4-435\,a^3\,b\,B-45\,a\,b^3\,B-21\,a^4\,(7\,A+9\,C)-3\,a^2\,b^2\,(93\,A+161\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/$$

$$\left(315\,a^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\left(15\,A\,b^2+90\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,d\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{2\left(5\,A\,b^3+75\,a^3\,B+135\,a\,b^2\,B+a^2\,b\,(163\,A+231\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{2\,(5\,A\,b+9\,a\,B)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{63\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,A\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Sec}[c+d\,x]^{7/2}}$$

Result (type 6, 6410 leaves) : Display of huge result suppressed!

- **Problem 1051: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 565 leaves, 12 steps) :

$$\left(2\left(a^2-b^2\right)\left(40\,A\,b^4+1254\,a^3\,b\,B-110\,a\,b^3\,B+75\,a^4\,(9\,A+11\,C)+15\,a^2\,b^2\,(19\,A+33\,C)\right)\right.$$

$$\left.\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(3465\,a^3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\left(40\,A\,b^5+1617\,a^5\,B+3069\,a^3\,b^2\,B-110\,a\,b^4\,B+15\,a^2\,b^3\,(17\,A+33\,C)+15\,a^4\,b\,(247\,A+319\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\right.$$

$$\left.\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/\left(3465\,a^3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\left(5\,A\,b^2+44\,a\,b\,B+3\,a^2\,(9\,A+11\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{231\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$

$$\frac{2\left(15\,A\,b^3+539\,a^3\,B+825\,a\,b^2\,B+5\,a^2\,b\,(229\,A+297\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3465\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{1}{3465\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

$$2\left(20\,A\,b^4-1793\,a^3\,b\,B-55\,a\,b^3\,B-75\,a^4\,(9\,A+11\,C)-5\,a^2\,b^2\,(205\,A+297\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]+$$

$$\frac{2\,(5\,A\,b+11\,a\,B)\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{99\,d\,\text{Sec}[c+d\,x]^{7/2}}+\frac{2\,A\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{11\,d\,\text{Sec}[c+d\,x]^{9/2}}$$

Result (type 6, 7479 leaves) : Display of huge result suppressed!

- **Problem 1052: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 350 leaves, 13 steps) :

$$\frac{(4\,b\,B-a\,C)\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticF\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{Sec[c+d\,x]}}{4\,b\,d\,\sqrt{a+b\,Sec[c+d\,x]}}+$$

$$\frac{\left(8\,A\,b^2-4\,a\,b\,B+3\,a^2\,C+4\,b^2\,C\right)\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticPi\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{Sec[c+d\,x]}}{4\,b^2\,d\,\sqrt{a+b\,Sec[c+d\,x]}}-$$

$$\frac{(4\,b\,B-3\,a\,C)\;EllipticE\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,Sec[c+d\,x]}}{4\,b^2\,d\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\,\sqrt{Sec[c+d\,x]}}+$$

$$\frac{(4\,b\,B-3\,a\,C)\,\sqrt{Sec[c+d\,x]}\,\sqrt{a+b\,Sec[c+d\,x]}\;Sin[c+d\,x]}{4\,b^2\,d}+\frac{C\,Sec[c+d\,x]^{3/2}\,\sqrt{a+b\,Sec[c+d\,x]}\;Sin[c+d\,x]}{2\,b\,d}$$

Result (type 4, 690 leaves) :

$$\left(\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{8\,a\,b\,C\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\frac{2\,\left(16\,A\,b^2-12\,a\,b\,B+9\,a^2\,C+8\,b^2\,C\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,i\,\left(-4\,a\,b\,B+3\,a^2\,C\right)\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(8\,b^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\left((b+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left.\left(\frac{\text{Sec}[c+d\,x]\,(4\,b\,B\,\text{Sin}[c+d\,x]-3\,a\,C\,\text{Sin}[c+d\,x])}{2\,b^2}+\frac{C\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{b}\right)\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)$$

- **Problem 1053: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 260 leaves, 12 steps):

$$\frac{(2A+C)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{(2\,b\,B-a\,C)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{C\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,d}$$

Result (type 4, 623 leaves):

$$\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]}{b\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\left(\sqrt{b+a\,\text{Cos}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{8\,A\,b\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{2\,(4\,b\,B-3\,a\,C)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\left(2\,i\,a\,C\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\,b\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(2\,b\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)$$

Problem 1054: Unable to integrate problem.

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 219 leaves, 11 steps):

$$-\frac{2\,(A\,b-a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,C\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

- **Problem 1055: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 216 leaves, 8 steps):

$$\frac{2\,\left(2\,A\,b^2-3\,a\,b\,B+a^2\,(A+3\,C)\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,(2\,A\,b-3\,a\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 6, 1959 leaves):

$$\left((b+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{4\,(-2\,A\,b+3\,a\,B)\,\text{Cot}[c]}{3\,a^2\,d}+\frac{4\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,a\,d}+\frac{4\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,a\,d}\right)\right)\Big/\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(4\,A\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2},\,\frac{1}{2},\,\frac{3}{2},\,\frac{\text{Csc}[c]\,\left(b-a\,\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\,\sqrt{1+\text{Cot}[c]^2}\,\left(1+\frac{b\,\text{Csc}[c]}{a\,\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\Bigg]\ \sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Csc}[c]$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}-b\,\mathrm{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\ \sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,a\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)-$$

$$\Bigg(4\,C\,\mathrm{AppellF1}\Big[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)},$$

$$\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\Bigg]\ \sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Csc}[c]$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}-b\,\mathrm{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\ \sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\left(a\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)+$$

$$\left(4\,A\,b\,\sqrt{b+a\,Cos[c+d\,x]}\;Csc[c]\;\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(\left(AppellF1\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{Sec[c]\left(b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}\right)}{a\,\sqrt{1+Tan[c]^2}\,\left(1-\frac{b\,Sec[c]}{a\,\sqrt{1+Tan[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{Sec[c]\left(b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}\right)}{a\,\sqrt{1+Tan[c]^2}\,\left(-1-\frac{b\,Sec[c]}{a\,\sqrt{1+Tan[c]^2}}\right)}\right]\;Sin[d\,x+ArcTan[Tan[c]]]\;Tan[c]\right)\Big/$$

$$\left(\sqrt{1+Tan[c]^2}\;\sqrt{\frac{a\,\sqrt{1+Tan[c]^2}-a\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}{b\,Sec[c]+a\,\sqrt{1+Tan[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\,\sqrt{1+Tan[c]^2}+a\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}{-b\,Sec[c]+a\,\sqrt{1+Tan[c]^2}}}\;\sqrt{b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]}{\sqrt{1+Tan[c]^2}}+\frac{2\,a\,Cos[c]\left(b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}\right)}{a^2\,Cos[c]^2+a^2\,Sin[c]^2}}{\sqrt{b+a\,Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}}\right)\right)\Big/$$

$$\left(3\,a\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\;Sec[c+d\,x]^{3/2}\,\sqrt{a+b\,Sec[c+d\,x]}\right)-$$

$$\left(2\,B\,\sqrt{b+a\,Cos[c+d\,x]}\;Csc[c]\;\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)$$

- **Problem 1056: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{5/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 291 leaves, 9 steps):

$$-\left(2\left(8 A b^3-5 a^3 B-10 a b^2 B+a^2 b(7 A+15 C)\right)\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\operatorname{Sec}[c+d x]}\right)\Big/\left(15 a^3 d\sqrt{a+b \operatorname{Sec}[c+d x]}\right)+$$

$$\frac{2\left(8 A b^2-10 a b B+3 a^2(3 A+5 C)\right)\operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \operatorname{Sec}[c+d x]}}{15 a^3 d\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{2 A\sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{5 a d \operatorname{Sec}[c+d x]^{3/2}}-\frac{2(4 A b-5 a B)\sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{15 a^2 d\sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 6, 3039 leaves) :

$$\left((b+a \operatorname{Cos}[c+d x])\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\left(-\frac{4\left(9 a^2 A+8 A b^2-10 a b B+15 a^2 C\right)\operatorname{Cot}[c]}{15 a^3 d}+\right.\right.$$
$$\left.\left.\frac{4(-4 A b+5 a B)\operatorname{Cos}[d x]\operatorname{Sin}[c]}{15 a^2 d}+\frac{2 A \operatorname{Cos}[2 d x]\operatorname{Sin}[2 c]}{5 a d}+\frac{4(-4 A b+5 a B)\operatorname{Cos}[c]\operatorname{Sin}[d x]}{15 a^2 d}+\frac{2 A \operatorname{Cos}[2 c]\operatorname{Sin}[2 d x]}{5 a d}\right)\right)\Big/$$
$$\left((A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\operatorname{Sec}[c+d x]^{3/2}\sqrt{a+b \operatorname{Sec}[c+d x]}\right)-$$

$$\left(8 A b \operatorname{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\operatorname{Csc}[c]\left(b-a\sqrt{1+\operatorname{Cot}[c]^2}\ \operatorname{Sin}[c]\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]\right)}{a\sqrt{1+\operatorname{Cot}[c]^2}\left(1+\frac{b \operatorname{Csc}[c]}{a\sqrt{1+\operatorname{Cot}[c]^2}}\right)},\right.\right.$$
$$\left.\frac{\operatorname{Csc}[c]\left(b-a\sqrt{1+\operatorname{Cot}[c]^2}\ \operatorname{Sin}[c]\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]\right)}{a\sqrt{1+\operatorname{Cot}[c]^2}\left(-1+\frac{b \operatorname{Csc}[c]}{a\sqrt{1+\operatorname{Cot}[c]^2}}\right)}\right]\sqrt{b+a \operatorname{Cos}[c+d x]}\ \operatorname{Csc}[c]$$
$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\operatorname{Cot}[c]^2}-a\sqrt{1+\operatorname{Cot}[c]^2}\ \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}{a\sqrt{1+\operatorname{Cot}[c]^2}-b \operatorname{Csc}[c]}}$$
$$\left.\sqrt{\frac{a\sqrt{1+\operatorname{Cot}[c]^2}+a\sqrt{1+\operatorname{Cot}[c]^2}\ \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}{a\sqrt{1+\operatorname{Cot}[c]^2}+b \operatorname{Csc}[c]}}\sqrt{b-a\sqrt{1+\operatorname{Cot}[c]^2}\ \operatorname{Sin}[c]\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right)\Big/$$
$$\left(15 a^2 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\sqrt{1+\operatorname{Cot}[c]^2}\ \operatorname{Sec}[c+d x]^{3/2}\sqrt{a+b \operatorname{Sec}[c+d x]}\right)-$$

$$\left(4\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,a\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(6\,A\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\ \sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(16\,A\,b^2\sqrt{b+a\,\text{Cos}[c+d\,x]}\ \text{Csc}[c]\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Bigg/$$

$$\left(15\,a^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\Bigg(4\,b\,B\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Bigg[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(3\,a\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\,C\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)$$

Problem 1057: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{7/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 380 leaves, 10 steps):

$$\left(2\left(48\,A\,b^4-49\,a^3\,b\,B-56\,a\,b^3\,B+5\,a^4\,(5\,A+7\,C)+2\,a^2\,b^2\,(16\,A+35\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(105\,a^4\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-\frac{2\left(48\,A\,b^3-63\,a^3\,B-56\,a\,b^2\,B+a^2\,(44\,A\,b+70\,b\,C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{105\,a^4\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{7\,a\,d\,\text{Sec}[c+d\,x]^{5/2}}-\frac{2\,(6\,A\,b-7\,a\,B)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{35\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\left(24\,A\,b^2-28\,a\,b\,B+5\,a^2\,(5\,A+7\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{105\,a^3\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 6, 4470 leaves):

$$\left((b+a\,\text{Cos}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{4\left(-44\,a^2\,A\,b-48\,A\,b^3+63\,a^3\,B+56\,a\,b^2\,B-70\,a^2\,b\,C\right)\text{Cot}[c]}{105\,a^4\,d}+\frac{\left(115\,a^2\,A+96\,A\,b^2-112\,a\,b\,B+140\,a^2\,C\right)\text{Cos}[d\,x]\,\text{Sin}[c]}{105\,a^3\,d}+\frac{2\,(-6\,A\,b+7\,a\,B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{35\,a^2\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,a\,d}+\frac{\left(115\,a^2\,A+96\,A\,b^2-112\,a\,b\,B+140\,a^2\,C\right)\text{Cos}[c]\,\text{Sin}[d\,x]}{105\,a^3\,d}+\frac{2\,(-6\,A\,b+7\,a\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{35\,a^2\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,a\,d}\right)\right)\Big/\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(20\,A\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,a\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\left(16\,A\,b^2\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(35\,a^3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(8\,b\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\right]\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Csc}[c]$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}-b\,\mathrm{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(15\,a^2\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)-$$

$$\left(4\,C\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\mathrm{Csc}[c]\left(b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\right)}{a\sqrt{1+\mathrm{Cot}[c]^2}\left(-1+\frac{b\,\mathrm{Csc}[c]}{a\sqrt{1+\mathrm{Cot}[c]^2}}\right)}\right]\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Csc}[c]$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}-b\,\mathrm{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\mathrm{Cot}[c]^2}+a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}{a\sqrt{1+\mathrm{Cot}[c]^2}+b\,\mathrm{Csc}[c]}}\sqrt{b-a\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,a\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)+$$

$$\left(88\,A\,b\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.\left(\left(\text{AppellF1}\left[-\frac{1}{2},\,-\frac{1}{2},\,-\frac{1}{2},\,\frac{1}{2},\right.\right.\right.$$

$$\left.-\frac{\text{Sec}[c]\,\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\,\sqrt{1+\text{Tan}[c]^2}\,\left(1-\frac{b\,\text{Sec}[c]}{a\,\sqrt{1+\text{Tan}[c]^2}}\right)},\,-\frac{\text{Sec}[c]\,\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\,\sqrt{1+\text{Tan}[c]^2}\,\left(-1-\frac{b\,\text{Sec}[c]}{a\,\sqrt{1+\text{Tan}[c]^2}}\right)}\right]$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\,\sqrt{1+\text{Tan}[c]^2}\,-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\,\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\,\sqrt{1+\text{Tan}[c]^2}\,+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\,\sqrt{1+\text{Tan}[c]^2}}}\,\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\,\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(105\,a\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\left(32\,A\,b^3\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},\,-\frac{1}{2},\,-\frac{1}{2},\,\frac{1}{2},\,-\frac{\text{Sec}[c]\,\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\,\sqrt{1+\text{Tan}[c]^2}\,\left(1-\frac{b\,\text{Sec}[c]}{a\,\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Bigg/$$

$$\left(35\,a^3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\Bigg(6\,B\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\,\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Bigg/$$

$$\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(16\,b^2\,B\sqrt{b+a\,\text{Cos}[c+d\,x]}\;\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(15\,a^2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\Bigg(4\,b\,C\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\,\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(3\,a\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)$$

- **Problem 1058: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(a\,A+(A\,b+a\,B)\,\text{Sec}[c+d\,x]+b\,B\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 253 leaves, 13 steps):

$$\frac{(2\,a\,A+b\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(2\,A\,b+a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{\text{Sec}[c+d\,x]}}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{B\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{B\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 521 leaves):

$$\frac{B\,(b+a\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{1}{4\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{8\,a\,A\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(4\,A\,b+a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}-\left(2\,\mathbb{i}\,a\,B\,\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]+a\,\left(2\,b\,\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\,\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\,\sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\,\frac{-a+b}{a+b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(\sqrt{\frac{1}{a-b}}\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\,\left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

- **Problem 1059: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 393 leaves, 13 steps) :

$$\frac{C\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{(2\,b\,B-3\,a\,C)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(2\,A\,b^2-2\,a\,b\,B+3\,a^2\,C-b^2\,C\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b^2\left(a^2-b^2\right)d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\left(2\,A\,b^2-2\,a\,b\,B+3\,a^2\,C-b^2\,C\right)\sqrt{\text{Sec}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\left(a^2-b^2\right)d}$$

Result (type 4, 774 leaves) :

$$\left((b+a\,\text{Cos}[c+d\,x])^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{2\left(4\,A\,b^3-4\,a\,b^2\,B+4\,a^2\,b\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+\right.\right.$$

$$\frac{2\left(2\,a\,A\,b^2-6\,a^2\,b\,B+4\,b^3\,B+9\,a^3\,C-7\,a\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]}{\sqrt{b+a\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\left(2\,a\,A\,b^2-2\,a^2\,b\,B+3\,a^3\,C-a\,b^2\,C\right)\sqrt{\frac{a-a\,\text{Cos}[c+d\,x]}{a+b}}\ \sqrt{\frac{a+a\,\text{Cos}[c+d\,x]}{a-b}}\ \text{Cos}[2(c+d\,x)]\right.$$

$$\left(-2\,b\,(a+b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\ \sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]+a\left(2\,b\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\ \sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\right.\right.\right.$$

$$\left.\left.\left.\frac{-a+b}{a+b}\right]+a\,\text{EllipticPi}\left[1-\frac{a}{b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\ \sqrt{b+a\,\text{Cos}[c+d\,x]}\right],\frac{-a+b}{a+b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left.\left(\sqrt{\frac{1}{a-b}}\ b\sqrt{1-\text{Cos}[c+d\,x]^2}\ \sqrt{\frac{a^2-a^2\,\text{Cos}[c+d\,x]^2}{a^2}}\ \left(-a^2+2\,b^2-4\,b\,(b+a\,\text{Cos}[c+d\,x])+2\,(b+a\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)\Big/$$

$$\left(2\,b^2\,(-a+b)\,(a+b)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\ (a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\left((b+a\,\text{Cos}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left.\left(-\frac{4\left(a\,A\,b^2\,\text{Sin}[c+d\,x]-a^2\,b\,B\,\text{Sin}[c+d\,x]+a^3\,C\,\text{Sin}[c+d\,x]\right)}{b^2\left(-a^2+b^2\right)(b+a\,\text{Cos}[c+d\,x])}+\frac{2\,C\,\text{Tan}[c+d\,x]}{b^2}\right)\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\ (a+b\,\text{Sec}[c+d\,x])^{3/2}\right)$$

- **Problem 1060: Unable to integrate problem.**

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 311 leaves, 12 steps) :

$$\frac{2A\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2C\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a\,b\,\left(a^2-b^2\right)d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{\sqrt{\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

- **Problem 1061: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 249 leaves, 8 steps):

$$-\frac{2\,(2\,A\,b-a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{2\left(2\,A\,b^2-a\,b\,B-a^2\,(A-C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a^2\left(a^2-b^2\right)d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 6, 3541 leaves):

$$\Bigg((b+a\,\text{Cos}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-\frac{2\left(a^2\,A-3\,A\,b^2+2\,a\,b\,B-2\,a^2\,C+a^2\,A\,\text{Cos}[2\,c]-A\,b^2\,\text{Cos}[2\,c]\right)\text{Csc}[c]\,\text{Sec}[c]}{a^2\left(a^2-b^2\right)d}-\Big(4\,\text{Sec}[c]$$

$$\left(A\,b^3\,\text{Sin}[c]-a\,b^2\,B\,\text{Sin}[c]+a^2\,b\,C\,\text{Sin}[c]-a\,A\,b^2\,\text{Sin}[d\,x]+a^2\,b\,B\,\text{Sin}[d\,x]-a^3\,C\,\text{Sin}[d\,x]\right)\Big)\Big/\left(a^2\left(a^2-b^2\right)d\,(b+a\,\text{Cos}[c+d\,x])\right)\Bigg)\Bigg)\Bigg/$$

$$\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\left(4\,A\,b\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\left(b+a\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\;\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(a\left(a^2-b^2\right)d\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\sqrt{1+\text{Cot}[c]^2}\;\sqrt{\text{Sec}[c+d\,x]}\;\left(a+b\,\text{Sec}[c+d\,x]\right)^{3/2}\right)-$$

$$\left(4\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\left(b+a\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\;\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(\left(a^2-b^2\right) d\, (A+2 C+2 B \,\text{Cos}[c+d x]+A \,\text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2} \sqrt{\text{Sec}[c+d x]} \,(a+b \,\text{Sec}[c+d x])^{3/2}\right)+$$

$$\Bigg(4 b C \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c] \left(b-a \sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[c] \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a \sqrt{1+\text{Cot}[c]^2} \left(1+\frac{b \,\text{Csc}[c]}{a \sqrt{1+\text{Cot}[c]^2}}\right)},\right.$$

$$\left.\frac{\text{Csc}[c] \left(b-a \sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[c] \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a \sqrt{1+\text{Cot}[c]^2} \left(-1+\frac{b \,\text{Csc}[c]}{a \sqrt{1+\text{Cot}[c]^2}}\right)}\right] (b+a \,\text{Cos}[c+d x])^{3/2} \,\text{Csc}[c]$$

$$\left(A+B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{\frac{a \sqrt{1+\text{Cot}[c]^2}-a \sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}{a \sqrt{1+\text{Cot}[c]^2}-b \,\text{Csc}[c]}}$$

$$\sqrt{\frac{a \sqrt{1+\text{Cot}[c]^2}+a \sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}{a \sqrt{1+\text{Cot}[c]^2}+b \,\text{Csc}[c]}} \sqrt{b-a \sqrt{1+\text{Cot}[c]^2} \,\text{Sin}[c] \,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(a \left(a^2-b^2\right) d\, (A+2 C+2 B \,\text{Cos}[c+d x]+A \,\text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2} \sqrt{\text{Sec}[c+d x]} \,(a+b \,\text{Sec}[c+d x])^{3/2}\right)-$$

$$\Bigg(2 a A\, (b+a \,\text{Cos}[c+d x])^{3/2} \,\text{Csc}[c] \left(A+B \,\text{Sec}[c+d x]+C \,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c] \left(b+a \,\text{Cos}[c] \,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}\right)}{a \sqrt{1+\text{Tan}[c]^2} \left(1-\frac{b \,\text{Sec}[c]}{a \sqrt{1+\text{Tan}[c]^2}}\right)},\right.$$

$$\left.-\frac{\text{Sec}[c] \left(b+a \,\text{Cos}[c] \,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}\right)}{a \sqrt{1+\text{Tan}[c]^2} \left(-1-\frac{b \,\text{Sec}[c]}{a \sqrt{1+\text{Tan}[c]^2}}\right)}\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \,\text{Tan}[c]\Bigg)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\ \sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\left(4\,A\,b^2\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(a\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)-$$

$$\Bigg(2\,b\,B\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\;\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\Bigg(2\,a\,C\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)$$

Problem 1062: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2}{\text{Sec}[c + d x]^{3/2}\,(a + b\,\text{Sec}[c + d x])^{3/2}}\,dx$$

Optimal (type 4, 350 leaves, 9 steps):

$$\frac{2\left(8 A b^2 - 6 a b B + a^2 (A + 3 C)\right)\sqrt{\frac{b + a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c + d x), \frac{2 a}{a+b}\right]\sqrt{\text{Sec}[c + d x]}}{3 a^3 d \sqrt{a + b\,\text{Sec}[c + d x]}} + \frac{2\left(8 A b^3 + 3 a^3 B - 6 a b^2 B - a^2 (5 A b - 3 b C)\right)\text{EllipticE}\left[\frac{1}{2}(c + d x), \frac{2 a}{a+b}\right]\sqrt{a + b\,\text{Sec}[c + d x]}}{3 a^3 (a^2 - b^2)\, d \sqrt{\frac{b + a \text{Cos}[c+d x]}{a+b}}\sqrt{\text{Sec}[c + d x]}} + \frac{2\left(A b^2 - a (b B - a C)\right)\text{Sin}[c + d x]}{a (a^2 - b^2)\, d \sqrt{\text{Sec}[c + d x]}\sqrt{a + b\,\text{Sec}[c + d x]}} - \frac{2\left(4 A b^2 - 3 a b B - a^2 (A - 3 C)\right)\sqrt{a + b\,\text{Sec}[c + d x]}\ \text{Sin}[c + d x]}{3 a^2 (a^2 - b^2)\, d \sqrt{\text{Sec}[c + d x]}}$$

Result (type 6, 4557 leaves):

$$\left((b + a\,\text{Cos}[c + d x])^2 \left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\right.$$
$$\left(-1 \big/ \left(3 a^3 (a^2 - b^2)\, d\right) 2 \left(-5 a^2 A b + 11 A b^3 + 3 a^3 B - 9 a b^2 B + 6 a^2 b C - 5 a^2 A b\,\text{Cos}[2 c] + 5 A b^3 \text{Cos}[2 c] + 3 a^3 B\,\text{Cos}[2 c] - 3 a b^2 B\,\text{Cos}[2 c]\right)\right.$$
$$\text{Csc}[c]\,\text{Sec}[c] + \frac{4 A\,\text{Cos}[d x]\,\text{Sin}[c]}{3 a^2 d} + \frac{4 A\,\text{Cos}[c]\,\text{Sin}[d x]}{3 a^2 d} +$$
$$\left(4\,\text{Sec}[c]\left(A b^4 \text{Sin}[c] - a b^3 B\,\text{Sin}[c] + a^2 b^2 C\,\text{Sin}[c] - a A b^3 \text{Sin}[d x] + a^2 b^2 B\,\text{Sin}[d x] - a^3 b C\,\text{Sin}[d x]\right)\right) \big/$$
$$\left.\left.\left(a^3 (a^2 - b^2)\, d\,(b + a\,\text{Cos}[c + d x])\right)\right)\right) \big/$$
$$\left((A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])\sqrt{\text{Sec}[c + d x]}\,(a + b\,\text{Sec}[c + d x])^{3/2}\right) -$$
$$\left(4 A\,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{3}{2}, \frac{\text{Csc}[c]\left(b - a\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1 + \text{Cot}[c]^2}\left(1 + \frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$
$$\left.\frac{\text{Csc}[c]\left(b - a\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1 + \text{Cot}[c]^2}\left(-1 + \frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right]\,(b + a\,\text{Cos}[c + d x])^{3/2}\,\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)-$$

$$\left(8\,A\,b^2\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\left.\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\right](b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,a^2\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\left(4\,b\,B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{3}{2},\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},\right.\right.$$

$$\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\Bigg]\ (b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\ \sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(a\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\ \sqrt{\text{Sec}[c+d\,x]}\ (a+b\,\text{Sec}[c+d\,x])^{3/2}\right)-$$

$$\Bigg(4\,C\,\text{AppellF1}\Big[\frac{1}{2},\ \frac{1}{2},\ \frac{1}{2},\ \frac{3}{2},\ \frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)},$$

$$\frac{\text{Csc}[c]\left(b-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\right)}{a\sqrt{1+\text{Cot}[c]^2}\left(-1+\frac{b\,\text{Csc}[c]}{a\sqrt{1+\text{Cot}[c]^2}}\right)}\Bigg]\ (b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}-b\,\text{Csc}[c]}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Cot}[c]^2}+a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}{a\sqrt{1+\text{Cot}[c]^2}+b\,\text{Csc}[c]}}\ \sqrt{b-a\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\ \sqrt{\text{Sec}[c+d\,x]}\ (a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\Bigg(10\,A\,b\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Csc}[c]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\mathrm{AppellF1}\Bigg[-\frac{1}{2},\,-\frac{1}{2},\,-\frac{1}{2},\,\frac{1}{2},\,-\frac{\mathrm{Sec}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a\sqrt{1+\mathrm{Tan}[c]^2}\left(1-\frac{b\,\mathrm{Sec}[c]}{a\sqrt{1+\mathrm{Tan}[c]^2}}\right)},$$

$$-\frac{\mathrm{Sec}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a\sqrt{1+\mathrm{Tan}[c]^2}\left(-1-\frac{b\,\mathrm{Sec}[c]}{a\sqrt{1+\mathrm{Tan}[c]^2}}\right)}\Bigg]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\mathrm{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\mathrm{Tan}[c]^2}-a\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{b\,\mathrm{Sec}[c]+a\sqrt{1+\mathrm{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\mathrm{Tan}[c]^2}+a\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{-b\,\mathrm{Sec}[c]+a\sqrt{1+\mathrm{Tan}[c]^2}}}\,\sqrt{b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}\Bigg)-$$

$$\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,a\,\mathrm{Cos}[c]\left(b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}\right)}{a^2\,\mathrm{Cos}[c]^2+a^2\,\mathrm{Sin}[c]^2}}{\sqrt{b+a\,\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(3\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{\mathrm{Sec}[c+d\,x]}\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\right)-$$

$$\Bigg(16\,A\,b^3\,(b+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Csc}[c]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},\,-\frac{1}{2},\,-\frac{1}{2},\,\frac{1}{2},\,-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1+\text{Tan}[c]^2}\,\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\,\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(3\,a^2\left(a^2-b^2\right)\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)-$$

$$\Bigg(2\,a\,B\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Big[-\frac{1}{2},\,-\frac{1}{2},\,-\frac{1}{2},\,\frac{1}{2},\,-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Bigg/$$

$$\left(\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)+$$

$$\Bigg(4\,b^2\,B\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{AppellF1}\Bigg[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},$$

$$-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\Bigg]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\left.\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\ \sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(a\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)-$$

$$\left(2\,b\,C\,(b+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Csc}[c]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{AppellF1}\left[-\frac{1}{2},-\frac{1}{2},-\frac{1}{2},\frac{1}{2},-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)},\right.\right.\right.$$

$$\left.\left.-\frac{\text{Sec}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a\sqrt{1+\text{Tan}[c]^2}\left(-1-\frac{b\,\text{Sec}[c]}{a\sqrt{1+\text{Tan}[c]^2}}\right)}\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1+\text{Tan}[c]^2}\ \sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}-a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\right.$$

$$\sqrt{\frac{a\sqrt{1+\text{Tan}[c]^2}+a\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{-b\,\text{Sec}[c]+a\sqrt{1+\text{Tan}[c]^2}}}\;\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\;\Bigg)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,a\,\text{Cos}[c]\left(b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}\right)}{a^2\,\text{Cos}[c]^2+a^2\,\text{Sin}[c]^2}}{\sqrt{b+a\,\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(\left(a^2-b^2\right)d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\right)$$

- **Problem 1063: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Sec}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 461 leaves, 10 steps):

$$-\left(2\left(48\,A\,b^3-5\,a^3\,B-40\,a\,b^2\,B+6\,a^2\,b\,(2\,A+5\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/$$

$$\left(15\,a^4\,d\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\left(48\,A\,b^4+25\,a^3\,b\,B-40\,a\,b^3\,B-6\,a^2\,b^2\,(4\,A-5\,C)-3\,a^4\,(3\,A+5\,C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/$$

$$\left(15\,a^4\left(a^2-b^2\right)d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)d\,\text{Sec}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\left(6\,A\,b^2-5\,a\,b\,B-a^2\,(A-5\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,a^2\left(a^2-b^2\right)d\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{2\left(24\,A\,b^3+5\,a^3\,B-20\,a\,b^2\,B-a^2\,(9\,A\,b-15\,b\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a^3\left(a^2-b^2\right)d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 6, 6134 leaves): Display of huge result suppressed!

- **Problem 1064: Result unnecessarily involves imaginary or complex numbers.**

$$\int\frac{\text{Sec}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 563 leaves, 14 steps) :

$$\frac{\left(2\,A\,b^2-2\,a\,b\,B+5\,a^2\,C-3\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,b^2\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(2\,b\,B-5\,a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}}{b^3\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(8\,A\,b^4+6\,a^3\,b\,B-14\,a\,b^3\,B-15\,a^4\,C+26\,a^2\,b^2\,C-3\,b^4\,C\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,b^3\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}+\frac{2\,\left(3\,A\,b^4+2\,a^3\,b\,B-6\,a\,b^3\,B-5\,a^4\,C+a^2\,b^2\,(A+9\,C)\right)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(8\,A\,b^4+6\,a^3\,b\,B-14\,a\,b^3\,B-15\,a^4\,C+26\,a^2\,b^2\,C-3\,b^4\,C\right)\,\sqrt{\text{Sec}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,b^3\,\left(a^2-b^2\right)^2\,d}$$

Result (type 4, 938 leaves) :

$$-\Bigg(\Bigg(\Bigg((b+a\,\mathrm{Cos}[c+d\,x])^{5/2}\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\Bigg(\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}$$

$$2\left(-4\,a^2\,A\,b^3-12\,A\,b^5-8\,a^3\,b^2\,B+24\,a\,b^4\,B+20\,a^4\,b\,C-36\,a^2\,b^3\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\ \frac{2\,a}{a+b}\right]+\frac{1}{\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}}$$

$$2\left(-8\,a\,A\,b^4-18\,a^4\,b\,B+38\,a^2\,b^3\,B-12\,b^5\,B+45\,a^5\,C-86\,a^3\,b^2\,C+33\,a\,b^4\,C\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \mathrm{EllipticPi}\left[2,\ \frac{1}{2}\,(c+d\,x),\ \frac{2\,a}{a+b}\right]+$$

$$\Bigg(2\,\mathbb{i}\left(-8\,a\,A\,b^4-6\,a^4\,b\,B+14\,a^2\,b^3\,B+15\,a^5\,C-26\,a^3\,b^2\,C+3\,a\,b^4\,C\right)\sqrt{\frac{a-a\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \sqrt{\frac{a+a\,\mathrm{Cos}[c+d\,x]}{a-b}}\ \mathrm{Cos}[2\,(c+d\,x)]$$

$$\Bigg(-2\,b\,(a+b)\,\mathrm{EllipticE}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\ \sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\ \frac{-a+b}{a+b}\right]+a\,\Bigg(2\,b\,\mathrm{EllipticF}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\right.\right.$$

$$\left.\left.\sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\ \frac{-a+b}{a+b}\right]+a\,\mathrm{EllipticPi}\left[1-\frac{a}{b},\ \mathbb{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{1}{a-b}}\ \sqrt{b+a\,\mathrm{Cos}[c+d\,x]}\right],\ \frac{-a+b}{a+b}\right]\Bigg)\Bigg)\,\mathrm{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left(\sqrt{\frac{1}{a-b}}\ b\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\ \sqrt{\frac{a^2-a^2\,\mathrm{Cos}[c+d\,x]^2}{a^2}}\ \left(-a^2+2\,b^2-4\,b\,(b+a\,\mathrm{Cos}[c+d\,x])+2\,(b+a\,\mathrm{Cos}[c+d\,x])^2\right)\right)\Bigg)\Bigg)\Bigg/$$

$$\left(6\,(a-b)^2\,b^3\,(a+b)^2\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\right)\Bigg)+$$

$$\Bigg((b+a\,\mathrm{Cos}[c+d\,x])^3\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-\frac{4\left(a\,A\,b^2\,\mathrm{Sin}[c+d\,x]-a^2\,b\,B\,\mathrm{Sin}[c+d\,x]+a^3\,C\,\mathrm{Sin}[c+d\,x]\right)}{3\,b^2\left(-a^2+b^2\right)(b+a\,\mathrm{Cos}[c+d\,x])^2}-$$

$$\left(4\left(4\,a\,A\,b^4\,\mathrm{Sin}[c+d\,x]+3\,a^4\,b\,B\,\mathrm{Sin}[c+d\,x]-7\,a^2\,b^3\,B\,\mathrm{Sin}[c+d\,x]-6\,a^5\,C\,\mathrm{Sin}[c+d\,x]+10\,a^3\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(3\,b^3\left(-a^2+b^2\right)^2(b+a\,\mathrm{Cos}[c+d\,x])\right)+\frac{2\,C\,\mathrm{Tan}[c+d\,x]}{b^3}\Bigg)\Bigg)\Bigg/$$

$$\left(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\right)$$

Problem 1065: Unable to integrate problem.

$$\int \frac{\operatorname{Sec}[c+d x]^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 447 leaves, 13 steps):

$$-\frac{2 \left(A b^2-a (b B-a C)\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{3 a b \left(a^2-b^2\right) d \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{2 C \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{\operatorname{Sec}[c+d x]}}{b^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{2 \left(A b^4-4 a b^3 B-3 a^4 C+a^2 b^2 (3 A+7 C)\right) \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}}{3 a b^2 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \sqrt{\operatorname{Sec}[c+d x]}}-\frac{2 \left(A b^2-a (b B-a C)\right) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \operatorname{Sec}[c+d x])^{3/2}}+\frac{2 \left(A b^4-4 a b^3 B-3 a^4 C+a^2 b^2 (3 A+7 C)\right) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Sec}[c+d x]}}$$

Result (type 8, 47 leaves):

$$\int \frac{\operatorname{Sec}[c+d x]^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Problem 1066: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{(a+b \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 378 leaves, 9 steps):

$$-\frac{2\left(2 A b^2+a b B-a^2 (3 A+C)\right)\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\sec[c+d x]}}{3 a^2\left(a^2-b^2\right) d\sqrt{a+b \sec[c+d x]}}-$$

$$\frac{2\left(2 A b^3+3 a^3 B+a b^2 B-2 a^2 b (3 A+2 C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \sec[c+d x]}}{3 a^2\left(a^2-b^2\right)^2 d\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\sqrt{\sec[c+d x]}}-$$

$$\frac{2\left(A b^2-a (b B-a C)\right)\sqrt{\sec[c+d x]}\ \sin[c+d x]}{3 b\left(a^2-b^2\right) d (a+b \sec[c+d x])^{3/2}}+\frac{2\left(A b^4+2 a^3 b B+2 a b^3 B+a^4 C-5 a^2 b^2 (A+C)\right)\sqrt{\sec[c+d x]}\ \sin[c+d x]}{3 a b\left(a^2-b^2\right)^2 d\sqrt{a+b \sec[c+d x]}}$$

Result (type 6, 5040 leaves) : Display of huge result suppressed !

- **Problem 1067: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B \sec[c+d x]+C \sec[c+d x]^2}{\sqrt{\sec[c+d x]}\ (a+b \sec[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 401 leaves, 9 steps) :

$$\frac{2\left(8 A b^3+3 a^3 B-2 a b^2 B-a^2 b (9 A+C)\right)\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\sec[c+d x]}}{3 a^3\left(a^2-b^2\right) d\sqrt{a+b \sec[c+d x]}}+$$

$$\left(2\left(8 A b^4+6 a^3 b B-2 a b^3 B+3 a^4 (A-C)-a^2 b^2 (15 A+C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \sec[c+d x]}\right)\Big/$$

$$\left(3 a^3\left(a^2-b^2\right)^2 d\sqrt{\frac{b+a \cos[c+d x]}{a+b}}\sqrt{\sec[c+d x]}\right)+\frac{2\left(A b^2-a (b B-a C)\right)\sqrt{\sec[c+d x]}\ \sin[c+d x]}{3 a\left(a^2-b^2\right) d (a+b \sec[c+d x])^{3/2}}-$$

$$\frac{2\left(4 A b^4+5 a^3 b B-a b^3 B-2 a^4 C-2 a^2 b^2 (4 A+C)\right)\sqrt{\sec[c+d x]}\ \sin[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d\sqrt{a+b \sec[c+d x]}}$$

Result (type 6, 6142 leaves) : Display of huge result suppressed !

- **Problem 1068: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B \sec[c+d x]+C \sec[c+d x]^2}{\sec[c+d x]^{3/2}\ (a+b \sec[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 521 leaves, 10 steps) :

$$-\left(2\left(16 A b^4+9 a^3 b B-8 a b^3 B-2 a^2 b^2 (8 A-C)-a^4 (A+3 C)\right)\sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{\operatorname{Sec}[c+d x]}\right)\Big/$$
$$\left(3 a^4\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Sec}[c+d x]}\right)-$$
$$\left(2\left(16 A b^5-3 a^5 B+15 a^3 b^2 B-8 a b^4 B-2 a^2 b^3 (14 A-C)+a^4 (8 A b-6 b C)\right) \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \operatorname{Sec}[c+d x]}\right)\Big/$$
$$\left(3 a^4\left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}\sqrt{\operatorname{Sec}[c+d x]}\right)+$$
$$\frac{2\left(A b^2-a (b B-a C)\right) \operatorname{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d \sqrt{\operatorname{Sec}[c+d x]}\,(a+b \operatorname{Sec}[c+d x])^{3/2}}+\frac{2\left(10 a^2 A b^2-6 A b^4-7 a^3 b B+3 a b^3 B+4 a^4 C\right) \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d \sqrt{\operatorname{Sec}[c+d x]}\sqrt{a+b \operatorname{Sec}[c+d x]}}+$$
$$\frac{2\left(8 A b^4+8 a^3 b B-4 a b^3 B+a^4 (A-5 C)-a^2 b^2 (13 A-C)\right)\sqrt{a+b \operatorname{Sec}[c+d x]}\ \operatorname{Sin}[c+d x]}{3 a^3\left(a^2-b^2\right)^2 d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 6, 7608 leaves) : Display of huge result suppressed!

- **Problem 1069: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2}{\operatorname{Sec}[c+d x]^{5/2}\,(a+b \operatorname{Sec}[c+d x])^{5/2}}\, dx$$

Optimal (type 4, 663 leaves, 11 steps) :

$$\left(2\left(128\,A\,b^5+5\,a^5\,B+80\,a^3\,b^2\,B-80\,a\,b^4\,B-4\,a^2\,b^3\,(29\,A-10\,C)-a^4\,b\,(17\,A+45\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(15\,a^5\,(a^2-b^2)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\left(128\,A\,b^6-40\,a^5\,b\,B+140\,a^3\,b^3\,B-80\,a\,b^5\,B+5\,a^4\,b^2\,(11\,A-15\,C)-4\,a^2\,b^4\,(53\,A-10\,C)+3\,a^6\,(3\,A+5\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/\left(15\,a^5\,(a^2-b^2)^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sin}[c+d\,x]}{3\,a\,(a^2-b^2)\,d\,\text{Sec}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}}-\frac{2\left(8\,A\,b^4+9\,a^3\,b\,B-5\,a\,b^3\,B-2\,a^2\,b^2\,(6\,A-C)-6\,a^4\,C\right)\text{Sin}[c+d\,x]}{3\,a^2\,(a^2-b^2)^2\,d\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\left(48\,A\,b^4+50\,a^3\,b\,B-30\,a\,b^3\,B+a^4\,(3\,A-35\,C)-a^2\,b^2\,(71\,A-15\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a^3\,(a^2-b^2)^2\,d\,\text{Sec}[c+d\,x]^{3/2}}-$$

$$\left(2\left(64\,A\,b^5-5\,a^5\,B+65\,a^3\,b^2\,B-40\,a\,b^4\,B+2\,a^4\,b\,(7\,A-20\,C)-2\,a^2\,b^3\,(49\,A-10\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/\left(15\,a^4\,(a^2-b^2)^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)$$

Result (type 6, 9192 leaves) : Display of huge result suppressed!

■ Problem 1070: Attempted integration timed out after 120 seconds.

$$\int(a+b\,\text{Sec}[c+d\,x])^{2/3}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 9, 247 leaves, 8 steps) :

$$\left(\sqrt{2}\,(a+b)\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{5}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)+$$

$$\left(\sqrt{2}\,(b\,B-a\,C)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}\,(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/\left(b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}\right)+A\,\text{Unintegrable}\left[(a+b\,\text{Sec}[c+d\,x])^{2/3},x\right]$$

Result (type 1, 1 leaves) :

???

- **Problem 1072: Attempted integration timed out after 120 seconds.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Sec}[c+d\,x])^{1/3}}\,dx$$

Optimal (type 9, 244 leaves, 8 steps):

$$\frac{\sqrt{2}\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-\frac{2}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right](a+b\,\text{Sec}[c+d\,x])^{2/3}\,\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{2/3}}+$$

$$\frac{\sqrt{2}\,(b\,B-a\,C)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},\frac{1}{3},\frac{3}{2},\frac{1}{2}(1-\text{Sec}[c+d\,x]),\frac{b\,(1-\text{Sec}[c+d\,x])}{a+b}\right]\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{1/3}\text{Tan}[c+d\,x]}{b\,d\,\sqrt{1+\text{Sec}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{1/3}}+$$

$$A\,\text{Unintegrable}\left[\frac{1}{(a+b\,\text{Sec}[c+d\,x])^{1/3}},x\right]$$

Result (type 1, 1 leaves):

???

- **Problem 1078: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 48 leaves, 3 steps):

$$\frac{2\,(A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 124 leaves):

$$-\Bigg(4\,\sqrt{\text{Cos}[c+d\,x]}\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\text{Sin}[c]$$
$$\Bigg((A+3\,C)\,\sqrt{\text{Cos}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2}\,\sqrt{\text{Csc}[c]^2}\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]-A\,\text{Csc}[c]\,\text{Sin}[c+d\,x]\Bigg)\Bigg)\Big/\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\right)$$

- **Problem 1079: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{\text{Cos}[c+d\,x]}\left(A+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 44 leaves, 3 steps):

$$\frac{2\,(A-C)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{2\,C\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 289 leaves) :

$$\int \text{Cos}[c+d x]^2 \left(A+C\,\text{Sec}[c+d x]^2\right)$$

$$\left(-\frac{4\,((A-2C)\,\text{Cos}[d x]+A\,\text{Cos}[2c+d x])\,\text{Csc}[c]}{d\sqrt{\text{Cos}[c+d x]}}+\left(2\,(A-C)\,\text{Csc}\left[\frac{c}{2}\right]\left(3\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]+\right.\right.\right.$$
$$\left.e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right)\text{Sec}\left[\frac{c}{2}\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/\left(3 d\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(2\,(A+2C+A\,\text{Cos}[2\,(c+d x)])\right)$$

- **Problem 1083: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{9/2}\,(a+a\,\text{Sec}[c+d x])\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 4, 165 leaves, 8 steps) :

$$\frac{2 a\,(7A+9C)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{15 d}+\frac{2 a\,(5A+7C)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21 d}+\frac{2 a\,(5A+7C)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{21 d}+$$
$$\frac{2 a\,(7A+9C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{45 d}+\frac{2 a A\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{7 d}+\frac{2 a A\,\text{Cos}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{9 d}$$

Result (type 5, 918 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\right.$$
$$\left(-\frac{(7A+9C)\,\text{Cot}[c]}{15 d}+\frac{(23A+28C)\,\text{Cos}[d x]\,\text{Sin}[c]}{84 d}+\frac{(19A+18C)\,\text{Cos}[2 d x]\,\text{Sin}[2c]}{180 d}+\frac{A\,\text{Cos}[3 d x]\,\text{Sin}[3c]}{28 d}+\frac{A\,\text{Cos}[4 d x]\,\text{Sin}[4c]}{72 d}+\right.$$
$$\left.\frac{(23A+28C)\,\text{Cos}[c]\,\text{Sin}[d x]}{84 d}+\frac{(19A+18C)\,\text{Cos}[2c]\,\text{Sin}[2 d x]}{180 d}+\frac{A\,\text{Cos}[3c]\,\text{Sin}[3 d x]}{28 d}+\frac{A\,\text{Cos}[4c]\,\text{Sin}[4 d x]}{72 d}\right)-\frac{1}{21 d\sqrt{1+\text{Cot}[c]^2}}$$
$$5A\,(1+\text{Cos}[c+d x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-\frac{1}{30\,d}7\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1084: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 134 leaves, 7 steps):

$$\frac{2\,a\,(3\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{2\,a\,(5\,A+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{2\,a\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 872 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{(3\,A+5\,C)\,\text{Cot}[c]}{5\,d}+\frac{(23\,A+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{84\,d}+\frac{A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\right.\right.$$
$$\left.\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{28\,d}+\frac{(23\,A+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{84\,d}+\frac{A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{28\,d}\right)-\frac{1}{21\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$5\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/ \left(\sqrt{1 - \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{1 + \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}} \sqrt{1 + \text{Tan}[c]^2}\right) - \frac{\frac{\text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1 + \text{Tan}[c]^2}} + \frac{2 \text{Cos}[c]^2 \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}{\text{Cos}[c]^2 + \text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}}\Bigg)\Bigg)$$

- **Problem 1085: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d x]^{5/2} (a + a \text{Sec}[c + d x]) \left(A + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 4, 101 leaves, 6 steps):

$$\frac{2 a (3 A + 5 C) \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{5 d} + \frac{2 a (A + 3 C) \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 d} + \frac{2 a A \sqrt{\text{Cos}[c + d x]} \text{Sin}[c + d x]}{3 d} + \frac{2 a A \text{Cos}[c + d x]^{3/2} \text{Sin}[c + d x]}{5 d}$$

Result (type 5, 824 leaves):

$$a \Bigg(\sqrt{\text{Cos}[c + d x]} (1 + \text{Cos}[c + d x]) \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \left(-\frac{(3 A + 5 C) \text{Cot}[c]}{5 d} + \frac{A \text{Cos}[d x] \text{Sin}[c]}{3 d} + \frac{A \text{Cos}[2 d x] \text{Sin}[2 c]}{10 d} + \frac{A \text{Cos}[c] \text{Sin}[d x]}{3 d} + \frac{A \text{Cos}[2 c] \text{Sin}[2 d x]}{10 d}\right) - \frac{1}{3 d \sqrt{1 + \text{Cot}[c]^2}} A (1 + \text{Cos}[c + d x]) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} - \frac{1}{d \sqrt{1 + \text{Cot}[c]^2}} C (1 + \text{Cos}[c + d x]) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^2$$

$$\text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} - \frac{1}{10 d} 3 A (1 + \text{Cos}[c + d x]) \text{Csc}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/\right.$$

$$\left(\sqrt{1 - \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{1 + \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}} \sqrt{1 + \text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1 + \text{Tan}[c]^2}} + \frac{2 \text{Cos}[c]^2 \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}{\text{Cos}[c]^2 + \text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}}\right) - \frac{1}{2 d} C (1 + \text{Cos}[c + d x]) \text{Csc}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/\right.$$

$$\left(\sqrt{1 - \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{1 + \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}} \sqrt{1 + \text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1 + \text{Tan}[c]^2}} + \frac{2 \text{Cos}[c]^2 \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}{\text{Cos}[c]^2 + \text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1086: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d x]^{3/2} (a + a \text{Sec}[c + d x]) \left(A + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 4, 95 leaves, 6 steps):

$$\frac{2 a (A - C) \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{d} + \frac{2 a (A + 3 C) \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 d} + \frac{2 a C \text{Sin}[c + d x]}{d \sqrt{\text{Cos}[c + d x]}} + \frac{2 a A \sqrt{\text{Cos}[c + d x]} \text{Sin}[c + d x]}{3 d}$$

Result (type 5, 813 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(A-2\,C+A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{2\,d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1087: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Sec}[c+d\,x])\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 95 leaves, 6 steps):

$$\frac{2\,a\,(A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{d}+\frac{2\,a\,(3\,A+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 817 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\ (1+\text{Cos}[c+d\,x])\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(A-2\,C+A\,\text{Cos}[2\,c])\ \text{Csc}[c]\ \text{Sec}[c]}{2\,d}+\frac{C\,\text{Sec}[c]\ \text{Sec}[c+d\,x]^2\ \text{Sin}[d\,x]}{3\,d}+\frac{\text{Sec}[c]\ \text{Sec}[c+d\,x]\ (C\,\text{Sin}[c]+3\,C\,\text{Sin}[d\,x])}{3\,d}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Bigg)$$

- **Problem 1088: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 132 leaves, 7 steps):

$$-\frac{2\,a\,(5\,A+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(3\,A+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+3\,C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 851 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\;(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{(5\,A+3\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\right.\right.$$

$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,C\,\text{Sin}[c]+5\,C\,\text{Sin}[d\,x])}{15\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,C\,\text{Sin}[c]+15\,A\,\text{Sin}[d\,x]+9\,C\,\text{Sin}[d\,x])}{15\,d}\right)-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\;\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;+\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1089: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 165 leaves, 8 steps) :

$$-\frac{2\,a\ (5\,A+3\,C)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),\ 2\right]}{5\,d}+\frac{2\,a\ (7\,A+5\,C)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),\ 2\right]}{21\,d}+$$
$$\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\ (7\,A+5\,C)\ \text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\ (5\,A+3\,C)\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 895 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\ (1+\text{Cos}[c+d\,x])\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{(5\,A+3\,C)\ \text{Csc}[c]\ \text{Sec}[c]}{5\,d}+\frac{C\,\text{Sec}[c]\ \text{Sec}[c+d\,x]^4\ \text{Sin}[d\,x]}{7\,d}+\right.\right.$$
$$\frac{\text{Sec}[c]\ \text{Sec}[c+d\,x]^3\ (5\,C\,\text{Sin}[c]+7\,C\,\text{Sin}[d\,x])}{35\,d}+\frac{\text{Sec}[c]\ \text{Sec}[c+d\,x]^2\ (21\,C\,\text{Sin}[c]+35\,A\,\text{Sin}[d\,x]+25\,C\,\text{Sin}[d\,x])}{105\,d}+$$
$$\left.\frac{\text{Sec}[c]\ \text{Sec}[c+d\,x]\ (35\,A\,\text{Sin}[c]+25\,C\,\text{Sin}[c]+105\,A\,\text{Sin}[d\,x]+63\,C\,\text{Sin}[d\,x])}{105\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$A\ (1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{21\,d\,\sqrt{1+\text{Cot}[c]^2}}5\,C\ (1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1090: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{11/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 230 leaves, 10 steps):

$$\frac{4 a^2 (7 A+9 C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{15 d}+\frac{8 a^2 (25 A+33 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{231 d}+$$
$$\frac{8 a^2 (25 A+33 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{231 d}+\frac{4 a^2 (7 A+9 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{45 d}+\frac{2 a^2 (89 A+99 C) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{693 d}+$$
$$\frac{2 A \text{Cos}[c+d x]^{5/2} (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{11 d}+\frac{8 A \text{Cos}[c+d x]^{5/2} \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{99 d}$$

Result (type 5, 976 leaves) :

$$a^2 \left(\sqrt{\text{Cos}[c+d x]} (1+\text{Cos}[c+d x])^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(-\frac{(7 A+9 C) \text{Cot}[c]}{15 d}+\frac{(941 A+1122 C) \text{Cos}[d x] \text{Sin}[c]}{3696 d}+\frac{(19 A+18 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{180 d}+\right.\right.$$
$$\frac{(101 A+44 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{2464 d}+\frac{A \text{Cos}[4 d x] \text{Sin}[4 c]}{72 d}+\frac{A \text{Cos}[5 d x] \text{Sin}[5 c]}{352 d}+\frac{(941 A+1122 C) \text{Cos}[c] \text{Sin}[d x]}{3696 d}+$$
$$\left.\frac{(19 A+18 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{180 d}+\frac{(101 A+44 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{2464 d}+\frac{A \text{Cos}[4 c] \text{Sin}[4 d x]}{72 d}+\frac{A \text{Cos}[5 c] \text{Sin}[5 d x]}{352 d}\right)-$$
$$\frac{1}{231 d \sqrt{1+\text{Cot}[c]^2}} 50 A (1+\text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{7 d \sqrt{1+\text{Cot}[c]^2}}$$
$$2 C (1+\text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{30 d} 7 A (1+\text{Cos}[c+d x])^2 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1091: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 197 leaves, 9 steps):

$$\frac{16\,a^2\,(2\,A+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^2\,(5\,A+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$
$$\frac{4\,a^2\,(5\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a^2\,(19\,A+21\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,A\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{9\,d}+\frac{8\,A\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{63\,d}$$

Result (type 5, 1118 leaves):

$$\frac{1}{A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]}\text{Cos}[c+d\,x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{8\,(2\,A+3\,C)\,\text{Cot}[c]}{15\,d}+\frac{(23\,A+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{42\,d}+\frac{(37\,A+18\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{180\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{14\,d}+\frac{A\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{72\,d}+\right.$$

$$\frac{(23\,A+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{42\,d}+\frac{(37\,A+18\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{180\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{14\,d}+\frac{A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{72\,d}\Bigg)-$$

$$\frac{1}{21\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,10\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\big(A+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,2\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\big(A+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\Bigg(8\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\big(A+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\Big)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(15\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(4\,C\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\,(5\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1092: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]^{7/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 164 leaves, 8 steps):

$$\frac{4\,a^2\,(3\,A+5\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{8\,a^2\,(3\,A+7\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{2\,a^2\,(33\,A+35\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{105\,d}+$$

$$\frac{2\,A\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{7\,d}+\frac{8\,A\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 1070 leaves):

$$\frac{1}{A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x]}$$

$$\mathrm{Cos}[c+d\,x]^{9/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(-\frac{2\,(3\,A+5\,C)\,\mathrm{Cot}[c]}{5\,d}+\frac{(51\,A+28\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{84\,d}+\right.$$

$$\left.\frac{A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}+\frac{A\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{28\,d}+\frac{(51\,A+28\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{84\,d}+\frac{A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}+\frac{A\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{28\,d}\right)-$$

$$\frac{1}{7\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}\,4\,A\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\text{Sec}[c+d\,x])^2 \left(A+C\,\text{Sec}[c+d\,x]^2\right) \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,4\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\text{Sec}[c+d\,x])^2 \left(A+C\,\text{Sec}[c+d\,x]^2\right) \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\left(3\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\text{Sec}[c+d\,x])^2 \left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\;(5\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))\;-$$

$$\left(C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\text{Sec}[c+d\,x])^2 \left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1093: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 158 leaves, 8 steps):

$$\frac{16\,a^2\,A\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^2\,(A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a^2\,(7\,A-15\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,(A-5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 799 leaves):

$$\frac{1}{A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]}\text{Cos}[c+d\,x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{(8\,A-5\,C+8\,A\,\text{Cos}[2\,c]+5\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{10\,d}+\frac{2\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{2\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+\frac{A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}\right)-\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}2\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{d\,(A+2C+A\,\mathrm{Cos}[2c+2dx])\,\sqrt{1+\mathrm{Cot}[c]^2}}\,2\,C\,\mathrm{Cos}[c+dx]^4\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+dx])^2\,\left(A+C\,\mathrm{Sec}[c+dx]^2\right)\,\mathrm{Sec}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,-$$
$$\Bigg(4\,A\,\mathrm{Cos}[c+dx]^4\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+dx])^2\,\left(A+C\,\mathrm{Sec}[c+dx]^2\right)$$
$$\Bigg(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/$$
$$\left(\sqrt{1-\mathrm{Cos}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$
$$\frac{\frac{\mathrm{Sin}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[dx+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(5\,d\,(A+2C+A\,\mathrm{Cos}[2c+2dx]))$$

- **Problem 1094: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+dx]^{3/2}\,(a+a\,\mathrm{Sec}[c+dx])^2\,\left(A+C\,\mathrm{Sec}[c+dx]^2\right)\,dx$$

Optimal (type 4, 154 leaves, 8 steps):

$$\frac{4\,a^2\,(A-C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+dx),2\right]}{d}+\frac{8\,a^2\,(A+C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+dx),2\right]}{3\,d}+$$
$$\frac{2\,a^2\,(A-5C)\,\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{3\,d}+\frac{2\,C\,(a+a\,\mathrm{Cos}[c+dx])^2\,\mathrm{Sin}[c+dx]}{3\,d\,\mathrm{Cos}[c+dx]^{3/2}}+\frac{8\,C\,\left(a^2+a^2\,\mathrm{Cos}[c+dx]\right)\,\mathrm{Sin}[c+dx]}{3\,d\,\sqrt{\mathrm{Cos}[c+dx]}}$$

Result (type 5, 1040 leaves):

$$\frac{1}{A+2C+A\,\mathrm{Cos}[2c+2dx]}$$

$$\text{Cos}[c+d\,x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{(A-2\,C+A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\right.$$

$$\left.\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(C\,\text{Sin}[c]+6\,C\,\text{Sin}[d\,x])}{3\,d}\right)-$$

$$\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,4\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,4\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\left(A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(C \operatorname{Cos}[c+d x]^4 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(A+C \operatorname{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1+\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}} \sqrt{1+\operatorname{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]}{\sqrt{1+\operatorname{Tan}[c]^2}}+\frac{2 \operatorname{Cos}[c]^2 \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}{\operatorname{Cos}[c]^2+\operatorname{Sin}[c]^2}}{\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}}\right)\right) \Big/ (d (A+2 C+A \operatorname{Cos}[2 c+2 d x]))$$

- **Problem 1095: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{\operatorname{Cos}[c+d x]} (a+a \operatorname{Sec}[c+d x])^2 \left(A+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 156 leaves, 8 steps):

$$-\frac{16 a^2 C \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), 2\right]}{5 d}+\frac{4 a^2 (3 A+C) \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), 2\right]}{3 d}+$$
$$\frac{2 a^2 (15 A+17 C) \operatorname{Sin}[c+d x]}{15 d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{2 C (a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sin}[c+d x]}{5 d \operatorname{Cos}[c+d x]^{5/2}}+\frac{8 C \left(a^2+a^2 \operatorname{Cos}[c+d x]\right) \operatorname{Sin}[c+d x]}{15 d \operatorname{Cos}[c+d x]^{3/2}}$$

Result (type 5, 800 leaves):

$$\frac{1}{A+2 C+A \operatorname{Cos}[2 c+2 d x]} \operatorname{Cos}[c+d x]^{9/2} \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2$$
$$\left(A+C \operatorname{Sec}[c+d x]^2\right)\left(-\frac{(-5 A-16 C+5 A \operatorname{Cos}[2 c]) \operatorname{Csc}[c] \operatorname{Sec}[c]}{10 d}+\frac{C \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^3 \operatorname{Sin}[d x]}{5 d}+\right.$$
$$\left.\frac{\operatorname{Sec}[c] \operatorname{Sec}[c+d x]^2 (3 C \operatorname{Sin}[c]+10 C \operatorname{Sin}[d x])}{15 d}+\frac{\operatorname{Sec}[c] \operatorname{Sec}[c+d x] (10 C \operatorname{Sin}[c]+15 A \operatorname{Sin}[d x]+24 C \operatorname{Sin}[d x])}{15 d}\right)-$$
$$\frac{1}{d (A+2 C+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2}} 2 A \operatorname{Cos}[c+d x]^4 \operatorname{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\},\left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+C\,\text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{3 d (A+2 C+A\,\text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 2 C\,\text{Cos}[c+d x]^4 \text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+C\,\text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,+$$

$$\left(4 C\,\text{Cos}[c+d x]^4 \text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/ (5 d (A+2 C+A\,\text{Cos}[2 c+2 d x]))$$

- **Problem 1096: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^2 \left(A+C\,\text{Sec}[c+d x]^2\right)}{\sqrt{\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 197 leaves, 9 steps) :

$$-\frac{4 a^2 (5 A+3 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{5 d}+\frac{8 a^2 (7 A+3 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{21 d}+\frac{2 a^2 (35 A+33 C) \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2}}+\frac{4 a^2 (5 A+3 C) \text{Sin}[c+d x]}{5 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 C (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2}}+\frac{8 C \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{35 d \text{Cos}[c+d x]^{5/2}}$$

Result (type 5, 1092 leaves) :

$$\frac{1}{A+2 C+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{9/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{2 (5 A+3 C) \text{Csc}[c] \text{Sec}[c]}{5 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^4 \text{Sin}[d x]}{7 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (5 C \text{Sin}[c]+14 C \text{Sin}[d x])}{35 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (42 C \text{Sin}[c]+35 A \text{Sin}[d x]+60 C \text{Sin}[d x])}{105 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (35 A \text{Sin}[c]+60 C \text{Sin}[c]+210 A \text{Sin}[d x]+126 C \text{Sin}[d x])}{105 d}\right)-$$

$$\frac{1}{3 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 4 A \text{Cos}[c+d x]^4 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{7 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 4 C \text{Cos}[c+d x]^4 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\left(A \text{Cos}[c+d x]^4 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/\,(d\,(A+2 C+A\,\text{Cos}[2 c+2 d x]))+$$

$$\left(3\,C\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4(a+a\,\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/\,(5\,d\,(A+2 C+A\,\text{Cos}[2 c+2 d x]))$$

- **Problem 1097: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\text{Sec}[c+d x])^2\left(A+C\,\text{Sec}[c+d x]^2\right)}{\text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 230 leaves, 10 steps) :

$$-\frac{16 a^2 (3 A+2 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{15 d}+\frac{4 a^2 (7 A+5 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{21 d}+\frac{2 a^2 (21 A+19 C) \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{5/2}}+$$

$$\frac{4 a^2 (7 A+5 C) \text{Sin}[c+d x]}{21 d \text{Cos}[c+d x]^{3/2}}+\frac{16 a^2 (3 A+2 C) \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 C (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{9 d \text{Cos}[c+d x]^{9/2}}+\frac{8 C \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{63 d \text{Cos}[c+d x]^{7/2}}$$

Result (type 5, 1137 leaves):

$$\frac{1}{A+2 C+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{9/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{8 (3 A+2 C) \text{Csc}[c] \text{Sec}[c]}{15 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^5 \text{Sin}[d x]}{9 d}+\right.$$

$$\frac{\text{Sec}[c] \text{Sec}[c+d x]^4 (7 C \text{Sin}[c]+18 C \text{Sin}[d x])}{63 d}+\frac{2 \text{Sec}[c] \text{Sec}[c+d x] (35 A \text{Sin}[c]+25 C \text{Sin}[c]+84 A \text{Sin}[d x]+56 C \text{Sin}[d x])}{105 d}+$$

$$\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (90 C \text{Sin}[c]+63 A \text{Sin}[d x]+112 C \text{Sin}[d x])}{315 d}+$$

$$\left.\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (63 A \text{Sin}[c]+112 C \text{Sin}[c]+210 A \text{Sin}[d x]+150 C \text{Sin}[d x])}{315 d}\right)-$$

$$\frac{1}{3 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 2 A \text{Cos}[c+d x]^4 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{21 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 10 C \text{Cos}[c+d x]^4 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\left(4 A \text{Cos}[c+d x]^4 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(5\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(8\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(15\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1098: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{13/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 279 leaves, 11 steps) :

$$\frac{4 a^3 (175 A + 221 C) \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{195 d} + \frac{4 a^3 (95 A + 121 C) \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{231 d} + \frac{4 a^3 (95 A + 121 C) \sqrt{\text{Cos}[c + d x]} \text{Sin}[c + d x]}{231 d} + \frac{4 a^3 (175 A + 221 C) \text{Cos}[c + d x]^{3/2} \text{Sin}[c + d x]}{585 d} + \frac{40 a^3 (118 A + 143 C) \text{Cos}[c + d x]^{5/2} \text{Sin}[c + d x]}{9009 d} + \frac{2 A \text{Cos}[c + d x]^{5/2} (a + a \text{Cos}[c + d x])^3 \text{Sin}[c + d x]}{13 d} + \frac{12 A \text{Cos}[c + d x]^{5/2} \left(a^2 + a^2 \text{Cos}[c + d x]\right)^2 \text{Sin}[c + d x]}{143 a d} + \frac{2 (145 A + 143 C) \text{Cos}[c + d x]^{5/2} \left(a^3 + a^3 \text{Cos}[c + d x]\right) \text{Sin}[c + d x]}{1287 d}$$

Result (type 5, 1022 leaves) :

$$a^3 \Bigg(\sqrt{\text{Cos}[c + d x]} (1 + \text{Cos}[c + d x])^3 \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6$$

$$\left(-\frac{(175 A + 221 C) \text{Cot}[c]}{390 d} + \frac{(1811 A + 2134 C) \text{Cos}[d x] \text{Sin}[c]}{7392 d} + \frac{(7825 A + 7592 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{74880 d} + \frac{(215 A + 132 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{4928 d} + \frac{(59 A + 13 C) \text{Cos}[4 d x] \text{Sin}[4 c]}{3744 d} + \frac{3 A \text{Cos}[5 d x] \text{Sin}[5 c]}{704 d} + \frac{A \text{Cos}[6 d x] \text{Sin}[6 c]}{1664 d} + \frac{(1811 A + 2134 C) \text{Cos}[c] \text{Sin}[d x]}{7392 d} + \frac{(7825 A + 7592 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{74880 d} + \frac{(215 A + 132 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{4928 d} + \frac{(59 A + 13 C) \text{Cos}[4 c] \text{Sin}[4 d x]}{3744 d} + \frac{3 A \text{Cos}[5 c] \text{Sin}[5 d x]}{704 d} + \frac{A \text{Cos}[6 c] \text{Sin}[6 d x]}{1664 d} \right) - \frac{1}{462 d \sqrt{1 + \text{Cot}[c]^2}}$$

$$95 A (1 + \text{Cos}[c + d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} -$$

$$\frac{1}{42 d \sqrt{1 + \text{Cot}[c]^2}} 11 C (1 + \text{Cos}[c + d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} - \frac{1}{156 d} 35 A (1 + \text{Cos}[c + d x])^3 \text{Csc}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{60\,d}17\,C\,(1+\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1099: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{11/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 246 leaves, 10 steps):

$$\frac{4\,a^3\,(5\,A+7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^3\,(105\,A+143\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{231\,d}+\frac{4\,a^3\,(105\,A+143\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{231\,d}+$$

$$\frac{8\,a^3\,(35\,A+44\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{385\,d}+\frac{2\,A\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{11\,d}+$$

$$\frac{4\,A\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{33\,a\,d}+\frac{2\,(35\,A+33\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{231\,d}$$

Result (type 5, 976 leaves):

$$a^3 \left(\sqrt{\text{Cos}[c+d x]}\, (1+\text{Cos}[c+d x])^3\, \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \right.$$

$$\left(-\frac{(5 A+7 C)\,\text{Cot}[c]}{10 d}+\frac{(1953 A+2354 C)\,\text{Cos}[d x]\,\text{Sin}[c]}{7392 d}+\frac{(25 A+18 C)\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{240 d}+\frac{(189 A+44 C)\,\text{Cos}[3 d x]\,\text{Sin}[3 c]}{4928 d}+\right.$$

$$\frac{A\,\text{Cos}[4 d x]\,\text{Sin}[4 c]}{96 d}+\frac{A\,\text{Cos}[5 d x]\,\text{Sin}[5 c]}{704 d}+\frac{(1953 A+2354 C)\,\text{Cos}[c]\,\text{Sin}[d x]}{7392 d}+\frac{(25 A+18 C)\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{240 d}+$$

$$\left.\frac{(189 A+44 C)\,\text{Cos}[3 c]\,\text{Sin}[3 d x]}{4928 d}+\frac{A\,\text{Cos}[4 c]\,\text{Sin}[4 d x]}{96 d}+\frac{A\,\text{Cos}[5 c]\,\text{Sin}[5 d x]}{704 d}\right)-\frac{1}{22 d\sqrt{1+\text{Cot}[c]^2}}$$

$$5 A\,(1+\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{42 d\sqrt{1+\text{Cot}[c]^2}}13 C\,(1+\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,-\frac{1}{4 d}A\,(1+\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{20 d}7 C\,(1+\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

- **Problem 1100: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 213 leaves, 9 steps):

$$\frac{4\,a^3\,(17\,A+27\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^3\,(11\,A+21\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$
$$\frac{8\,a^3\,(16\,A+21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d}+$$
$$\frac{4\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{21\,a\,d}+\frac{2\,(73\,A+63\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{315\,d}$$

Result (type 5, 1116 leaves):

$$\frac{1}{A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]}\text{Cos}[c+d\,x]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(17\,A+27\,C)\,\text{Cot}[c]}{15\,d}+\frac{(97\,A+84\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{168\,d}+\frac{(73\,A+18\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{360\,d}+\frac{3\,A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{56\,d}+\frac{A\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{144\,d}+\right.$$
$$\left.\frac{(97\,A+84\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{168\,d}+\frac{(73\,A+18\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{360\,d}+\frac{3\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{56\,d}+\frac{A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{144\,d}\right)-$$
$$\frac{1}{21\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}11\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\frac{1}{d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\ C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\left(17\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (30\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))\ -$$

$$\left(9\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1101: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 215 leaves, 9 steps):

$$\frac{4\,a^3\,(7\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^3\,(13\,A+35\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{4\,a^3\,(41\,A-35\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,(A-7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{7\,a\,d}+\frac{2\,(11\,A-35\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 1108 leaves):

$$\frac{1}{A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]}\text{Cos}[c+d\,x]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(14\,A+5\,C+14\,A\,\text{Cos}[2\,c]+15\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{20\,d}+\frac{(107\,A+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{168\,d}+\frac{3\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{20\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{56\,d}+\right.$$
$$\left.\frac{(107\,A+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{168\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{2\,d}+\frac{3\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{20\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{56\,d}\right)-$$
$$\frac{1}{21\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}13\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}5\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 (a+a\,\text{Sec}[c+d\,x])^3 \left(A+C\,\text{Sec}[c+d\,x]^2\right) \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\Bigg(7\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 (a+a\,\text{Sec}[c+d\,x])^3 \left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))\;-$$

$$\Bigg(C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 (a+a\,\text{Sec}[c+d\,x])^3 \left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1102: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 211 leaves, 9 steps):

$$\frac{4\,a^3\,(9\,A-5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^3\,(3\,A+5\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+\frac{8\,a^3\,(3\,A-10\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,C\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,(3\,A-35\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d}$$

Result (type 5, 1089 leaves):

$$\frac{1}{A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]}\text{Cos}[c+d\,x]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(18\,A-25\,C+18\,A\,\text{Cos}[2\,c]+5\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{20\,d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{2\,d}+\frac{A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{20\,d}+\right.$$
$$\left.\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{2\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{6\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(C\,\text{Sin}[c]+9\,C\,\text{Sin}[d\,x])}{6\,d}+\frac{A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{20\,d}\right)-$$
$$\frac{1}{d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,5\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\left(9\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1103: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 213 leaves, 9 steps) :

$$\frac{4 a^3 (5 A-9 C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{4 a^3 (5 A+3 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 d}-\frac{4 a^3 (5 A+21 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 d}+$$
$$\frac{2 C (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{5/2}}+\frac{4 C \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{5 a d \text{Cos}[c+d x]^{3/2}}+\frac{2 (5 A+11 C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{5 d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 1085 leaves) :

$$\frac{1}{A+2 C+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{11/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)$$
$$\left(-\frac{(5 A-36 C+15 A \text{Cos}[2 c]) \text{Csc}[c] \text{Sec}[c]}{20 d}+\frac{A \text{Cos}[d x] \text{Sin}[c]}{6 d}+\frac{A \text{Cos}[c] \text{Sin}[d x]}{6 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{10 d}+\right.$$
$$\left.\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (C \text{Sin}[c]+5 C \text{Sin}[d x])}{10 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (5 C \text{Sin}[c]+5 A \text{Sin}[d x]+18 C \text{Sin}[d x])}{10 d}\right)-$$
$$\frac{1}{3 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 5 A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} C \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\left(A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/\,(2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))\,+$$

$$\left(9\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Bigg)\Big/\,(10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1104: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 213 leaves, 9 steps) :

$$-\frac{4 a^3 (5 A+7 C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{4 a^3 (35 A+13 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{21 d}+\frac{8 a^3 (70 A+53 C) \text{Sin}[c+d x]}{105 d \sqrt{\text{Cos}[c+d x]}}+$$

$$\frac{2 C (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2}}+\frac{12 C \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{35 a d \text{Cos}[c+d x]^{5/2}}+\frac{2 (5 A+7 C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{15 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 5, 1102 leaves) :

$$\frac{1}{A+2 C+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{11/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3$$

$$\left(A+C \text{Sec}[c+d x]^2\right) \left(-\frac{(-25 A-28 C+5 A \text{Cos}[2 c]) \text{Csc}[c] \text{Sec}[c]}{20 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^4 \text{Sin}[d x]}{14 d}+\right.$$

$$\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (5 C \text{Sin}[c]+21 C \text{Sin}[d x])}{70 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (63 C \text{Sin}[c]+35 A \text{Sin}[d x]+130 C \text{Sin}[d x])}{210 d}+$$

$$\left.\frac{\text{Sec}[c] \text{Sec}[c+d x] (35 A \text{Sin}[c]+130 C \text{Sin}[c]+315 A \text{Sin}[d x]+294 C \text{Sin}[d x])}{210 d}\right)-$$

$$\frac{1}{3 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 5 A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{21 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 13 C \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\left(A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/\ (2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(7\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1105: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 246 leaves, 10 steps) :

$$-\frac{4 a^3 (27 A+17 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{15 d}+\frac{4 a^3 (21 A+11 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{21 d}+\frac{8 a^3 (21 A+16 C) \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2}}+\frac{4 a^3 (27 A+17 C) \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 C (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{9 d \text{Cos}[c+d x]^{9/2}}+\frac{4 C \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{21 a d \text{Cos}[c+d x]^{7/2}}+\frac{2 (63 A+73 C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{315 d \text{Cos}[c+d x]^{5/2}}$$

Result (type 5, 1135 leaves):

$$\frac{1}{A+2 C+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{11/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{(27 A+17 C) \text{Csc}[c] \text{Sec}[c]}{15 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^5 \text{Sin}[d x]}{18 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^4 (7 C \text{Sin}[c]+27 C \text{Sin}[d x])}{126 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (135 C \text{Sin}[c]+63 A \text{Sin}[d x]+238 C \text{Sin}[d x])}{630 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (105 A \text{Sin}[c]+110 C \text{Sin}[c]+378 A \text{Sin}[d x]+238 C \text{Sin}[d x])}{210 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (63 A \text{Sin}[c]+238 C \text{Sin}[c]+315 A \text{Sin}[d x]+330 C \text{Sin}[d x])}{630 d}\right)-$$

$$\frac{1}{d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{21 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 11 C \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\left(9 A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/\ (10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))\ +$$

$$\left(17\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (30\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1106: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 279 leaves, 11 steps):

$$-\frac{4 a^3 (7 A+5 C) \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{4 a^3 (143 A+105 C) \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{231 d}+\frac{8 a^3 (44 A+35 C) \text{Sin}[c+d x]}{385 d \text{Cos}[c+d x]^{5/2}}+\frac{4 a^3 (143 A+105 C) \text{Sin}[c+d x]}{231 d \text{Cos}[c+d x]^{3/2}}+\frac{4 a^3 (7 A+5 C) \text{Sin}[c+d x]}{5 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 C (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{11 d \text{Cos}[c+d x]^{11/2}}+\frac{4 C \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{33 a d \text{Cos}[c+d x]^{9/2}}+\frac{2 (33 A+35 C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{231 d \text{Cos}[c+d x]^{7/2}}$$

Result (type 5, 1179 leaves) :

$$\frac{1}{A+2 C+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{11/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{(7 A+5 C) \text{Csc}[c] \text{Sec}[c]}{5 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^6 \text{Sin}[d x]}{22 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^5 (3 C \text{Sin}[c]+11 C \text{Sin}[d x])}{66 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^4 (77 C \text{Sin}[c]+33 A \text{Sin}[d x]+126 C \text{Sin}[d x])}{462 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (165 A \text{Sin}[c]+630 C \text{Sin}[c]+693 A \text{Sin}[d x]+770 C \text{Sin}[d x])}{2310 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (693 A \text{Sin}[c]+770 C \text{Sin}[c]+1430 A \text{Sin}[d x]+1050 C \text{Sin}[d x])}{2310 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (715 A \text{Sin}[c]+525 C \text{Sin}[c]+1617 A \text{Sin}[d x]+1155 C \text{Sin}[d x])}{1155 d}\right)-$$

$$\frac{1}{21 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 13 A \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{11 d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 5 C \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a \text{Sec}[c+d x])^3 \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\Bigg(7\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(10\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\Bigg(C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(2\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1107: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d\,x]^{7/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 192 leaves, 8 steps):

$$-\frac{3\,(7\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,a\,d}+\frac{5\,(9\,A+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,a\,d}+\frac{5\,(9\,A+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,a\,d}-\frac{(7\,A+5\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}+\frac{(9\,A+7\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,a\,d}-\frac{(A+C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1393 leaves):

$$-\frac{1}{10\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,21\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(\frac{4\,(5\,A+5\,C+16\,A\,\text{Cos}[c]+10\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{2\,(51\,A+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}-\right.\right.$$
$$\frac{4\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{2\,A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{2\,(51\,A+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d}-$$
$$\left.\left.\frac{4\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{2\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\right)\right)\Big/\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\left(30\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(7\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$
$$\left(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1108: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 159 leaves, 7 steps):

$$\frac{3\,(7\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}-\frac{(5\,A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}-$$
$$\frac{(5\,A+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}+\frac{(7\,A+5\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}-\frac{(A+C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1345 leaves):

$$\frac{1}{10\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,21\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\Big) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\Big)+$$

$$\frac{1}{2 (A+2 C+A \mathrm{Cos}[2 c+2 d x]) (a+a \mathrm{Sec}[c+d x])} 3 i C \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \mathrm{Cos}[c+d x] \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right] \left(A+C \mathrm{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\mathrm{Cos}[c]+i \mathrm{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)-$$

$$\Bigg(2 \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\mathrm{Cos}[c]+i \mathrm{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\Bigg)+$$

$$\Bigg(\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \mathrm{Cos}[c+d x]^{3/2} \left(A+C \mathrm{Sec}[c+d x]^2\right) \Bigg(-\frac{4 (5 A+5 C+16 A \mathrm{Cos}[c]+10 C \mathrm{Cos}[c]) \mathrm{Csc}[c]}{5 d}-\frac{8 A \mathrm{Cos}[d x] \mathrm{Sin}[c]}{3 d}+$$

$$\frac{4 A \mathrm{Cos}[2 d x] \mathrm{Sin}[2 c]}{5 d}-\frac{4 \mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \mathrm{Sin}\left[\frac{d x}{2}\right]+C \mathrm{Sin}\left[\frac{d x}{2}\right]\right)}{d}-\frac{8 A \mathrm{Cos}[c] \mathrm{Sin}[d x]}{3 d}+\frac{4 A \mathrm{Cos}[2 c] \mathrm{Sin}[2 d x]}{5 d}\Bigg)\Bigg) \Big/$$

$$((A+2 C+A \mathrm{Cos}[2 c+2 d x]) (a+a \mathrm{Sec}[c+d x]))+\Bigg(10 A \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \mathrm{Cos}[c+d x] \mathrm{Csc}\left[\frac{c}{2}\right]$$

$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right] \mathrm{Sec}\left[\frac{c}{2}\right] \left(A+C \mathrm{Sec}[c+d x]^2\right) \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]} \sqrt{-\sqrt{1+\mathrm{Cot}[c]^2} \mathrm{Sin}[c] \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]} \sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d (A+2 C+A \mathrm{Cos}[2 c+2 d x]) \sqrt{1+\mathrm{Cot}[c]^2} (a+a \mathrm{Sec}[c+d x])\right)+$$

$$\Bigg(2 C \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \mathrm{Cos}[c+d x] \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right] \left(A+C \mathrm{Sec}[c+d x]^2\right) \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]] \sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2} \mathrm{Sin}[c] \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]} \sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (A+2 C+A \mathrm{Cos}[2 c+2 d x]) \sqrt{1+\mathrm{Cot}[c]^2} (a+a \mathrm{Sec}[c+d x])\right)$$

Problem 1109: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(A+C \text{Sec}[c+d x]^2\right)}{a+a \text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 122 leaves, 6 steps):

$$-\frac{(3 A+C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{a d}+\frac{(5 A+3 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 a d}+\frac{(5 A+3 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{3 a d}-\frac{(A+C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{d (a+a \text{Cos}[c+d x])}$$

Result (type 5, 1300 leaves):

$$-\frac{1}{2 (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])} 3 i A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)-$$
$$\frac{1}{2 (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])} i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]^{3/2} \left(A+C \text{Sec}[c+d x]^2\right) \left(\frac{4 (A+C+2 A \text{Cos}[c]) \text{Csc}[c]}{d}+\frac{8 A \text{Cos}[d x] \text{Sin}[c]}{3 d}+\right.\right.$$
$$\left.\left.\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{8 A \text{Cos}[c] \text{Sin}[d x]}{3 d}\right)\right) \Big/ \left((A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])\right)-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$
$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1110: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 84 leaves, 5 steps):

$$\frac{(3\,A+C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1270 leaves):

$$\frac{1}{2\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\frac{1}{2\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])}\,\mathrm{i}\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Cos}[c+d\,x]^{3/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(-\frac{4\,(A+C+2\,A\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}\right)\right)\Big/$$

$$((A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x]))+$$

$$\left(2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])\right)-$$

$$\left(2\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])\right)$$

- **Problem 1111: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 112 leaves, 6 steps) :

$$-\frac{(A+3C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{a d}+\frac{(A-C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{a d}+\frac{(A+3C)\,\text{Sin}[c+dx]}{a d\sqrt{\text{Cos}[c+dx]}}-\frac{(A+C)\,\text{Sin}[c+dx]}{d\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])}$$

Result (type 5, 1304 leaves) :

$$-\frac{1}{2\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{2\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}\,3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{2\,(2C+A\,\text{Cos}[c]+C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}+\right.\right.$$
$$\left.\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}+\frac{8\,C\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{d}\right)\right)\Big/\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])\right)-$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\ (A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])\right)+$$

$$\Bigg(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\ \text{Csc}\left[\frac{c}{2}\right]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\ (A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1112: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\ (a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 150 leaves, 7 steps):

$$\frac{(A+3\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(3\,A+5\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}+$$
$$\frac{(3\,A+5\,C)\ \text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{(A+3\,C)\ \text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A+C)\ \text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\ (a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1337 leaves):

$$\frac{1}{2\ (A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\ \text{Csc}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\ (\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\ (\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{2\ (A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])}\,3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\ \text{Csc}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) - \left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \text{Cos}[c + d x]^{3/2} \left(A + C\, \text{Sec}[c + d x]^2\right) \left(-\frac{2 (2 C + A\, \text{Cos}[c] + C\, \text{Cos}[c])\, \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c]}{d} - \frac{4\, \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right] \left(A\, \text{Sin}\left[\frac{d x}{2}\right] + C\, \text{Sin}\left[\frac{d x}{2}\right]\right)}{d} + \frac{8 C\, \text{Sec}[c]\, \text{Sec}[c + d x]^2\, \text{Sin}[d x]}{3 d} + \frac{8\, \text{Sec}[c]\, \text{Sec}[c + d x] (C\, \text{Sin}[c] - 3 C\, \text{Sin}[d x])}{3 d}\right)\right) \Big/$$

$$((A + 2 C + A\, \text{Cos}[2 c + 2 d x]) (a + a\, \text{Sec}[c + d x])) - \left(2 A\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \text{Cos}[c + d x]\, \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(d (A + 2 C + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])\right) -$$

$$\left(10 C\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \text{Cos}[c + d x]\, \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \left(A + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(3 d (A + 2 C + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])\right)$$

- **Problem 1113: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + C\, \text{Sec}[c + d x]^2}{\text{Cos}[c + d x]^{5/2} (a + a\, \text{Sec}[c + d x])}\, dx$$

Optimal (type 4, 192 leaves, 8 steps) :

$$-\frac{3\,(5A+7C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{5ad}-\frac{(3A+5C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3ad}+\frac{(5A+7C)\,\text{Sin}[c+dx]}{5ad\,\text{Cos}[c+dx]^{5/2}}-\frac{(3A+5C)\,\text{Sin}[c+dx]}{3ad\,\text{Cos}[c+dx]^{3/2}}+\frac{3\,(5A+7C)\,\text{Sin}[c+dx]}{5ad\sqrt{\text{Cos}[c+dx]}}-\frac{(A+C)\,\text{Sin}[c+dx]}{d\,\text{Cos}[c+dx]^{5/2}\,(a+a\,\text{Cos}[c+dx])}$$

Result (type 5, 1382 leaves):

$$-\frac{1}{2\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{10\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}21\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]^{3/2}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(\frac{2\,(10A+16C+5A\,\text{Cos}[c]+5C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{5d}+\right.\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}+\frac{8C\,\text{Sec}[c]\,\text{Sec}[c+dx]^3\,\text{Sin}[dx]}{5d}-$$
$$\left.\left.\frac{8\,\text{Sec}[c]\,\text{Sec}[c+dx]\,(5C\,\text{Sin}[c]-15A\,\text{Sin}[dx]-24C\,\text{Sin}[dx])}{15d}+\frac{8\,\text{Sec}[c]\,\text{Sec}[c+dx]^2\,(3C\,\text{Sin}[c]-5C\,\text{Sin}[dx])}{15d}\right)\right)\Big/$$

$$((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx]))+\Bigg(2A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])\right)+$$

$$\Bigg(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])\right)$$

Problem 1114: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+dx]^{5/2}\left(A+C\,\text{Sec}[c+dx]^2\right)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 196 leaves, 8 steps):

$$\frac{4\,(14A+5C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{5a^2d}-\frac{5\,(3A+C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3a^2d}-\frac{5\,(3A+C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{3a^2d}+$$
$$\frac{4\,(14A+5C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{15a^2d}-\frac{(3A+C)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{a^2d\,(1+\text{Cos}[c+dx])}-\frac{(A+C)\,\text{Cos}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 5, 1398 leaves):

$$\frac{1}{5\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}\,56\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}\,4 i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\Bigg(\Bigg(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\Bigg(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\Bigg(20\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^2\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{16\,(10A+5C+18A\,\text{Cos}[c]+5C\,\text{Cos}[c])\,\text{Csc}[c]}{5d}-\frac{32\,A\,\text{Cos}[dx]\,\text{Sin}[c]}{3d}+\right.$$

$$\frac{8\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$

$$\left.\left.\frac{32\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{8\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

■ **Problem 1115: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 161 leaves, 7 steps):

$$-\frac{(7\,A+C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a^2\,d}+\frac{2\,(5\,A+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a^2\,d}+$$

$$\frac{2\,(5\,A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(7\,A+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A+C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1355 leaves):

$$-\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,7\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$

$$\frac{1}{(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$

$$\left(40\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(3\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)-$$

$$\left(8\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(3\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{8\,(3\,A+C+4\,A\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{d}+\frac{16\,A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(3\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{16\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}-\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left((A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)$$

- **Problem 1116: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Cos}[c+d\,x]}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 130 leaves, 6 steps) :

$$\frac{4\,A\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a^2\,d}-\frac{(5\,A-C)\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,a^2\,d}-\frac{(5\,A-C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A+C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2}$$

Result (type 5, 934 leaves) :

$$\frac{1}{(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}\,4\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)$$

$$\Bigg(\Bigg(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\Bigg)+$$
$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^2\right)-$$
$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\left(A+C\,\text{Sec}[c+dx]^2\right)\right.$$
$$\left.\left(-\frac{16\,A\,\text{Cot}\left[\frac{c}{2}\right]}{d}-\frac{16\,A\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Bigg)\Big/$$
$$\left((A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2\right)$$

Problem 1117: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{\sqrt{\text{Cos}[c + d\,x]}\,\left(a + a\,\text{Sec}[c + d\,x]\right)^2}\,dx$$

Optimal (type 4, 125 leaves, 6 steps):

$$-\frac{(A - C)\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{a^2\,d} + \frac{2\,(A + C)\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{3\,a^2\,d} + \frac{(A - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{a^2\,d\,(1 + \text{Cos}[c + d\,x])} - \frac{(A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{3\,d\,(a + a\,\text{Cos}[c + d\,x])^2}$$

Result (type 5, 1322 leaves):

$$-\frac{1}{(A + 2\,C + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + a\,\text{Sec}[c + d\,x])^2}\,i\,A\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A + C\,\text{Sec}[c + d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] - 3\,d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right) -$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right) +$$
$$\frac{1}{(A + 2\,C + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + a\,\text{Sec}[c + d\,x])^2}\,i\,C\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A + C\,\text{Sec}[c + d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] - 3\,d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right) -$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right) -$$
$$\left(8\,A\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A + C\,\text{Sec}[c + d\,x]^2\right)\right.$$
$$\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)-$$

$$\Bigg(8\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+$$

$$\Bigg(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\Bigg(\frac{8\,(A-C)\,\mathrm{Csc}[c]}{d}+\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)\Bigg)\Big/\left((A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)$$

- **Problem 1118: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 151 leaves, 7 steps):

$$-\frac{4\,C\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a^2\,d}+\frac{(A-5\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}+$$

$$\frac{4\,C\,\mathrm{Sin}[c+d\,x]}{a^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+\frac{(A-5\,C)\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A+C)\,\mathrm{Sin}[c+d\,x]}{3\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^2}$$

Result (type 5, 954 leaves):

$$-\frac{1}{(A+2C+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])^2}\,4\,i\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+dx]^2\right)$$

$$\left(\left(2\,e^{2idx}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\mathrm{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2idx}\,\mathrm{Cos}[2c]+i\,e^{2idx}\,\mathrm{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\mathrm{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2idx}\,\mathrm{Cos}[2c]+i\,e^{2idx}\,\mathrm{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\mathrm{Cos}[c]+d\left(-1+e^{2idx}\right)\mathrm{Sin}[c]\right)\right)-$$

$$\left(4\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+dx]^2\right)\right.$$

$$\mathrm{Sec}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2C+A\,\mathrm{Cos}[2c+2dx])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+dx])^2\right)+$$

$$\left(20\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+C\,\mathrm{Sec}[c+dx]^2\right)\mathrm{Sec}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[dx-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2C+A\,\mathrm{Cos}[2c+2dx])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+dx])^2\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\mathrm{Cos}[c+dx]}\left(A+C\,\mathrm{Sec}[c+dx]^2\right)\right.$$

$$\left(\frac{16\,C\,\mathrm{Cot}\left[\frac{c}{2}\right]\mathrm{Sec}[c]}{d}+\frac{16\,C\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\mathrm{Sin}\left[\frac{dx}{2}\right]}{d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\right.$$

$$\left.\left.\frac{16\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]\,\mathrm{Sin}[dx]}{d}+\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left((A+2C+A\,\mathrm{Cos}[2c+2dx])\,(a+a\,\mathrm{Sec}[c+dx])^2\right)$$

■ Problem 1119: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + C\,\text{Sec}[c + d\,x]^2}{\text{Cos}[c + d\,x]^{5/2}\,(a + a\,\text{Sec}[c + d\,x])^2}\,dx$$

Optimal (type 4, 189 leaves, 8 steps):

$$\frac{(A + 7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{a^2\,d} + \frac{2\,(A + 5\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{3\,a^2\,d} + \frac{2\,(A + 5\,C)\,\text{Sin}[c + d\,x]}{3\,a^2\,d\,\text{Cos}[c + d\,x]^{3/2}} - \frac{(A + 7\,C)\,\text{Sin}[c + d\,x]}{a^2\,d\,\sqrt{\text{Cos}[c + d\,x]}} - \frac{(A + 7\,C)\,\text{Sin}[c + d\,x]}{3\,a^2\,d\,\text{Cos}[c + d\,x]^{3/2}\,(1 + \text{Cos}[c + d\,x])} - \frac{(A + C)\,\text{Sin}[c + d\,x]}{3\,d\,\text{Cos}[c + d\,x]^{3/2}\,(a + a\,\text{Cos}[c + d\,x])^2}$$

Result (type 5, 1391 leaves):

$$\frac{1}{(A + 2\,C + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + a\,\text{Sec}[c + d\,x])^2}\,i\,A\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A + C\,\text{Sec}[c + d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] - 3\,d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right) -$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right) +$$
$$\frac{1}{(A + 2\,C + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + a\,\text{Sec}[c + d\,x])^2}\,7\,i\,C\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A + C\,\text{Sec}[c + d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] - 3\,d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right) -$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + 2\,i\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1 + e^{2\,i\,d\,x}\,\text{Cos}[2\,c] + i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1 + e^{2\,i\,d\,x}\right)\,\text{Cos}[c] + d\,\left(-1 + e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right) -$$
$$\left(8\,A\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A + C\,\text{Sec}[c + d\,x]^2\right)\right.$$
$$\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^2\right)-$$

$$\Bigg(40\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ \text{Csc}\left[\frac{c}{2}\right]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\ \sqrt{\text{Cos}[c+d\,x]}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)\ \Bigg(-\frac{4\,(4\,C+A\,\text{Cos}[c]+3\,C\,\text{Cos}[c])\ \text{Csc}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}[c]}{d}-$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\ \left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\ \left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{16\,C\,\text{Sec}[c]\ \text{Sec}[c+d\,x]^2\ \text{Sin}[d\,x]}{3\,d}+$$

$$\frac{16\,\text{Sec}[c]\ \text{Sec}[c+d\,x]\ (C\,\text{Sin}[c]-6\,C\,\text{Sin}[d\,x])}{3\,d}-\frac{4\,(A+C)\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)\Bigg)\Bigg/\left((A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 1120: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\ \left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 250 leaves, 9 steps):

$$\frac{7\,(33\,A+7\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}-\frac{(63\,A+13\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-$$

$$\frac{(63\,A+13\,C)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{6\,a^3\,d}+\frac{7\,(33\,A+7\,C)\ \text{Cos}[c+d\,x]^{3/2}\ \text{Sin}[c+d\,x]}{30\,a^3\,d}-$$

$$\frac{(A+C)\ \text{Cos}[c+d\,x]^{9/2}\ \text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{2\,(6\,A+C)\ \text{Cos}[c+d\,x]^{7/2}\ \text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(63\,A+13\,C)\ \text{Cos}[c+d\,x]^{5/2}\ \text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1507 leaves):

$$\frac{1}{5\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\,231\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{5\,(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\,49\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$

$$\left(84\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\right.$$
$$\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(52\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\text{Sec}[c+dx]\,\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\frac{1}{\sqrt{\text{Cos}[c+d\,x]}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{8\,(99\,A+29\,C+132\,A\,\text{Cos}[c]+20\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}-\right.$$

$$\frac{32\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{16\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(12\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+7\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(99\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+29\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$

$$\left.\frac{32\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{16\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{16\,(12\,A+7\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

- **Problem 1121: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 209 leaves, 8 steps):

$$-\frac{(119\,A+9\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(11\,A+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{2\,a^3\,d}+\frac{(11\,A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,a^3\,d}-$$

$$\frac{(A+C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{2\,A\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(119\,A+9\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{30\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1470 leaves):

$$-\frac{1}{5\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,119\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{5\,(A+2\,C+A\,Cos[2\,c+2\,d\,x])\,(a+a\,Sec[c+d\,x])^3}\,9\,i\,C\,Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 Csc\left[\frac{c}{2}\right] Sec\left[\frac{c}{2}\right] Sec[c+d\,x]\,\left(A+C\,Sec[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,Hypergeometric2F1\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(Cos[c]+i\,Sin[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)Cos[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)Sin[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,Cos[2\,c]+i\,e^{2\,i\,d\,x}\,Sin[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)Cos[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)Sin[c]\right)-$$

$$\left(2\,Hypergeometric2F1\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(Cos[c]+i\,Sin[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)Cos[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)Sin[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,Cos[2\,c]+i\,e^{2\,i\,d\,x}\,Sin[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)Cos[c]+d\left(-1+e^{2\,i\,d\,x}\right)Sin[c]\right)\right)-$$

$$\left(44\,A\,Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,Sin[d\,x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right] Sec[c+d\,x]\right.$$

$$\left(A+C\,Sec[c+d\,x]^2\right) Sec[d\,x-ArcTan[Cot[c]]]\,\sqrt{1-Sin[d\,x-ArcTan[Cot[c]]]}$$

$$\left.\sqrt{-\sqrt{1+Cot[c]^2}\,Sin[c]\,Sin[d\,x-ArcTan[Cot[c]]]}\,\sqrt{1+Sin[d\,x-ArcTan[Cot[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+A\,Cos[2\,c+2\,d\,x])\,\sqrt{1+Cot[c]^2}\,(a+a\,Sec[c+d\,x])^3\right)-$$

$$\left(4\,C\,Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,Sin[d\,x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right]\right.$$

$$Sec[c+d\,x]\,\left(A+C\,Sec[c+d\,x]^2\right) Sec[d\,x-ArcTan[Cot[c]]]\,\sqrt{1-Sin[d\,x-ArcTan[Cot[c]]]}$$

$$\left.\sqrt{-\sqrt{1+Cot[c]^2}\,Sin[c]\,Sin[d\,x-ArcTan[Cot[c]]]}\,\sqrt{1+Sin[d\,x-ArcTan[Cot[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+A\,Cos[2\,c+2\,d\,x])\,\sqrt{1+Cot[c]^2}\,(a+a\,Sec[c+d\,x])^3\right)+$$

$$\left(Cos\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \left(A+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(\frac{8\,(59\,A+9\,C+60\,A\,Cos[c])\,Csc[c]}{5\,d}+\frac{32\,A\,Cos[d\,x]\,Sin[c]}{3\,d}+\frac{4\,Sec\left[\frac{c}{2}\right]Sec\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,Sin\left[\frac{d\,x}{2}\right]+C\,Sin\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\right.$$

$$\frac{8\,Sec\left[\frac{c}{2}\right]Sec\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(19\,A\,Sin\left[\frac{d\,x}{2}\right]+9\,C\,Sin\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\frac{8\,Sec\left[\frac{c}{2}\right]Sec\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(59\,A\,Sin\left[\frac{d\,x}{2}\right]+9\,C\,Sin\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{32\,A\,Cos[c]\,Sin[d\,x]}{3\,d}-$$

$$\left.\left.\frac{8\,(19\,A+9\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\mathrm{Sec}[c+d\,x]\right)^3\right)$$

- **Problem 1122: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\left(a+a\,\mathrm{Sec}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 186 leaves, 7 steps):

$$\frac{(49\,A-C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}-\frac{(13\,A-C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-$$
$$\frac{(A+C)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}-\frac{2\,(4\,A-C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2}-\frac{(13\,A-C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)}$$

Result (type 5, 1446 leaves):

$$\frac{1}{5\,\left(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\mathrm{Sec}[c+d\,x]\right)^3}\,49\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c+d\,x]\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,\left(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\mathrm{Sec}[c+d\,x]\right)^3}\,i\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c+d\,x]\,\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)\right)+$$
$$\left(52\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c+d\,x]\right.$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$
$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{8\,(29\,A-C+20\,A\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(29\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\right.\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(7\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$
$$\left.\left.\frac{16\,(7\,A+2\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(\sqrt{\text{Cos}[c+d\,x]}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 1123: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 184 leaves, 7 steps):

$$-\frac{(9\,A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}+\frac{(3\,A+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-$$
$$\frac{(A+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{2\,(3\,A-2\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{(9\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1439 leaves):

$$-\frac{1}{5\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{5\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,C\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\Bigg(4\,A\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[c+d\,x]$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$

$$\Bigg(4\,C\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{8\,(9\,A-C)\,\text{Csc}[c]}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\right.$$

$$\left.\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,(9\,A-C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\,\left(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3\right)$$

Problem 1124: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 180 leaves, 7 steps):

$$-\frac{(A-9\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-$$

$$\frac{(A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+\frac{2\,(2\,A-3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{(A-9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1436 leaves):

$$-\frac{1}{5\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{5\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,9\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\left(4\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\right.$$

$$\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d\,x]\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{8\,(A-9\,C)\,\text{Csc}[c]}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\right.$$

$$\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,(2\,A-3\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\Bigg)\Big/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 1125: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 209 leaves, 8 steps):

$$\frac{(A-49C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{10a^3d}+\frac{(A-13C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{6a^3d}-\frac{(A-49C)\,\text{Sin}[c+dx]}{10a^3d\sqrt{\text{Cos}[c+dx]}}-\frac{(A+C)\,\text{Sin}[c+dx]}{5d\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^3}+\frac{2(A-4C)\,\text{Sin}[c+dx]}{15ad\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^2}+\frac{(A-13C)\,\text{Sin}[c+dx]}{6d\sqrt{\text{Cos}[c+dx]}\,\left(a^3+a^3\,\text{Cos}[c+dx]\right)}$$

Result (type 5, 1473 leaves):

$$\frac{1}{5(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3id\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-id\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5(A+2C+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\,49\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3id\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-id\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\left(4A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\right.$$
$$\left(A+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3d\,(A+2C+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+dx])^3\right)+$$

$$\left(52\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(-\frac{4\,(-20\,C+A\,\mathrm{Cos}[c]-29\,C\,\mathrm{Cos}[c])\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]}{5\,d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-29\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+11\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\frac{32\,C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[d\,x]}{d}+\frac{8\,(A+11\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(\sqrt{\mathrm{Cos}[c+d\,x]}\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)$$

- **Problem 1126: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\mathrm{Sec}[c+d\,x]^2}{\mathrm{Cos}[c+d\,x]^{7/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 242 leaves, 9 steps):

$$\frac{(9\,A+119\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}+\frac{(A+11\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{2\,a^3\,d}+\frac{(A+11\,C)\,\mathrm{Sin}[c+d\,x]}{2\,a^3\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}-\frac{(9\,A+119\,C)\,\mathrm{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}-\frac{(A+C)\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Cos}[c+d\,x])^3}-\frac{2\,C\,\mathrm{Sin}[c+d\,x]}{3\,a\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Cos}[c+d\,x])^2}-\frac{(9\,A+119\,C)\,\mathrm{Sin}[c+d\,x]}{30\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)}$$

Result (type 5, 1505 leaves):

$$\frac{1}{5\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3}\,9\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c+d\,x]\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-\right.\right.$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{5 (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3} 119 i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)-$$

$$\Bigg(4 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c+d x]$$

$$\left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2} (a+a \text{Sec}[c+d x])^3\right)-$$

$$\Bigg(44 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d x] \left(A+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (A+2 C+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2} (a+a \text{Sec}[c+d x])^3\right)+$$

$$\frac{1}{\sqrt{\text{Cos}[c+d x]} (A+2 C+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])^3}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+C \text{Sec}[c+d x]^2\right) \Bigg(-\frac{4 (60 C+9 A \text{Cos}[c]+59 C \text{Cos}[c]) \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c]}{5 d}-$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(A \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}-\frac{16 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(3 A \text{Sin}\left[\frac{d x}{2}\right]+8 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}-$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+59\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{32\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$

$$\left.\frac{32\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(C\,\text{Sin}[c]-9\,C\,\text{Sin}[d\,x]\right)}{3\,d}-\frac{16\,\left(3\,A+8\,C\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,\left(A+C\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 1130: Result unnecessarily involves higher level functions.

$$\int\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 136 leaves, 5 steps):

$$\frac{2\,\sqrt{a}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$

$$\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 174 leaves):

$$\left(2\,\sqrt{\text{Cos}[c+d\,x]}\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,\left(1+\text{Sec}[c+d\,x]\right)}\,\left(-6\,i\,C\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-\right.\right.$$

$$\left.\left.2\,i\,C\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+A\,\left(3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)\right)\right)\Big/\,\left(3\,d\,\left(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)]\right)\right)$$

Problem 1131: Result unnecessarily involves higher level functions.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 135 leaves, 5 steps):

$$\frac{\sqrt{a}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{a\,\left(2\,A-C\right)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 184 leaves):

$$\left(2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a\,\left(1+\text{Sec}[c+d\,x]\right)}\right.$$

$$\left(-3\,i\,C\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-i\,C\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+\right.$$

$$\left.\left.3\,\left(C+2\,A\,\text{Cos}[c+d\,x]\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\,\left(3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)]\right)\right)$$

Problem 1132: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{\sqrt{a}\,(8\,A+3\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+\frac{a\,C\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 161 leaves):

$$\frac{1}{12\,d}\sqrt{\text{Cos}[c+d\,x]}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-3\,i\,(8\,A+3\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$\left.i\,(8\,A+3\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+3\,C\,\text{Sec}[c+d\,x]\,(3+2\,\text{Sec}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1133: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 189 leaves, 6 steps):

$$\frac{\sqrt{a}\,(8\,A+5\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+$$
$$\frac{a\,C\,\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(8\,A+5\,C)\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 176 leaves):

$$\frac{1}{24\,d}\sqrt{\text{Cos}[c+d\,x]}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-3\,i\,(8\,A+5\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,(8\,A+5\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\right.$$
$$\left.\text{Sec}[c+d\,x]\,\left(24\,A+15\,C+10\,C\,\text{Sec}[c+d\,x]+8\,C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1134: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 234 leaves, 7 steps):

$$\frac{\sqrt{a}\,(48A+35C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{64 d}+\frac{a\,C\,\text{Sin}[c+d x]}{24 d\,\text{Cos}[c+d x]^{7/2}\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{a\,(48A+35C)\,\text{Sin}[c+d x]}{96 d\,\text{Cos}[c+d x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a\,(48A+35C)\,\text{Sin}[c+d x]}{64 d\,\text{Cos}[c+d x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{C\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{4 d\,\text{Cos}[c+d x]^{7/2}}$$

Result (type 5, 195 leaves):

$$\frac{1}{192 d}\sqrt{\text{Cos}[c+d x]}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{a\,(1+\text{Sec}[c+d x])}$$
$$\left(-3\,i\,(48A+35C)\,e^{\frac{1}{2}i(c+d x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2 i (c+d x)}\right]-i\,(48A+35C)\,e^{\frac{3}{2}i(c+d x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2 i (c+d x)}\right]+\right.$$
$$\left.\text{Sec}[c+d x]\left(3\,(48A+35C)+(96A+70C)\,\text{Sec}[c+d x]+56C\,\text{Sec}[c+d x]^2+48C\,\text{Sec}[c+d x]^3\right)\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 1138: Result unnecessarily involves higher level functions.

$$\int \text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^{3/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 183 leaves, 6 steps):

$$\frac{2 a^{3/2}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{d}+\frac{2 a^2\,(4A+5C)\,\text{Sin}[c+d x]}{5 d\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Sec}[c+d x]}}+$$

$$\frac{2 a A\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{5 d}+\frac{2 A\,\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{5 d}$$

Result (type 5, 198 leaves):

$$\frac{1}{30 d\,(A+2C+A\,\text{Cos}[2(c+d x)])}\,a\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])\left(C+A\,\text{Cos}[c+d x]^2\right)$$
$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\sqrt{a\,(1+\text{Sec}[c+d x])}\left(-60\,i\,C\,e^{\frac{1}{2}i(c+d x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2 i (c+d x)}\right]-\right.$$
$$\left.20\,i\,C\,e^{\frac{3}{2}i(c+d x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2 i (c+d x)}\right]+6\,(13A+10C+6A\,\text{Cos}[c+d x]+A\,\text{Cos}[2(c+d x)])\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 1139: Result unnecessarily involves higher level functions.

$$\int \text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^{3/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 189 leaves, 6 steps):

$$\frac{3 a^{3/2} C \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{d}+\frac{a^2 (8 A-3 C) \text{Sin}[c+d x]}{3 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Sec}[c+d x]}}-\frac{a (2 A-3 C) \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 A \sqrt{\text{Cos}[c+d x]} (a+a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d}$$

Result (type 5, 207 leaves) :

$$\frac{1}{3 d \sqrt{\text{Cos}[c+d x]} (A+2 C+A \text{Cos}[2 (c+d x)])} a (1+\text{Cos}[c+d x]) \left(C+A \text{Cos}[c+d x]^2\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \sqrt{a (1+\text{Sec}[c+d x])} \left(-9 i C e^{\frac{1}{2} i (c+d x)} \text{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-3 i C e^{\frac{3}{2} i (c+d x)} \text{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]+(A+3 C+10 A \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

- **Problem 1140: Result unnecessarily involves higher level functions.**

$$\int \sqrt{\text{Cos}[c+d x]} (a+a \text{Sec}[c+d x])^{3/2} \left(A+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 191 leaves, 6 steps) :

$$\frac{a^{3/2} (8 A+7 C) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{4 d}+\frac{a^2 (8 A-5 C) \text{Sin}[c+d x]}{4 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Sec}[c+d x]}}+\frac{3 a C \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{4 d \sqrt{\text{Cos}[c+d x]}}+\frac{C (a+a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{2 d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 224 leaves) :

$$\frac{1}{12 d \text{Cos}[c+d x]^{3/2} (A+2 C+A \text{Cos}[2 (c+d x)])} a (1+\text{Cos}[c+d x]) \left(C+A \text{Cos}[c+d x]^2\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \sqrt{a (1+\text{Sec}[c+d x])} \left(-3 i (8 A+7 C) e^{\frac{1}{2} i (c+d x)} \text{Cos}[c+d x]^2 \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-i (8 A+7 C) e^{\frac{3}{2} i (c+d x)} \text{Cos}[c+d x]^2 \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]+3 \left(2 C+7 C \text{Cos}[c+d x]+8 A \text{Cos}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

- **Problem 1141: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a \text{Sec}[c+d x])^{3/2} \left(A+C \text{Sec}[c+d x]^2\right)}{\sqrt{\text{Cos}[c+d x]}} dx$$

Optimal (type 3, 191 leaves, 6 steps) :

$$\frac{a^{3/2} (24 A + 11 C) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{8 d} +$$

$$\frac{a^2 (24 A + 19 C) \text{Sin}[c+d x]}{24 d \text{Cos}[c+d x]^{3/2} \sqrt{a + a \text{Sec}[c+d x]}} + \frac{a C \sqrt{a + a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{4 d \text{Cos}[c+d x]^{3/2}} + \frac{C (a + a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 5, 229 leaves):

$$\frac{1}{24 d \text{Cos}[c+d x]^{5/2} (A + 2 C + A \text{Cos}[2 (c+d x)])} a (1 + \text{Cos}[c+d x]) \left(C + A \text{Cos}[c+d x]^2\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \sqrt{a (1 + \text{Sec}[c+d x])}$$
$$\left(-3 i (24 A + 11 C) e^{\frac{1}{2} i (c+d x)} \text{Cos}[c+d x]^3 \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right] - i (24 A + 11 C) e^{\frac{3}{2} i (c+d x)} \text{Cos}[c+d x]^3\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right] + \left(8 C + 22 C \text{Cos}[c+d x] + 3 (8 A + 11 C) \text{Cos}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 1142: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \text{Sec}[c+d x])^{3/2} \left(A + C \text{Sec}[c+d x]^2\right)}{\text{Cos}[c+d x]^{3/2}} \, dx$$

Optimal (type 3, 238 leaves, 7 steps):

$$\frac{a^{3/2} (112 A + 75 C) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{64 d} + \frac{a^2 (16 A + 13 C) \text{Sin}[c+d x]}{32 d \text{Cos}[c+d x]^{5/2} \sqrt{a + a \text{Sec}[c+d x]}} +$$

$$\frac{a^2 (112 A + 75 C) \text{Sin}[c+d x]}{64 d \text{Cos}[c+d x]^{3/2} \sqrt{a + a \text{Sec}[c+d x]}} + \frac{a C \sqrt{a + a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{8 d \text{Cos}[c+d x]^{5/2}} + \frac{C (a + a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{4 d \text{Cos}[c+d x]^{5/2}}$$

Result (type 5, 261 leaves):

$$\frac{1}{768 d \text{Cos}[c+d x]^{7/2} (A + 2 C + A \text{Cos}[2 (c+d x)])} a (1 + \text{Cos}[c+d x]) \left(C + A \text{Cos}[c+d x]^2\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3$$
$$\sqrt{a (1 + \text{Sec}[c+d x])} \left(-12 i (112 A + 75 C) e^{\frac{1}{2} i (c+d x)} \text{Cos}[c+d x]^4 \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right] -\right.$$
$$4 i (112 A + 75 C) e^{\frac{3}{2} i (c+d x)} \text{Cos}[c+d x]^4 \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right] +$$
$$\left.3 (64 A + 164 C + 7 (48 A + 55 C) \text{Cos}[c+d x] + 4 (16 A + 25 C) \text{Cos}[2 (c+d x)] + 112 A \text{Cos}[3 (c+d x)] + 75 C \text{Cos}[3 (c+d x)]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 1143: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \text{Sec}[c+d x])^{3/2} \left(A + C \text{Sec}[c+d x]^2\right)}{\text{Cos}[c+d x]^{5/2}} \, dx$$

Optimal (type 3, 285 leaves, 8 steps):

$$\frac{a^{3/2}\,(176 A+133 C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{128 d}+\frac{a^2\,(80 A+67 C)\,\text{Sin}[c+d x]}{240 d\,\text{Cos}[c+d x]^{7/2}\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2\,(176 A+133 C)\,\text{Sin}[c+d x]}{192 d\,\text{Cos}[c+d x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{a^2\,(176 A+133 C)\,\text{Sin}[c+d x]}{128 d\,\text{Cos}[c+d x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{3 a C\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{40 d\,\text{Cos}[c+d x]^{7/2}}+\frac{C\,(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{5 d\,\text{Cos}[c+d x]^{7/2}}$$

Result (type 5, 263 leaves):

$$\frac{1}{1920 d\,\text{Cos}[c+d x]^{9/2}\,(A+2 C+A\,\text{Cos}[2 (c+d x)])}\,a\,(1+\text{Cos}[c+d x])\left(C+A\,\text{Cos}[c+d x]^2\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\sqrt{a\,(1+\text{Sec}[c+d x])}\left(-15 i\,(176 A+133 C)\,e^{\frac{1}{2} i (c+d x)}\,\text{Cos}[c+d x]^5\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2 i (c+d x)}\right]-5 i\,(176 A+133 C)\,e^{\frac{3}{2} i (c+d x)}\,\text{Cos}[c+d x]^5\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2 i (c+d x)}\right]+\left(384 C+912 C\,\text{Cos}[c+d x]+8 (80 A+133 C)\,\text{Cos}[c+d x]^2+10 (176 A+133 C)\,\text{Cos}[c+d x]^3+15 (176 A+133 C)\,\text{Cos}[c+d x]^4\right)\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

- **Problem 1147: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d x]^{7/2}\,(a+a\,\text{Sec}[c+d x])^{5/2}\left(A+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 3, 230 leaves, 7 steps):

$$\frac{2 a^{5/2}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{d}+\frac{2 a^3\,(32 A+49 C)\,\text{Sin}[c+d x]}{21 d\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Sec}[c+d x]}}+\frac{2 a^2\,(8 A+7 C)\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{21 d}+\frac{2 a A\,\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Sec}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{7 d}+\frac{2 A\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{7 d}$$

Result (type 5, 297 leaves):

$$\left(C\,\mathrm{Cos}[c+d\,x]^{9/2}\left(-2\,i\,e^{\frac{1}{2}i(c+d\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+d\,x)}\right]-\frac{2}{3}\,i\,e^{\frac{3}{2}i(c+d\,x)}\,\mathrm{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a(1+\mathrm{Sec}[c+d\,x]))^{5/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(2\,d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+\left(\mathrm{Cos}[c+d\,x]^{9/2}\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5(a(1+\mathrm{Sec}[c+d\,x]))^{5/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{5}{8}(3\,A+4\,C)\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{24}(11\,A+4\,C)\,\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{8}A\,\mathrm{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\frac{1}{56}A\,\mathrm{Sin}\left[\frac{7}{2}(c+d\,x)\right]\right)\right)\Big/\left(d\,(A+2\,C+A\,\mathrm{Cos}[2\,c+2\,d\,x])\right)$$

Problem 1148: Result unnecessarily involves higher level functions.

$$\int \mathrm{Cos}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 230 leaves, 7 steps):

$$\frac{5\,a^{5/2}\,C\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{d}+\frac{a^3\,(64\,A+15\,C)\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}-\frac{a^2\,(16\,A-15\,C)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 230 leaves):

$$\frac{1}{60\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(A+2\,C+A\,\mathrm{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\mathrm{Cos}[c+d\,x])^2\left(C+A\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\left(-150\,i\,C\,e^{\frac{1}{2}i(c+d\,x)}\,\mathrm{Cos}[c+d\,x]\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+d\,x)}\right]-50\,i\,C\,e^{\frac{3}{2}i(c+d\,x)}\,\mathrm{Cos}[c+d\,x]\,\mathrm{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+d\,x)}\right]+(28\,A+30\,C+(181\,A+60\,C)\,\mathrm{Cos}[c+d\,x]+28\,A\,\mathrm{Cos}[2\,(c+d\,x)]+3\,A\,\mathrm{Cos}[3\,(c+d\,x)])\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 1149: Result unnecessarily involves higher level functions.

$$\int \mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^{5/2}\left(A+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 244 leaves, 7 steps):

$$\frac{a^{5/2}\,(8\,A+19\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+$$

$$\frac{a^3\,(56\,A-27\,C)\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}-\frac{a^2\,(8\,A-21\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{\text{Cos}[c+d\,x]}}-$$

$$\frac{a\,(4\,A-3\,C)\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{6\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 246 leaves) :

$$\frac{1}{24\,d\,\text{Cos}[c+d\,x]^{3/2}\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-3\,i\,(8\,A+19\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$i\,(8\,A+19\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^2\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.(32\,A+6\,C+(6\,A+33\,C)\,\text{Cos}[c+d\,x]+32\,A\,\text{Cos}[2\,(c+d\,x)]+2\,A\,\text{Cos}[3\,(c+d\,x)])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 1150: Result unnecessarily involves higher level functions.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 238 leaves, 7 steps) :

$$\frac{5\,a^{5/2}\,(8\,A+5\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+\frac{a^3\,(24\,A-49\,C)\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a^2\,(24\,A+31\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{5\,a\,C\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 244 leaves) :

$$\frac{1}{48\,d\,\text{Cos}[c+d\,x]^{5/2}\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-15\,i\,(8\,A+5\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-5\,i\,(8\,A+5\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^3\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(8\,C+34\,C\,\text{Cos}[c+d\,x]+3\,(8\,A+25\,C)\,\text{Cos}[c+d\,x]^2+48\,A\,\text{Cos}[c+d\,x]^3\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1151: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 238 leaves, 7 steps):

$$\frac{a^{5/2}\,(304\,A+163\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+\frac{a^3\,(432\,A+299\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(16\,A+17\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{5\,a\,C\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 248 leaves):

$$\frac{1}{384\,d\,\text{Cos}[c+d\,x]^{7/2}\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-3\,i\,(304\,A+163\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^4\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$i\,(304\,A+163\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^4\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.\left(48\,C+184\,C\,\text{Cos}[c+d\,x]+(96\,A+326\,C)\,\text{Cos}[c+d\,x]^2+(528\,A+489\,C)\,\text{Cos}[c+d\,x]^3\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1152: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 285 leaves, 8 steps):

$$\frac{a^{5/2}\,(400\,A+283\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{128\,d}+$$
$$\frac{a^3\,(1040\,A+787\,C)\,\text{Sin}[c+d\,x]}{960\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(400\,A+283\,C)\,\text{Sin}[c+d\,x]}{128\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(80\,A+79\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{a\,C\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 267 leaves):

$$\frac{1}{3840\,d\,\text{Cos}[c+d\,x]^{9/2}\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-15\,i\,(400\,A+283\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^5\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$5\,i\,(400\,A+283\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^5\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.\left(384\,C+1392\,C\,\text{Cos}[c+d\,x]+8\,(80\,A+283\,C)\,\text{Cos}[c+d\,x]^2+10\,(272\,A+283\,C)\,\text{Cos}[c+d\,x]^3+15\,(400\,A+283\,C)\,\text{Cos}[c+d\,x]^4\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 1153: Result unnecessarily involves higher level functions.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 332 leaves, 9 steps):

$$\frac{a^{5/2}\,(1304\,A+1015\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{512\,d}+$$
$$\frac{a^3\,(136\,A+109\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(1304\,A+1015\,C)\,\text{Sin}[c+d\,x]}{768\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(1304\,A+1015\,C)\,\text{Sin}[c+d\,x]}{512\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(24\,A+23\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{96\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{a\,C\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{6\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 282 leaves):

$$\frac{1}{3072\,d\,\text{Cos}[c+d\,x]^{11/2}\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-3\,i\,(1304\,A+1015\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^6\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,-e^{2\,i\,(c+d\,x)}\right]-i\,(1304\,A+1015\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\right.$$
$$\text{Cos}[c+d\,x]^6\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,-e^{2\,i\,(c+d\,x)}\right]+\left(256\,C+896\,C\,\text{Cos}[c+d\,x]+48\,(8\,A+29\,C)\,\text{Cos}[c+d\,x]^2+\right.$$
$$\left.\left.8\,(184\,A+203\,C)\,\text{Cos}[c+d\,x]^3+(2608\,A+2030\,C)\,\text{Cos}[c+d\,x]^4+(3912\,A+3045\,C)\,\text{Cos}[c+d\,x]^5\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 1164: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 185 leaves, 7 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{a^{3/2}\,d}+$$

$$\frac{(3\,A-5\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 386 leaves) :

$$-\Bigg(\Bigg(\left(2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(C+A\,\text{Cos}[c+d\,x]^2\right)\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right.$$
$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\sqrt{1+\text{Cos}[c+d\,x]}\,\Big(\sqrt{2}\,(3\,A-C)\,\text{Log}[1+\text{Cos}[c+d\,x]]+8\,C\,\text{Log}\left[\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\right]-$$
$$2\,\sqrt{2}\,C\,\text{Log}\left[(1+\text{Cos}[c+d\,x])^2\right]-3\,\sqrt{2}\,A\,\text{Log}\left[2\,\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]+$$
$$\sqrt{2}\,C\,\text{Log}\left[2\,\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]-8\,C\,\text{Log}\left[1+\text{Cos}[c+d\,x]+\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]^2}\right]+$$
$$2\,\sqrt{2}\,C\,\text{Log}\left[3+2\,\text{Cos}[c+d\,x]-\text{Cos}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]^2}\right]\Big)+(A+C)\,\sqrt{\text{Sin}[c+d\,x]^2}\Bigg)\Bigg)\Bigg/$$
$$\left(a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,(A+2\,C+A\,\text{Cos}[2\,(c+d\,x)])\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\sqrt{\text{Sin}[c+d\,x]^2}\right)\right)$$

- **Problem 1165: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 228 leaves, 8 steps) :

$$-\frac{3\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{a^{3/2}\,d}+\frac{(A+9\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\sqrt{2}\,a^{3/2}\,d}-$$

$$\frac{(A+C)\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}+\frac{(A+3\,C)\,\text{Sin}[c+d\,x]}{2\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 540 leaves) :

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3 \sqrt{\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)\left(8\,C\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\left(A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\Big/$$

$$\left(d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)-\left(\sqrt{2}\,(A+3\,C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{1+\text{Cos}[c+d\,x]}\right.$$

$$\left.\left(\text{Log}[1+\text{Cos}[c+d\,x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]\right)\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\sqrt{1-\text{Cos}[c+d\,x]^2}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)+\left(3\,C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{1+\text{Cos}[c+d\,x]}\right.$$

$$\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d\,x])^2\right]+4\,\text{Log}\left[\sqrt{\text{Cos}[c+d\,x]}+\text{Cos}[c+d\,x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d\,x]+\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right]+\right.$$

$$\left.\left.\sqrt{2}\,\text{Log}\left[3+2\,\text{Cos}[c+d\,x]-\text{Cos}[c+d\,x]^2+2\sqrt{2}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right]\right)\left(A+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\sqrt{1-\text{Cos}[c+d\,x]^2}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)$$

Problem 1171: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 232 leaves, 8 steps):

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{a^{5/2}\,d}+\frac{(5\,A-43\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{16\sqrt{2}\,a^{5/2}\,d}-$$

$$\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}+\frac{(5\,A-11\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 563 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 (A+C\,\text{Sec}[c+d x]^2)\left(\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(5 A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-11 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\left(-A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\Big/\left(d\sqrt{\text{Cos}[c+d x]}\,(A+2 C+A\,\text{Cos}[2 c+2 d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\frac{1}{4 d\,(A+2 C+A\,\text{Cos}[2 c+2 d x])\,(a\,(1+\text{Sec}[c+d x]))^{5/2}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\sqrt{\text{Sec}[c+d x]}\,(A+C\,\text{Sec}[c+d x]^2)$$

$$\left(-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}\sqrt{2}\,(5 A-11 C)\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}\left(\text{Log}[1+\text{Cos}[c+d x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d x]}+\sqrt{2-2\,\text{Cos}[c+d x]^2}\right]\right)\right.$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}16 C\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}$$

$$\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d x])^2\right]+4\,\text{Log}\left[\sqrt{\text{Cos}[c+d x]}+\text{Cos}[c+d x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d x]+\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]+\right.$$

$$\left.\left.\sqrt{2}\,\text{Log}\left[3+2\,\text{Cos}[c+d x]-\text{Cos}[c+d x]^2+2\sqrt{2}\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]\right)$$

- **Problem 1172: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+C\,\text{Sec}[c+d x]^2}{\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 277 leaves, 9 steps):

$$-\frac{5 C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{a^{5/2}\,d}+\frac{(3 A+115 C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{16\sqrt{2}\,a^{5/2}\,d}-$$

$$\frac{(A+C)\,\text{Sin}[c+d x]}{4 d\,\text{Cos}[c+d x]^{7/2}\,(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{(A-15 C)\,\text{Sin}[c+d x]}{16 a d\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{(3 A+35 C)\,\text{Sin}[c+d x]}{16 a^2 d\,\text{Cos}[c+d x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 580 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5 \left(A+C\,\text{Sec}[c+d\,x]^2\right) \left(16\,C\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\right.\right.$$
$$\left.\left.\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4 \left(A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)+\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2 \left(3\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+19\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\Big/$$
$$\left(d\sqrt{\text{Cos}[c+d\,x]}\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+\frac{1}{4\,d\,(A+2\,C+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}}$$
$$\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5 \sqrt{\text{Sec}[c+d\,x]}\,\left(A+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{1}{\sqrt{1-\text{Cos}[c+d\,x]^2}}\sqrt{2}\,(3\,A+35\,C)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\left(\text{Log}[1+\text{Cos}[c+d\,x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]\right)\right.$$
$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]+\frac{1}{\sqrt{1-\text{Cos}[c+d\,x]^2}}40\,C\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{1+\text{Cos}[c+d\,x]}$$
$$\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d\,x])^2\right]+4\,\text{Log}\left[\sqrt{\text{Cos}[c+d\,x]}+\text{Cos}[c+d\,x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d\,x]+\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right]+\right.$$
$$\left.\left.\sqrt{2}\,\text{Log}\left[3+2\,\text{Cos}[c+d\,x]-\text{Cos}[c+d\,x]^2+2\sqrt{2}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)$$

- **Problem 1182: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 65 leaves, 5 steps) :

$$\frac{2\,B\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{2\,(A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,A\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 682 leaves) :

$$\frac{\text{Cos}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{4\,B\,\text{Cot}[c]}{d}+\frac{4\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}\right)}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}-$$

$$\Big(4\,A\,\text{Cos}[c+d\,x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Big)\Big/\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Big(4\,C\,\text{Cos}[c+d\,x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Big)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-\Big(2\,B\,\text{Cos}[c+d\,x]^2\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1183: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{\text{Cos}[c+d x]}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,dx$$

Optimal (type 4, 61 leaves, 5 steps):

$$\frac{2\,(A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),\,2\right]}{d}+\frac{2\,B\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),\,2\right]}{d}+\frac{2\,C\,\text{Sin}[c+d x]}{d\,\sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 759 leaves):

$$\frac{\text{Cos}[c+d x]^{5/2}\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,\left(-\frac{2\,(A-2\,C+A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{4\,C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{d}\right)}{A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]}-$$

$$\left(4\,B\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x])\,\sqrt{1+\text{Cot}[c]^2}\right)-\left(2\,A\,\text{Cos}[c+d x]^2\,\text{Csc}[c]\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$(d (A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))+\Bigg(2C\,\text{Cos}[c+dx]^2\,\text{Csc}[c]\,(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Big/$$

$$\Bigg(\sqrt{1-\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\Bigg)-$$

$$\frac{\frac{\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/(d (A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx]))$$

Problem 1187: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+dx]^{9/2}\,(a+a\,\text{Sec}[c+dx])\,(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)\,dx$$

Optimal (type 4, 175 leaves, 8 steps):

$$\frac{2a(7A+9(B+C))\,\text{EllipticE}\big[\frac{1}{2}(c+dx),2\big]}{15d}+\frac{2a(5(A+B)+7C)\,\text{EllipticF}\big[\frac{1}{2}(c+dx),2\big]}{21d}+\frac{2a(5(A+B)+7C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{21d}+$$
$$\frac{2a(7A+9(B+C))\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{45d}+\frac{2a(A+B)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{7d}+\frac{2aA\,\text{Cos}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{9d}$$

Result (type 5, 1292 leaves):

$$a\Bigg(\sqrt{\text{Cos}[c+dx]}\,(1+\text{Cos}[c+dx])\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^2\Bigg(-\frac{(7A+9B+9C)\,\text{Cot}[c]}{15d}+\frac{(23A+23B+28C)\,\text{Cos}[dx]\,\text{Sin}[c]}{84d}+$$
$$\frac{(19A+18B+18C)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{180d}+\frac{(A+B)\,\text{Cos}[3dx]\,\text{Sin}[3c]}{28d}+\frac{A\,\text{Cos}[4dx]\,\text{Sin}[4c]}{72d}+\frac{(23A+23B+28C)\,\text{Cos}[c]\,\text{Sin}[dx]}{84d}+$$
$$\frac{(19A+18B+18C)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{180d}+\frac{(A+B)\,\text{Cos}[3c]\,\text{Sin}[3dx]}{28d}+\frac{A\,\text{Cos}[4c]\,\text{Sin}[4dx]}{72d}\Bigg)-\frac{1}{21d\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{21\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{30\,d}7\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}3\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1188: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 142 leaves, 7 steps):

$$\frac{2\,a\,(3\,(A+B)+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(5\,A+7\,(B+C))\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$

$$\frac{2\,a\,(5\,A+7\,(B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a\,(A+B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 1240 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{(3\,A+3\,B+5\,C)\,\text{Cot}[c]}{5\,d}+\frac{(23\,A+28\,B+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{84\,d}+\frac{(A+B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\right.\right.$$

$$\left.\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{28\,d}+\frac{(23\,A+28\,B+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{84\,d}+\frac{(A+B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{28\,d}\right)-\frac{1}{21\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}3\,B\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1189: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 106 leaves, 6 steps):

$$\frac{2\,a\,(3\,A+5\,(B+C))\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(A+B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+$$
$$\frac{2\,a\,(A+B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 1186 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(3\,A+5\,B+5\,C)\,\text{Cot}[c]}{5\,d}+\frac{(A+B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{(A+B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}\right)-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1190: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 98 leaves, 6 steps):

$$\frac{2\,a\,(A+B-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{2\,a\,(A+3\,(B+C))\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 1173 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(A+B-2\,C+A\,\text{Cos}[2\,c]+B\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{2\,d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\right)-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\middle/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\middle/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1191: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 103 leaves, 6 steps):

$$\frac{2\,a\,(A-B-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{2\,a\,(3\,A+3\,B+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(B+C)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1180 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(A-2\,B-2\,C+A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{2\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(C\,\text{Sin}[c]+3\,B\,\text{Sin}[d\,x]+3\,C\,\text{Sin}[d\,x])}{3\,d}\right)-$$

$$\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1192: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 141 leaves, 7 steps):

$$-\frac{2\,a\,(5\,A+5\,B+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(3\,A+B+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+$$
$$\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(B+C)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+5\,B+3\,C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1228 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(\frac{(5\,A+5\,B+3\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,C\,\text{Sin}[c]+5\,B\,\text{Sin}[d\,x]+5\,C\,\text{Sin}[d\,x])}{15\,d}+\right.$$

$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,B\,\text{Sin}[c]+5\,C\,\text{Sin}[c]+15\,A\,\text{Sin}[d\,x]+15\,B\,\text{Sin}[d\,x]+9\,C\,\text{Sin}[d\,x])}{15\,d}\right)-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1193: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 177 leaves, 8 steps):

$$-\frac{2\,a\,(5\,A+3\,(B+C))\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(7\,A+7\,B+5\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$

$$\frac{2\,a\,C\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,a\,(B+C)\ \text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(7\,A+7\,B+5\,C)\ \text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(5\,A+3\,(B+C))\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1284 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\ (1+\text{Cos}[c+d\,x])\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(\frac{(5A+3B+3C)\,\text{Csc}[c]\,\text{Sec}[c]}{5d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+dx]^4\,\text{Sin}[dx]}{7d}+\frac{\text{Sec}[c]\,\text{Sec}[c+dx]^3\,(5C\,\text{Sin}[c]+7B\,\text{Sin}[dx]+7C\,\text{Sin}[dx])}{35d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+dx]^2\,(21B\,\text{Sin}[c]+21C\,\text{Sin}[c]+35A\,\text{Sin}[dx]+35B\,\text{Sin}[dx]+25C\,\text{Sin}[dx])}{105d}+\frac{1}{105d}$$

$$\left.\text{Sec}[c]\,\text{Sec}[c+dx]\,(35A\,\text{Sin}[c]+35B\,\text{Sin}[c]+25C\,\text{Sin}[c]+105A\,\text{Sin}[dx]+63B\,\text{Sin}[dx]+63C\,\text{Sin}[dx])\right)-\frac{1}{3d\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,(1+\text{Cos}[c+dx])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3d\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(1+\text{Cos}[c+dx])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{21d\sqrt{1+\text{Cot}[c]^2}}5C\,(1+\text{Cos}[c+dx])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2$$

$$\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}+\frac{1}{2d}A\,(1+\text{Cos}[c+dx])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10d}3B\,(1+\text{Cos}[c+dx])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/ \left(\sqrt{1 - \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{1 + \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}} \sqrt{1 + \text{Tan}[c]^2}\right) - \frac{\frac{\text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1 + \text{Tan}[c]^2}} + \frac{2 \text{Cos}[c]^2 \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}{\text{Cos}[c]^2 + \text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}}\right) + \frac{1}{10 d} 3 C (1 + \text{Cos}[c + d x]) \text{Csc}[c] \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/ \left(\sqrt{1 - \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{1 + \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}} \sqrt{1 + \text{Tan}[c]^2}\right) - \frac{\frac{\text{Sin}[d x + \text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1 + \text{Tan}[c]^2}} + \frac{2 \text{Cos}[c]^2 \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}{\text{Cos}[c]^2 + \text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x + \text{ArcTan}[\text{Tan}[c]]] \sqrt{1 + \text{Tan}[c]^2}}}\right)\right)$$

- **Problem 1194: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d x]^{11/2} (a + a \text{Sec}[c + d x])^2 \left(A + B \text{Sec}[c + d x] + C \text{Sec}[c + d x]^2\right) dx$$

Optimal (type 4, 251 leaves, 10 steps):

$$\frac{4 a^2 (7 A+8 B+9 C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{15 d}+$$
$$\frac{4 a^2 (50 A+55 B+66 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{231 d}+\frac{4 a^2 (50 A+55 B+66 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{231 d}+$$
$$\frac{4 a^2 (7 A+8 B+9 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{45 d}+\frac{2 a^2 (89 A+121 B+99 C) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{693 d}+$$
$$\frac{2 A \text{Cos}[c+d x]^{5/2} (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{11 d}+\frac{2 (4 A+11 B) \text{Cos}[c+d x]^{5/2} \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{99 d}$$

Result (type 5, 1364 leaves) :

$$a^2 \Bigg(\sqrt{\text{Cos}[c+d x]} (1+\text{Cos}[c+d x])^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\left(-\frac{(7 A+8 B+9 C) \text{Cot}[c]}{15 d}+\frac{(941 A+1012 B+1122 C) \text{Cos}[d x] \text{Sin}[c]}{3696 d}+\frac{(38 A+37 B+36 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{360 d}+\right.$$
$$\frac{(101 A+88 B+44 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{2464 d}+\frac{(2 A+B) \text{Cos}[4 d x] \text{Sin}[4 c]}{144 d}+\frac{A \text{Cos}[5 d x] \text{Sin}[5 c]}{352 d}+\frac{(941 A+1012 B+1122 C) \text{Cos}[c] \text{Sin}[d x]}{3696 d}+$$
$$\left.\frac{(38 A+37 B+36 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{360 d}+\frac{(101 A+88 B+44 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{2464 d}+\frac{(2 A+B) \text{Cos}[4 c] \text{Sin}[4 d x]}{144 d}+\frac{A \text{Cos}[5 c] \text{Sin}[5 d x]}{352 d}\right)-$$
$$\frac{1}{231 d \sqrt{1+\text{Cot}[c]^2}} 50 A (1+\text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{21 d \sqrt{1+\text{Cot}[c]^2}}$$
$$5 B (1+\text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{7 d \sqrt{1+\text{Cot}[c]^2}} 2 C (1+\text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]} - \frac{1}{30\,d} 7\,A\,(1+\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right) - \frac{1}{15\,d} 4\,B\,(1+\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right) - \frac{1}{10\,d} 3\,C\,(1+\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

- **Problem 1195: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{9/2}\,(a+a\,\text{Sec}[c+d x])^2\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,dx$$

Optimal (type 4, 215 leaves, 9 steps):

$$\frac{4\,a^2\,(8\,A+9\,B+12\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),\,2\right]}{15\,d}+\frac{4\,a^2\,(5\,A+6\,B+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),\,2\right]}{21\,d}+$$
$$\frac{4\,a^2\,(5\,A+6\,B+7\,C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{21\,d}+\frac{2\,a^2\,(19\,A+27\,B+21\,C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{105\,d}+$$
$$\frac{2\,A\,\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Cos}[c+d x])^2\,\text{Sin}[c+d x]}{9\,d}+\frac{2\,(4\,A+9\,B)\,\text{Cos}[c+d x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d x]\right)\,\text{Sin}[c+d x]}{63\,d}$$

Result (type 5, 1699 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]}$$
$$\text{Cos}[c+d x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,(a+a\,\text{Sec}[c+d x])^2\,\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,\Bigg(-\frac{2\,(8\,A+9\,B+12\,C)\,\text{Cot}[c]}{15\,d}+$$
$$\frac{(46\,A+51\,B+56\,C)\,\text{Cos}[d x]\,\text{Sin}[c]}{84\,d}+\frac{(37\,A+36\,B+18\,C)\,\text{Cos}[2\,d x]\,\text{Sin}[2\,c]}{180\,d}+\frac{(2\,A+B)\,\text{Cos}[3\,d x]\,\text{Sin}[3\,c]}{28\,d}+\frac{A\,\text{Cos}[4\,d x]\,\text{Sin}[4\,c]}{72\,d}+$$
$$\frac{(46\,A+51\,B+56\,C)\,\text{Cos}[c]\,\text{Sin}[d x]}{84\,d}+\frac{(37\,A+36\,B+18\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d x]}{180\,d}+\frac{(2\,A+B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d x]}{28\,d}+\frac{A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d x]}{72\,d}\Bigg)-$$
$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x])\,\sqrt{1+\text{Cot}[c]^2}}\,10\,A\,\text{Cos}[c+d x]^4\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,(a+a\,\text{Sec}[c+d x])^2$$
$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$4\,B\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$2\,C\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,-$$

$$\Bigg(8\,A\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\Big(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\Big)\Big/$$

$$\Big(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\Big)\,-$$

$$\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(15\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\,-$$

$$\left(3\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(4\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1196: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]^{7/2} (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 179 leaves, 8 steps):

$$\frac{4 a^2 (3 A+4 B+5 C) \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{4 a^2 (6 A+7 B+14 C) \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{21 d}+\frac{2 a^2 (33 A+49 B+35 C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{105 d}+\frac{2 A \sqrt{\operatorname{Cos}[c+d x]} (a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sin}[c+d x]}{7 d}+\frac{2 (4 A+7 B) \sqrt{\operatorname{Cos}[c+d x]} \left(a^2+a^2 \operatorname{Cos}[c+d x]\right) \operatorname{Sin}[c+d x]}{35 d}$$

Result (type 5, 2001 leaves):

$$\frac{1}{10 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} 3 i A \operatorname{Cos}[c+d x]^4 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$
$$\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)+$$
$$\frac{1}{5 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} 2 i B \operatorname{Cos}[c+d x]^4 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2$$
$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$
$$\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)+$$
$$\frac{1}{2 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} i C \operatorname{Cos}[c+d x]^4 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \operatorname{Sec}[c+d x])^2$$
$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\left(\text{Cos}[c + d x]^{9/2}\, \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a\, \text{Sec}[c + d x])^2 \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)\right.$$

$$\left(-\frac{2 (3 A + 4 B + 5 C)\, \text{Cot}[c]}{5 d} + \frac{(51 A + 56 B + 28 C)\, \text{Cos}[d x]\, \text{Sin}[c]}{84 d} + \frac{(2 A + B)\, \text{Cos}[2 d x]\, \text{Sin}[2 c]}{10 d} + \right.$$

$$\left.\left.\frac{A\, \text{Cos}[3 d x]\, \text{Sin}[3 c]}{28 d} + \frac{(51 A + 56 B + 28 C)\, \text{Cos}[c]\, \text{Sin}[d x]}{84 d} + \frac{(2 A + B)\, \text{Cos}[2 c]\, \text{Sin}[2 d x]}{10 d} + \frac{A\, \text{Cos}[3 c]\, \text{Sin}[3 d x]}{28 d}\right)\right) \Big/$$

$$(A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) - \frac{1}{7 d (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}}$$

$$4 A\, \text{Cos}[c + d x]^4\, \text{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a\, \text{Sec}[c + d x])^2 \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)$$

$$\text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} -$$

$$\frac{1}{3 d (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}}$$

$$2 B\, \text{Cos}[c + d x]^4\, \text{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 (a + a\, \text{Sec}[c + d x])^2 \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} -$$

$$\frac{1}{3 d (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}}$$

$$4 C\, \text{Cos}[c + d x]^4\, \text{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

- **Problem 1197: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{5/2} (a+a\,\text{Sec}[c+d x])^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 170 leaves, 8 steps):

$$\frac{4 a^2 (4 A+5 B)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{4 a^2 (A+2 B+3 C)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 d}+\frac{2 a^2 (7 A+5 B-15 C) \sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{15 d}+$$
$$\frac{2 C (a+a\,\text{Cos}[c+d x])^2\,\text{Sin}[c+d x]}{d \sqrt{\text{Cos}[c+d x]}}+\frac{2 (A-5 C) \sqrt{\text{Cos}[c+d x]} \left(a^2+a^2\,\text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{5 d}$$

Result (type 5, 1356 leaves):

$$\Bigg(\text{Cos}[c+d x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$
$$\left(-\frac{(8 A+10 B-5 C+8 A\,\text{Cos}[2 c]+10 B\,\text{Cos}[2 c]+5 C\,\text{Cos}[2 c])\,\text{Csc}[c]\,\text{Sec}[c]}{10 d}+\frac{(2 A+B)\,\text{Cos}[d x]\,\text{Sin}[c]}{3 d}+\right.$$
$$\left.\frac{A\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{10 d}+\frac{(2 A+B)\,\text{Cos}[c]\,\text{Sin}[d x]}{3 d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{d}+\frac{A\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{10 d}\right)\Bigg)\Big/$$
$$(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])-\frac{1}{3 d (A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}}$$
$$2 A\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$
$$\frac{1}{3 d (A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}}$$
$$4 B\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a\,\text{Sec}[c+d x])^2 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ \sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ \sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ -$$

$$\frac{1}{d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$2\,C\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\ \mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ \sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ \sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ -$$

$$\left(4\,A\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\ \mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}\ \sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\ (5\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ -$$

$$\left(B\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]\ \mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\mathrm{Sec}[c+d\,x])^2\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

Problem 1198: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 170 leaves, 8 steps):

$$\frac{4\,a^2\,(A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{4\,a^2\,(2\,A+3\,B+2\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+$$
$$\frac{2\,a^2\,(A-3\,B-5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(3\,B+4\,C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1583 leaves):

$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\Bigg(\text{Cos}[c+d x]^{9/2}\,\text{Sec}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg(-\frac{(2 A-B-4 C+2 A\,\text{Cos}[2 c]+B\,\text{Cos}[2 c])\,\text{Csc}[c]\,\text{Sec}[c]}{2 d}+$$

$$\frac{A\,\text{Cos}[d x]\,\text{Sin}[c]}{3 d}+\frac{A\,\text{Cos}[c]\,\text{Sin}[d x]}{3 d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{3 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,(C\,\text{Sin}[c]+3 B\,\text{Sin}[d x]+6 C\,\text{Sin}[d x])}{3 d}\Bigg)\Bigg)\Big/$$

$$(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])-\frac{1}{3 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}}$$

$$4 A\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}}$$

$$2 B\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}}$$

$$4 C\,\text{Cos}[c+d x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^4\,(a+a\,\text{Sec}[c+d x])^2\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

- **Problem 1199: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\;(a+a\,\text{Sec}[c+d\,x])^2\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 174 leaves, 8 steps):

$$-\frac{4\,a^2\,(5\,B+4\,C)\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^2\,(3\,A+2\,B+C)\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+\frac{2\,a^2\,(15\,A+25\,B+17\,C)\;\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,(5\,B+4\,C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 1599 leaves):

$$-\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,2\,i\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\left(\text{Cos}[c+d\,x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{(-5\,A-20\,B-16\,C+5\,A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{10\,d}+\right.\right.$$

$$\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,C\,\text{Sin}[c]+5\,B\,\text{Sin}[d\,x]+10\,C\,\text{Sin}[d\,x])}{15\,d}+$$
$$\left.\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,B\,\text{Sin}[c]+10\,C\,\text{Sin}[c]+15\,A\,\text{Sin}[d\,x]+30\,B\,\text{Sin}[d\,x]+24\,C\,\text{Sin}[d\,x])}{15\,d}\right)\right)\Big/$$

$$(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])-\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$
$$2\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$
$$4\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$
$$2\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

- **Problem 1200: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 215 leaves, 9 steps):

$$-\frac{4 a^2 (5 A+4 B+3 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{5 d}+\frac{4 a^2 (14 A+7 B+6 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{21 d}+\frac{2 a^2 (35 A+49 B+33 C) \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2}}+\frac{4 a^2 (5 A+4 B+3 C) \text{Sin}[c+d x]}{5 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 C (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2}}+\frac{2 (7 B+4 C) \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{35 d \text{Cos}[c+d x]^{5/2}}$$

Result (type 5, 2041 leaves):

$$-\frac{1}{2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} i A \text{Cos}[c+d x]^4 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)-$$
$$\frac{1}{5 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 2 i B \text{Cos}[c+d x]^4 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2$$
$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)-$$
$$\frac{1}{10 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 3 i C \text{Cos}[c+d x]^4 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 (a+a \text{Sec}[c+d x])^2$$
$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{9/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{2\,(5\,A+4\,B+3\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{7\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(5\,C\,\text{Sin}[c]+7\,B\,\text{Sin}[d\,x]+14\,C\,\text{Sin}[d\,x])}{35\,d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(21\,B\,\text{Sin}[c]+42\,C\,\text{Sin}[c]+35\,A\,\text{Sin}[d\,x]+70\,B\,\text{Sin}[d\,x]+60\,C\,\text{Sin}[d\,x])}{105\,d}+\frac{1}{105\,d}$$

$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(35\,A\,\text{Sin}[c]+70\,B\,\text{Sin}[c]+60\,C\,\text{Sin}[c]+210\,A\,\text{Sin}[d\,x]+168\,B\,\text{Sin}[d\,x]+126\,C\,\text{Sin}[d\,x])\right)-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}}\,4\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}}$$

$$4\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d\,x])^2\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

- **Problem 1201: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+a\,\mathrm{Sec}[c+d\,x])^2\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 251 leaves, 10 steps):

$$-\frac{4\,a^2\,(12\,A+9\,B+8\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+\frac{4\,a^2\,(7\,A+6\,B+5\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{2\,a^2\,(21\,A+27\,B+19\,C)\,\mathrm{Sin}[c+d\,x]}{105\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^2\,(7\,A+6\,B+5\,C)\,\mathrm{Sin}[c+d\,x]}{21\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(12\,A+9\,B+8\,C)\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{2\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{9\,d\,\mathrm{Cos}[c+d\,x]^{9/2}}+\frac{2\,(9\,B+4\,C)\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sin}[c+d\,x]}{63\,d\,\mathrm{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 1741 leaves):

$$\frac{1}{A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]}\mathrm{Cos}[c+d\,x]^{9/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d\,x])^2\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{2\,(12\,A+9\,B+8\,C)\,\mathrm{Csc}[c]\,\mathrm{Sec}[c]}{15\,d}+\frac{C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^5\,\mathrm{Sin}[d\,x]}{9\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^4\,(7\,C\,\mathrm{Sin}[c]+9\,B\,\mathrm{Sin}[d\,x]+18\,C\,\mathrm{Sin}[d\,x])}{63\,d}+\right.$$
$$\frac{1}{105\,d}2\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(35\,A\,\mathrm{Sin}[c]+30\,B\,\mathrm{Sin}[c]+25\,C\,\mathrm{Sin}[c]+84\,A\,\mathrm{Sin}[d\,x]+63\,B\,\mathrm{Sin}[d\,x]+56\,C\,\mathrm{Sin}[d\,x])+$$
$$\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,(45\,B\,\mathrm{Sin}[c]+90\,C\,\mathrm{Sin}[c]+63\,A\,\mathrm{Sin}[d\,x]+126\,B\,\mathrm{Sin}[d\,x]+112\,C\,\mathrm{Sin}[d\,x])}{315\,d}+\frac{1}{315\,d}$$
$$\left.\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(63\,A\,\mathrm{Sin}[c]+126\,B\,\mathrm{Sin}[c]+112\,C\,\mathrm{Sin}[c]+210\,A\,\mathrm{Sin}[d\,x]+180\,B\,\mathrm{Sin}[d\,x]+150\,C\,\mathrm{Sin}[d\,x])\right)-$$
$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}2\,A\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Csc}[c]$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 (a+a\,\mathrm{Sec}[c+d\,x])^2$$
$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;-$$

$$\frac{1}{7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$4\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$10\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,+$$

$$\left(4\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,+$$

$$\left(3\,B\,Cos[c+d\,x]^4\,Csc[c]\,Sec\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,Sec[c+d\,x])^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(\left(HypergeometricPFQ\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},Cos[d\,x+ArcTan[Tan[c]]]^2\right]\,Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]\right)\Big/\right.$$

$$\left(\sqrt{1-Cos[d\,x+ArcTan[Tan[c]]]}\,\sqrt{1+Cos[d\,x+ArcTan[Tan[c]]]}\,\sqrt{Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}\,\sqrt{1+Tan[c]^2}\right)-$$

$$\left.\left.\frac{\frac{Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]}{\sqrt{1+Tan[c]^2}}+\frac{2\,Cos[c]^2\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}{Cos[c]^2+Sin[c]^2}}{\sqrt{Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}}\right)\right)\Big/\,(5\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x]))\,+$$

$$\left(8\,C\,Cos[c+d\,x]^4\,Csc[c]\,Sec\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,(a+a\,Sec[c+d\,x])^2\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)\right.$$

$$\left(\left(HypergeometricPFQ\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},Cos[d\,x+ArcTan[Tan[c]]]^2\right]\,Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]\right)\Big/\right.$$

$$\left(\sqrt{1-Cos[d\,x+ArcTan[Tan[c]]]}\,\sqrt{1+Cos[d\,x+ArcTan[Tan[c]]]}\,\sqrt{Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}\,\sqrt{1+Tan[c]^2}\right)-$$

$$\left.\left.\frac{\frac{Sin[d\,x+ArcTan[Tan[c]]]\,Tan[c]}{\sqrt{1+Tan[c]^2}}+\frac{2\,Cos[c]^2\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}{Cos[c]^2+Sin[c]^2}}{\sqrt{Cos[c]\,Cos[d\,x+ArcTan[Tan[c]]]\,\sqrt{1+Tan[c]^2}}}\right)\right)\Big/\,(15\,d\,(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x]))$$

- **Problem 1202: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{11/2} (a+a\,\text{Sec}[c+d x])^3 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 267 leaves, 10 steps):

$$\frac{4 a^3 (15 A+17 B+21 C)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{15 d}+\frac{4 a^3 (105 A+121 B+143 C)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{231 d}+\frac{4 a^3 (105 A+121 B+143 C)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{231 d}+\frac{4 a^3 (210 A+253 B+264 C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{1155 d}+\frac{2 A\,\text{Cos}[c+d x]^{3/2} (a+a\,\text{Cos}[c+d x])^3\,\text{Sin}[c+d x]}{11 d}+\frac{2 (6 A+11 B)\,\text{Cos}[c+d x]^{3/2}\left(a^2+a^2\,\text{Cos}[c+d x]\right)^2\text{Sin}[c+d x]}{99 a d}+\frac{2 (105 A+143 B+99 C)\,\text{Cos}[c+d x]^{3/2}\left(a^3+a^3\,\text{Cos}[c+d x]\right)\text{Sin}[c+d x]}{693 d}$$

Result (type 5, 1364 leaves):

$$a^3 \Bigg(\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \Bigg(-\frac{(15 A+17 B+21 C)\,\text{Cot}[c]}{30 d}+\frac{(1953 A+2134 B+2354 C)\,\text{Cos}[d x]\,\text{Sin}[c]}{7392 d}+\frac{(75 A+73 B+54 C)\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{720 d}+\frac{(189 A+132 B+44 C)\,\text{Cos}[3 d x]\,\text{Sin}[3 c]}{4928 d}+\frac{(3 A+B)\,\text{Cos}[4 d x]\,\text{Sin}[4 c]}{288 d}+\frac{A\,\text{Cos}[5 d x]\,\text{Sin}[5 c]}{704 d}+\frac{(1953 A+2134 B+2354 C)\,\text{Cos}[c]\,\text{Sin}[d x]}{7392 d}+\frac{(75 A+73 B+54 C)\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{720 d}+\frac{(189 A+132 B+44 C)\,\text{Cos}[3 c]\,\text{Sin}[3 d x]}{4928 d}+\frac{(3 A+B)\,\text{Cos}[4 c]\,\text{Sin}[4 d x]}{288 d}+\frac{A\,\text{Cos}[5 c]\,\text{Sin}[5 d x]}{704 d}\Bigg)-\frac{1}{22 d\sqrt{1+\text{Cot}[c]^2}}$$

$$5 A (1+\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{42 d\sqrt{1+\text{Cot}[c]^2}}11 B (1+\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{42 d\sqrt{1+\text{Cot}[c]^2}}$$

$$13\,C\,(1+\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-\;\frac{1}{4\,d}A\,(1+\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$

$$\Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\Big)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)-\frac{1}{60\,d}17\,B\,(1+\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$

$$\Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\Big)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)-\frac{1}{20\,d}7\,C\,(1+\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

- **Problem 1203: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\ (a+a\,\text{Sec}[c+d\,x])^3\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 231 leaves, 9 steps):

$$\frac{4\,a^3\ (17\,A+21\,B+27\,C)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),\,2\right]}{15\,d}+\frac{4\,a^3\ (11\,A+13\,B+21\,C)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{4\,a^3\ (32\,A+41\,B+42\,C)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{105\,d}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Cos}[c+d\,x])^3\ \text{Sin}[c+d\,x]}{9\,d}+$$
$$\frac{2\ (2\,A+3\,B)\ \sqrt{\text{Cos}[c+d\,x]}\ \left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\ \text{Sin}[c+d\,x]}{21\,a\,d}+\frac{2\ (73\,A+99\,B+63\,C)\ \sqrt{\text{Cos}[c+d\,x]}\ \left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\ \text{Sin}[c+d\,x]}{315\,d}$$

Result (type 5, 1697 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}$$
$$\text{Cos}[c+d\,x]^{11/2}\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\ (a+a\,\text{Sec}[c+d\,x])^3\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\ \left(-\frac{(17\,A+21\,B+27\,C)\ \text{Cot}[c]}{15\,d}+\right.$$
$$\frac{(97\,A+107\,B+84\,C)\ \text{Cos}[d\,x]\ \text{Sin}[c]}{168\,d}+\frac{(73\,A+54\,B+18\,C)\ \text{Cos}[2\,d\,x]\ \text{Sin}[2\,c]}{360\,d}+\frac{(3\,A+B)\ \text{Cos}[3\,d\,x]\ \text{Sin}[3\,c]}{56\,d}+\frac{A\,\text{Cos}[4\,d\,x]\ \text{Sin}[4\,c]}{144\,d}+$$
$$\left.\frac{(97\,A+107\,B+84\,C)\ \text{Cos}[c]\ \text{Sin}[d\,x]}{168\,d}+\frac{(73\,A+54\,B+18\,C)\ \text{Cos}[2\,c]\ \text{Sin}[2\,d\,x]}{360\,d}+\frac{(3\,A+B)\ \text{Cos}[3\,c]\ \text{Sin}[3\,d\,x]}{56\,d}+\frac{A\,\text{Cos}[4\,c]\ \text{Sin}[4\,d\,x]}{144\,d}\right)-$$
$$\frac{1}{21\,d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}}\ 11\,A\,\text{Cos}[c+d\,x]^5\ \text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\ (a+a\,\text{Sec}[c+d\,x])^3$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\frac{1}{21\, d\, (A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$13\,B\,\mathrm{Cos}[c+d x]^5\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-$$

$$\frac{1}{d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$C\,\mathrm{Cos}[c+d x]^5\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$(a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-$$

$$\left(17\,A\,\mathrm{Cos}[c+d x]^5\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6(a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\mathrm{Sin}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\sqrt{1+\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\left(30\,d\,(A+2C+2B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2c+2d x])\right)-$$

$$\left(7\,B\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))-$$

$$\left(9\,C\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1204: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d x]^{7/2}\,(a+a\,\mathrm{Sec}[c+d x])^3\,\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\,dx$$

Optimal (type 4, 227 leaves, 9 steps):

$$\frac{4 a^3 (7 A+9 B+5 C)\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{4 a^3 (13 A+21 B+35 C)\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21 d}+\frac{4 a^3 (41 A+42 B-35 C)\sqrt{\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{105 d}+\frac{2 C (a+a\,\mathrm{Cos}[c+d x])^3\,\mathrm{Sin}[c+d x]}{d\sqrt{\mathrm{Cos}[c+d x]}}+\frac{2 (A-7 C)\sqrt{\mathrm{Cos}[c+d x]}\left(a^2+a^2\,\mathrm{Cos}[c+d x]\right)^2\mathrm{Sin}[c+d x]}{7 a d}+\frac{2 (11 A+7 B-35 C)\sqrt{\mathrm{Cos}[c+d x]}\left(a^3+a^3\,\mathrm{Cos}[c+d x]\right)\mathrm{Sin}[c+d x]}{35 d}$$

Result (type 5, 1688 leaves):

$$\frac{1}{A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x]}\mathrm{Cos}[c+d x]^{11/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\left(-\frac{(14 A+18 B+5 C+14 A\,\mathrm{Cos}[2 c]+18 B\,\mathrm{Cos}[2 c]+15 C\,\mathrm{Cos}[2 c])\,\mathrm{Csc}[c]\,\mathrm{Sec}[c]}{20 d}+\frac{(107 A+84 B+28 C)\,\mathrm{Cos}[d x]\,\mathrm{Sin}[c]}{168 d}+\frac{(3 A+B)\,\mathrm{Cos}[2 d x]\,\mathrm{Sin}[2 c]}{20 d}+\frac{A\,\mathrm{Cos}[3 d x]\,\mathrm{Sin}[3 c]}{56 d}+\frac{(107 A+84 B+28 C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d x]}{168 d}+\frac{C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d x]\,\mathrm{Sin}[d x]}{2 d}+\frac{(3 A+B)\,\mathrm{Cos}[2 c]\,\mathrm{Sin}[2 d x]}{20 d}+\frac{A\,\mathrm{Cos}[3 c]\,\mathrm{Sin}[3 d x]}{56 d}\right)-\frac{1}{21 d (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\sqrt{1+\mathrm{Cot}[c]^2}}13 A\,\mathrm{Cos}[c+d x]^5\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-\frac{1}{d (A+2 C+2 B\,\mathrm{Cos}[c+d x]+A\,\mathrm{Cos}[2 c+2 d x])\sqrt{1+\mathrm{Cot}[c]^2}}B\,\mathrm{Cos}[c+d x]^5\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 (a+a\,\mathrm{Sec}[c+d x])^3\left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right)\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$5\,C\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,-$$

$$\left(7\,A\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\,-$$

$$\left(9\,B\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\mathrm{Sec}[c+d\,x])^3\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\;(10\,d\;(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(C\,\text{Cos}[c+d\,x]^5\;\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\;(a+a\,\text{Sec}[c+d\,x])^3\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\;\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\;(2\,d\;(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1205: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\;(a+a\,\text{Sec}[c+d\,x])^3\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 226 leaves, 9 steps):

$$\frac{4a^3(9A+5B-5C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{5d}+\frac{4a^3(3A+5(B+C))\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3d}+$$
$$\frac{4a^3(6A-5B-20C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{15d}+\frac{2C(a+a\,\text{Cos}[c+dx])^3\,\text{Sin}[c+dx]}{3d\,\text{Cos}[c+dx]^{3/2}}+$$
$$\frac{2(B+2C)\left(a^2+a^2\,\text{Cos}[c+dx]\right)^2\text{Sin}[c+dx]}{a\,d\sqrt{\text{Cos}[c+dx]}}+\frac{2(3A-15B-35C)\sqrt{\text{Cos}[c+dx]}\left(a^3+a^3\,\text{Cos}[c+dx]\right)\text{Sin}[c+dx]}{15d}$$

Result (type 5, 1672 leaves) :

$$\left(\text{Cos}[c+dx]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6(a+a\,\text{Sec}[c+dx])^3\right.$$
$$\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\left(-\frac{(18A+5B-25C+18A\,\text{Cos}[2c]+15B\,\text{Cos}[2c]+5C\,\text{Cos}[2c])\,\text{Csc}[c]\,\text{Sec}[c]}{20d}+\right.$$
$$\frac{(3A+B)\,\text{Cos}[dx]\,\text{Sin}[c]}{6d}+\frac{A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{20d}+\frac{(3A+B)\,\text{Cos}[c]\,\text{Sin}[dx]}{6d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+dx]^2\,\text{Sin}[dx]}{6d}+$$
$$\left.\left.\frac{\text{Sec}[c]\,\text{Sec}[c+dx]\,(C\,\text{Sin}[c]+3B\,\text{Sin}[dx]+9C\,\text{Sin}[dx])}{6d}+\frac{A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{20d}\right)\right)\Big/$$
$$(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])-\frac{1}{d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}}$$
$$A\,\text{Cos}[c+dx]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6(a+a\,\text{Sec}[c+dx])^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}}$$
$$5B\,\text{Cos}[c+dx]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6(a+a\,\text{Sec}[c+dx])^3\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{3d\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\left(9\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,-$$

$$\left(B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1206: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 231 leaves, 9 steps):

$$\frac{4\,a^3\,(5\,A-5\,B-9\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(5\,A+5\,B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}-\frac{4\,a^3\,(5\,A+20\,B+21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+$$

$$\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,(5\,B+6\,C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{15\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(15\,A+35\,B+33\,C)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1673 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{(5\,A-25\,B-36\,C+15\,A\,\text{Cos}[2\,c]+5\,B\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{20\,d}+\frac{A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{6\,d}+\right.$$

$$\frac{A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{6\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{10\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,C\,\text{Sin}[c]+5\,B\,\text{Sin}[d\,x]+15\,C\,\text{Sin}[d\,x])}{30\,d}+$$

$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,B\,\text{Sin}[c]+15\,C\,\text{Sin}[c]+15\,A\,\text{Sin}[d\,x]+45\,B\,\text{Sin}[d\,x]+54\,C\,\text{Sin}[d\,x])}{30\,d}\right)-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,5\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\left(A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\;(2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\;+$$

$$\left(B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\;(2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\;+$$

$$\left(9\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x])\right)$$

- **Problem 1207: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)dx$$

Optimal (type 4, 231 leaves, 9 steps):

$$-\frac{4\,a^3\,(5\,A+9\,B+7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),2\right]}{5\,d}+\frac{4\,a^3\,(35\,A+21\,B+13\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]}{21\,d}+\frac{4\,a^3\,(140\,A+147\,B+106\,C)\,\text{Sin}[c+d x]}{105\,d\,\sqrt{\text{Cos}[c+d x]}}+\frac{2\,C\,(a+a\,\text{Cos}[c+d x])^3\,\text{Sin}[c+d x]}{7\,d\,\text{Cos}[c+d x]^{7/2}}+\frac{2\,(7\,B+6\,C)\,\left(a^2+a^2\,\text{Cos}[c+d x]\right)^2\,\text{Sin}[c+d x]}{35\,a\,d\,\text{Cos}[c+d x]^{5/2}}+\frac{2\,(5\,A+9\,B+7\,C)\,\left(a^3+a^3\,\text{Cos}[c+d x]\right)\,\text{Sin}[c+d x]}{15\,d\,\text{Cos}[c+d x]^{3/2}}$$

Result (type 5, 1692 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x]}\,\text{Cos}[c+d x]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,(a+a\,\text{Sec}[c+d x])^3\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{(-25\,A-36\,B-28\,C+5\,A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{20\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{14\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5\,C\,\text{Sin}[c]+7\,B\,\text{Sin}[d x]+21\,C\,\text{Sin}[d x])}{70\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(21\,B\,\text{Sin}[c]+63\,C\,\text{Sin}[c]+35\,A\,\text{Sin}[d x]+105\,B\,\text{Sin}[d x]+130\,C\,\text{Sin}[d x])}{210\,d}+\frac{1}{210\,d}\text{Sec}[c]\,\text{Sec}[c+d x]\,(35\,A\,\text{Sin}[c]+105\,B\,\text{Sin}[c]+130\,C\,\text{Sin}[c]+315\,A\,\text{Sin}[d x]+378\,B\,\text{Sin}[d x]+294\,C\,\text{Sin}[d x])\right)-\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2\,c+2\,d x])\,\sqrt{1+\text{Cot}[c]^2}}5\,A\,\text{Cos}[c+d x]^5\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$13\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;+$$

$$\left(A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)\;-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (2\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(9\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(7\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1208: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 267 leaves, 10 steps):

$$-\frac{4\,a^3\,(27\,A+21\,B+17\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+\frac{4\,a^3\,(21\,A+13\,B+11\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+\frac{4\,a^3\,(42\,A+41\,B+32\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(27\,A+21\,B+17\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{2\,(3\,B+2\,C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{21\,a\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,(63\,A+99\,B+73\,C)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 1739 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{11/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{(27\,A+21\,B+17\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{15\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{18\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(7\,C\,\text{Sin}[c]+9\,B\,\text{Sin}[d\,x]+27\,C\,\text{Sin}[d\,x])}{126\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(45\,B\,\text{Sin}[c]+135\,C\,\text{Sin}[c]+63\,A\,\text{Sin}[d\,x]+189\,B\,\text{Sin}[d\,x]+238\,C\,\text{Sin}[d\,x])}{630\,d}+\frac{1}{210\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(105\,A\,\text{Sin}[c]+130\,B\,\text{Sin}[c]+110\,C\,\text{Sin}[c]+378\,A\,\text{Sin}[d\,x]+294\,B\,\text{Sin}[d\,x]+238\,C\,\text{Sin}[d\,x])+\frac{1}{630\,d}$$
$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(63\,A\,\text{Sin}[c]+189\,B\,\text{Sin}[c]+238\,C\,\text{Sin}[c]+315\,A\,\text{Sin}[d\,x]+390\,B\,\text{Sin}[d\,x]+330\,C\,\text{Sin}[d\,x])\right)-$$
$$\frac{1}{d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$13\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$11\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,+$$

$$\left(9\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,+$$

$$\left(7\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,+$$

$$\left(17\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,(a+a\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(30\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1209: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d x]^{13/2} (a+a\,\mathrm{Sec}[c+d x])^4 \left(A+B\,\mathrm{Sec}[c+d x]+C\,\mathrm{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 310 leaves, 11 steps):

$$\frac{8 a^4 (185 A+208 B+247 C)\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{195 d}+\frac{8 a^4 (100 A+113 B+132 C)\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{231 d}+\frac{8 a^4 (100 A+113 B+132 C)\sqrt{\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{231 d}+\frac{4 a^4 (5255 A+6019 B+6721 C)\,\mathrm{Cos}[c+d x]^{3/2}\,\mathrm{Sin}[c+d x]}{15015 d}+\frac{2 a (8 A+13 B)\,\mathrm{Cos}[c+d x]^{3/2} (a+a\,\mathrm{Cos}[c+d x])^3\,\mathrm{Sin}[c+d x]}{143 d}+\frac{2 A\,\mathrm{Cos}[c+d x]^{3/2} (a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sin}[c+d x]}{13 d}+\frac{2 (13 A+17 B+11 C)\,\mathrm{Cos}[c+d x]^{3/2} \left(a^2+a^2\,\mathrm{Cos}[c+d x]\right)^2\,\mathrm{Sin}[c+d x]}{99 d}+\frac{4 (1355 A+1612 B+1573 C)\,\mathrm{Cos}[c+d x]^{3/2} \left(a^4+a^4\,\mathrm{Cos}[c+d x]\right)\,\mathrm{Sin}[c+d x]}{9009 d}$$

Result (type 5, 1416 leaves):

$$a^4 \left(\sqrt{\mathrm{Cos}[c+d x]}\,(1+\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 \left(-\frac{(185 A+208 B+247 C)\,\mathrm{Cot}[c]}{390 d}+\frac{(3764 A+4087 B+4488 C)\,\mathrm{Cos}[d x]\,\mathrm{Sin}[c]}{14784 d}+\frac{(15625 A+15392 B+13208 C)\,\mathrm{Cos}[2 d x]\,\mathrm{Sin}[2 c]}{149760 d}+\frac{(404 A+321 B+176 C)\,\mathrm{Cos}[3 d x]\,\mathrm{Sin}[3 c]}{9856 d}+\frac{(98 A+52 B+13 C)\,\mathrm{Cos}[4 d x]\,\mathrm{Sin}[4 c]}{7488 d}+\frac{(4 A+B)\,\mathrm{Cos}[5 d x]\,\mathrm{Sin}[5 c]}{1408 d}+\frac{A\,\mathrm{Cos}[6 d x]\,\mathrm{Sin}[6 c]}{3328 d}+\frac{(3764 A+4087 B+4488 C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d x]}{14784 d}+\frac{(15625 A+15392 B+13208 C)\,\mathrm{Cos}[2 c]\,\mathrm{Sin}[2 d x]}{149760 d}+\frac{(404 A+321 B+176 C)\,\mathrm{Cos}[3 c]\,\mathrm{Sin}[3 d x]}{9856 d}+\frac{(98 A+52 B+13 C)\,\mathrm{Cos}[4 c]\,\mathrm{Sin}[4 d x]}{7488 d}+\frac{(4 A+B)\,\mathrm{Cos}[5 c]\,\mathrm{Sin}[5 d x]}{1408 d}+\frac{A\,\mathrm{Cos}[6 c]\,\mathrm{Sin}[6 d x]}{3328 d}\right)-\frac{1}{231 d \sqrt{1+\mathrm{Cot}[c]^2}}\right.$$

$$50 A (1+\mathrm{Cos}[c+d x])^4\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\,\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-$$

$$\frac{1}{462 d \sqrt{1+\mathrm{Cot}[c]^2}} 113 B (1+\mathrm{Cos}[c+d x])^4\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{7\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,C\,(1+\text{Cos}[c+d\,x])^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{156\,d}37\,A\,(1+\text{Cos}[c+d\,x])^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{15\,d}4\,B\,(1+\text{Cos}[c+d\,x])^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{60\,d}19\,C\,(1+\text{Cos}[c+d\,x])^4\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8$$

$$\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

- **Problem 1210: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{11/2}\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 274 leaves, 10 steps):

$$\frac{8\,a^4\,(16\,A+19\,B+24\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{8\,a^4\,(113\,A+132\,B+187\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{231\,d}+$$
$$\frac{4\,a^4\,(667\,A+803\,B+913\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{1155\,d}+\frac{2\,a\,(8\,A+11\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{99\,d}+$$
$$\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{11\,d}+\frac{2\,(43\,A+55\,B+33\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{231\,d}+$$
$$\frac{4\,(769\,A+946\,B+891\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{3465\,d}$$

Result (type 5, 1751 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{13/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{(16\,A+19\,B+24\,C)\,\text{Cot}[c]}{15\,d}+\frac{(4087\,A+4488\,B+4202\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{7392\,d}+\right.$$
$$\frac{(148\,A+127\,B+72\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{720\,d}+\frac{(321\,A+176\,B+44\,C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{4928\,d}+\frac{(4\,A+B)\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{288\,d}+$$
$$\frac{A\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{704\,d}+\frac{(4087\,A+4488\,B+4202\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{7392\,d}+\frac{(148\,A+127\,B+72\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{720\,d}+$$

$$\frac{(321\,A+176\,B+44\,C)\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{4928\,d}+\frac{(4\,A+B)\,\mathrm{Cos}[4\,c]\,\mathrm{Sin}[4\,d\,x]}{288\,d}+\frac{A\,\mathrm{Cos}[5\,c]\,\mathrm{Sin}[5\,d\,x]}{704\,d}\Bigg)-$$

$$\frac{1}{231\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}\;113\,A\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]$$

$$\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;-$$

$$\frac{1}{7\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$4\,B\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;-$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$17\,C\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\;-$$

$$\Bigg(8\,A\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (15\,d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(19\,B\,\text{Cos}[c+d\,x]^6\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\ (a+a\,\text{Sec}[c+d\,x])^4\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (30\,d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(4\,C\,\text{Cos}[c+d\,x]^6\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\ (a+a\,\text{Sec}[c+d\,x])^4\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1211: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 270 leaves, 10 steps):

$$\frac{8\,a^4\,(19\,A+24\,B+21\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{8\,a^4\,(12\,A+17\,B+28\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$
$$\frac{4\,a^4\,(73\,A+83\,B+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,a\,(A-9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d}+$$
$$\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,(5\,A+3\,B-21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{4\,(86\,A+81\,B-126\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{315\,d}$$

Result (type 5, 1742 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{13/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(76\,A+96\,B+69\,C+76\,A\,\text{Cos}[2\,c]+96\,B\,\text{Cos}[2\,c]+99\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{120\,d}+\frac{(204\,A+191\,B+112\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{336\,d}+\right.$$
$$\frac{(127\,A+72\,B+18\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{720\,d}+\frac{(4\,A+B)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{112\,d}+\frac{A\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{288\,d}+\frac{(204\,A+191\,B+112\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{336\,d}+$$
$$\left.\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{4\,d}+\frac{(127\,A+72\,B+18\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{720\,d}+\frac{(4\,A+B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{112\,d}+\frac{A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{288\,d}\right)-$$
$$\frac{1}{7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,4\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$17\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

$$\left(19\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)\ -$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (30\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(7\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1212: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 269 leaves, 10 steps):

$$\frac{8\,a^4\,(8\,A+7\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{8\,a^4\,(17\,A+28\,B+35\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{4\,a^4\,(83\,A+7\,B-175\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,a\,(3\,B+8\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$
$$\frac{2\,(A-7\,B-21\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{7\,d}+\frac{4\,(27\,A-42\,B-175\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{105\,d}$$

Result (type 5, 1451 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{13/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(-\frac{(32\,A+23\,B-20\,C+32\,A\,\text{Cos}[2\,c]+33\,B\,\text{Cos}[2\,c]+20\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{40\,d}+\frac{(191\,A+112\,B+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{336\,d}+\right.$$
$$\frac{(4\,A+B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{40\,d}+\frac{A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{112\,d}+\frac{(191\,A+112\,B+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{336\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{12\,d}+$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(C\,\text{Sin}[c]+3\,B\,\text{Sin}[d\,x]+12\,C\,\text{Sin}[d\,x])}{12\,d}+\frac{(4\,A+B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{40\,d}+\frac{A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{112\,d}\right)-$$
$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,17\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\Bigg(4\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$

$$\Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\Big)\,-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))\,-$$

$$\left(7\,B\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\left(10\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1213: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \mathrm{Cos}[c+d\,x]^{5/2}\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 267 leaves, 10 steps):

$$\frac{56\,a^4\,(A-C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{8\,a^4\,(4\,A+5\,B+4\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+$$

$$\frac{4\,a^4\,(A-25\,B-41\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d}+\frac{2\,a\,(5\,B+8\,C)\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sin}[c+d\,x]}{15\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{2\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+$$

$$\frac{2\,(5\,A+15\,B+19\,C)\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)^2\,\mathrm{Sin}[c+d\,x]}{5\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}-\frac{4\,(6\,A+25\,B+34\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a^4+a^4\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{15\,d}$$

Result (type 5, 1449 leaves):

$$\frac{1}{A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]}\,\mathrm{Cos}[c+d\,x]^{13/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{(23\,A-20\,B-61\,C+33\,A\,\mathrm{Cos}[2\,c]+20\,B\,\mathrm{Cos}[2\,c]+5\,C\,\mathrm{Cos}[2\,c])\,\mathrm{Csc}[c]\,\mathrm{Sec}[c]}{40\,d}+\frac{(4\,A+B)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{12\,d}+\frac{A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{40\,d}+\right.$$

$$\frac{(4\,A+B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{12\,d}+\frac{C\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}[d\,x]}{20\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(3\,C\,\mathrm{Sin}[c]+5\,B\,\mathrm{Sin}[d\,x]+20\,C\,\mathrm{Sin}[d\,x])}{60\,d}+$$

$$\frac{\text{Sec}[c]\ \text{Sec}[c+d x]\ (5 B \text{Sin}[c]+20 C \text{Sin}[c]+15 A \text{Sin}[d x]+60 B \text{Sin}[d x]+99 C \text{Sin}[d x])}{60 d}+\frac{A \text{Cos}[2 c]\ \text{Sin}[2 d x]}{40 d}\Bigg)-$$

$$\frac{1}{3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 4 A \text{Cos}[c+d x]^6 \text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}}$$

$$5 B \text{Cos}[c+d x]^6 \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}}$$

$$4 C \text{Cos}[c+d x]^6 \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\Bigg(7 A \text{Cos}[c+d x]^6 \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (10\,d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(7\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\ (a+a\,\text{Sec}[c+d\,x])^4\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (10\,d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1214: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\ (a+a\,\text{Sec}[c+d\,x])^4\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 271 leaves, 10 steps) :

$$-\frac{8 a^4 (7 B+8 C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{8 a^4 (35 A+28 B+17 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{21 d}-\frac{4 a^4 (175 A+287 B+253 C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{105 d}+\frac{2 a (7 B+8 C) (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{35 d \text{Cos}[c+d x]^{5/2}}+\frac{2 C (a+a \text{Cos}[c+d x])^4 \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2}}+\frac{2 (35 A+77 B+73 C) \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2}}+\frac{4 (175 A+238 B+197 C) \left(a^4+a^4 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{105 d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 1454 leaves):

$$\frac{1}{A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]} \text{Cos}[c+d x]^{13/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \left(-\frac{(-20 A-61 B-64 C+20 A \text{Cos}[2 c]+5 B \text{Cos}[2 c]) \text{Csc}[c] \text{Sec}[c]}{40 d}+\frac{A \text{Cos}[d x] \text{Sin}[c]}{12 d}+\frac{A \text{Cos}[c] \text{Sin}[d x]}{12 d}+\frac{C \text{Sec}[c] \text{Sec}[c+d x]^4 \text{Sin}[d x]}{28 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^3 (5 C \text{Sin}[c]+7 B \text{Sin}[d x]+28 C \text{Sin}[d x])}{140 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (21 B \text{Sin}[c]+84 C \text{Sin}[c]+35 A \text{Sin}[d x]+140 B \text{Sin}[d x]+235 C \text{Sin}[d x])}{420 d}+\frac{1}{420 d} \text{Sec}[c] \text{Sec}[c+d x] (35 A \text{Sin}[c]+140 B \text{Sin}[c]+235 C \text{Sin}[c]+420 A \text{Sin}[d x]+693 B \text{Sin}[d x]+672 C \text{Sin}[d x])\right)-$$

$$\frac{1}{3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 5 A \text{Cos}[c+d x]^6 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2}\, \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{3 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}} 4 B \text{Cos}[c+d x]^6 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8 (a+a \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2}\, \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}$$

$$17\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\left(7\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\,(10\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))+$$

$$\left(4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (5\,d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

■ Problem 1215: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Sec}[c+d\,x])^4\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 274 leaves, 10 steps):

$$-\frac{8\,a^4\,(21\,A+24\,B+19\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+\frac{8\,a^4\,(28\,A+17\,B+12\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$

$$\frac{4\,a^4\,(287\,A+253\,B+193\,C)\ \text{Sin}[c+d\,x]}{105\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a\,(9\,B+8\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}+$$

$$\frac{2\,(63\,A+117\,B+97\,C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,(21\,A+24\,B+19\,C)\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{45\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 1748 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}$$

$$\text{Cos}[c+d\,x]^{13/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{(-183\,A-192\,B-152\,C+15\,A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{120\,d}+\right.$$

$$\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{36\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(7\,C\,\text{Sin}[c]+9\,B\,\text{Sin}[d\,x]+36\,C\,\text{Sin}[d\,x])}{252\,d}+$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(45\,B\,\text{Sin}[c]+180\,C\,\text{Sin}[c]+63\,A\,\text{Sin}[d\,x]+252\,B\,\text{Sin}[d\,x]+427\,C\,\text{Sin}[d\,x])}{1260\,d}+\frac{1}{420\,d}$$

$$\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(140\,A\,\text{Sin}[c]+235\,B\,\text{Sin}[c]+240\,C\,\text{Sin}[c]+693\,A\,\text{Sin}[d\,x]+672\,B\,\text{Sin}[d\,x]+532\,C\,\text{Sin}[d\,x])+\frac{1}{1260\,d}$$

$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(63\,A\,\text{Sin}[c]+252\,B\,\text{Sin}[c]+427\,C\,\text{Sin}[c]+420\,A\,\text{Sin}[d\,x]+705\,B\,\text{Sin}[d\,x]+720\,C\,\text{Sin}[d\,x])\right)-$$

$$\frac{1}{3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,4\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8(a+a\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}}$$
$$17\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8(a+a\,\text{Sec}[c+d\,x])^4\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}}$$
$$4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8(a+a\,\text{Sec}[c+d\,x])^4\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$
$$\Bigg(7\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8(a+a\,\text{Sec}[c+d\,x])^4\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\ (10\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ +$$

$$\left(4\,B\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)\ -$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/\ (5\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x]))\ +$$

$$\left(19\,C\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\mathrm{Sec}[c+d\,x])^4\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)\ -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\,(30\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))$$

- **Problem 1216: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 310 leaves, 11 steps):

$$-\frac{8\,a^4\,(24\,A+19\,B+16\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{8\,a^4\,(187\,A+132\,B+113\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{231\,d}+$$
$$\frac{4\,a^4\,(913\,A+803\,B+667\,C)\,\text{Sin}[c+d\,x]}{1155\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{8\,a^4\,(24\,A+19\,B+16\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,a\,(11\,B+8\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{99\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{2\,C\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{11\,d\,\text{Cos}[c+d\,x]^{11/2}}+$$
$$\frac{2\,(33\,A+55\,B+43\,C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{231\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{4\,(891\,A+946\,B+769\,C)\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{3465\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 1795 leaves):

$$\frac{1}{A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]}\,\text{Cos}[c+d\,x]^{13/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\frac{(24\,A+19\,B+16\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{15\,d}+\frac{C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^6\,\text{Sin}[d\,x]}{44\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,(9\,C\,\text{Sin}[c]+11\,B\,\text{Sin}[d\,x]+44\,C\,\text{Sin}[d\,x])}{396\,d}+$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(77\,B\,\text{Sin}[c]+308\,C\,\text{Sin}[c]+99\,A\,\text{Sin}[d\,x]+396\,B\,\text{Sin}[d\,x]+675\,C\,\text{Sin}[d\,x])}{2772\,d}+\frac{1}{13\,860\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(495\,A\,\text{Sin}[c]+1980\,B\,\text{Sin}[c]+3375\,C\,\text{Sin}[c]+2772\,A\,\text{Sin}[d\,x]+4697\,B\,\text{Sin}[d\,x]+4928\,C\,\text{Sin}[d\,x])+\frac{1}{4620\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(2585\,A\,\text{Sin}[c]+2640\,B\,\text{Sin}[c]+2260\,C\,\text{Sin}[c]+7392\,A\,\text{Sin}[d\,x]+5852\,B\,\text{Sin}[d\,x]+4928\,C\,\text{Sin}[d\,x])+\frac{1}{13\,860\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(2772\,A\,\text{Sin}[c]+4697\,B\,\text{Sin}[c]+4928\,C\,\text{Sin}[c]+7755\,A\,\text{Sin}[d\,x]+7920\,B\,\text{Sin}[d\,x]+6780\,C\,\text{Sin}[d\,x])\Bigg)-$$
$$\frac{1}{21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}}\,17\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]} -$$

$$\frac{1}{7\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\sqrt{1 + \text{Cot}[c]^2}}$$

$$4\,B\,\text{Cos}[c + d\,x]^6\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8 (a + a\,\text{Sec}[c + d\,x])^4 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]} -$$

$$\frac{1}{231\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\sqrt{1 + \text{Cot}[c]^2}}$$

$$113\,C\,\text{Cos}[c + d\,x]^6\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8 (a + a\,\text{Sec}[c + d\,x])^4 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]} +$$

$$\left(4\,A\,\text{Cos}[c + d\,x]^6\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8 (a + a\,\text{Sec}[c + d\,x])^4 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d\,x + \text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right) \right/$$

$$\left(\sqrt{1 - \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1 + \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1 + \text{Tan}[c]^2}}\ \sqrt{1 + \text{Tan}[c]^2}\right) -$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(5\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(19\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(30\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(8\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,(a+a\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(15\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1217: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{7/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 210 leaves, 8 steps):

$$-\frac{3\,(7\,A-7\,B+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}+\frac{5\,(9\,A-7\,B+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,a\,d}+\frac{5\,(9\,A-7\,B+7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,a\,d}-\frac{(7\,A-7\,B+5\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}+\frac{(9\,A-7\,B+7\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,a\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 2117 leaves):

$$-\frac{1}{10\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}$$
$$21\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{10\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,21\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\,\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\,\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\,\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\,\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{4\,(5\,A-5\,B+5\,C+16\,A\,\text{Cos}[c]-16\,B\,\text{Cos}[c]+10\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{2\,(51\,A-28\,B+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}-\right.$$

$$\frac{4\,(A-B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{2\,A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\left.\frac{2\,(51\,A-28\,B+28\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d}-\frac{4\,(A-B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{2\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\right)-$$

$$\left(30\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)+$$

$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}}\Bigg)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$
$$\Bigg(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}}\Bigg)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1218: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 174 leaves, 7 steps):

$$\frac{3\,(7\,A-5\,B+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}-\frac{(5\,A-5\,B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}-$$
$$\frac{(5\,A-5\,B+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}+\frac{(7\,A-5\,B+5\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 2063 leaves):

$$\frac{1}{10\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}$$
$$21\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\Bigg(-\frac{4\,(5\,A-5\,B+5\,C+16\,A\,\text{Cos}[c]-10\,B\,\text{Cos}[c]+10\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}-$$

$$\frac{8\,(A-B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$

$$\frac{8\,(A-B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{4\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\Bigg)\Bigg)\Big/\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])\right)+$$

$$\Bigg(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3 d\ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a \text{Sec}[c+d x])\right)-$$

$$\Bigg(10 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]\ \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3 d\ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a \text{Sec}[c+d x])\right)+$$

$$\Bigg(2 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]\ \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a \text{Sec}[c+d x])\right)$$

- **Problem 1219: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[c+d x]^{3/2}\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{a+a \text{Sec}[c+d x]}\, dx$$

Optimal (type 4, 134 leaves, 6 steps):

$$-\frac{(3 A-3 B+C)\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a d}+\frac{(5 A-3 B+3 C)\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a d}+$$
$$\frac{(5 A-3 B+3 C)\ \sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{3 a d}-\frac{(A-B+C)\ \text{Cos}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{d\ (a+a \text{Cos}[c+d x])}$$

Result (type 5, 2008 leaves):

$$-\frac{1}{2\ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ (a+a \text{Sec}[c+d x])}$$

$$3\, i\, A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right) +$$

$$\frac{1}{2\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\, (a+a \operatorname{Sec}[c+d x])}\, 3\, i\, B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right]$$

$$\operatorname{Sec}\left[\frac{c}{2}\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right) -$$

$$\frac{1}{2\, (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\, (a+a \operatorname{Sec}[c+d x])}\, i\, C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right]$$

$$\operatorname{Sec}\left[\frac{c}{2}\right] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right) +$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Cos}[c+d x]^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(\frac{4\, (A-B+C+2 A \operatorname{Cos}[c]-2 B \operatorname{Cos}[c]) \operatorname{Csc}[c]}{d}+\right.\right.$$

$$\frac{8\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{8\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}\Bigg)\Bigg)\Big/$$

$$((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x]))-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)+$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1220: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+a\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 93 leaves, 5 steps) :

$$\frac{(3A-B+C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{a d}-\frac{(A-B-C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{a d}-\frac{(A-B+C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{d\,(a+a\,\text{Cos}[c+dx])}$$

Result (type 5, 1973 leaves) :

$$\frac{1}{2\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}$$
$$3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{2\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{2\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])}\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Cos}[c+dx]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\,\right)\right/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{4\,(A-B+C+2\,A\,\text{Cos}[c])\,\text{Csc}[c]}{d}-\right.\right.$$

$$\left.\left.\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}\right)\right)\right/\,((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x]))+$$

$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\right/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\right/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\right/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1221: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 122 leaves, 6 steps):

$$-\frac{(A-B+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a\,d}+\frac{(A+B-C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a\,d}+\frac{(A-B+3\,C)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 2009 leaves):

$$-\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}$$
$$i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg) \Bigg/ \left(3 i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i\operatorname{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg) \Bigg/ \left(-i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)\Bigg)+$$

$$\Bigg(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\operatorname{Cos}[c+d x]^{3/2}\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\Bigg(\frac{2\,(2 C+A\operatorname{Cos}[c]-B\operatorname{Cos}[c]+C\operatorname{Cos}[c])\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c]}{d}+$$

$$\frac{4\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\operatorname{Sin}\left[\frac{d x}{2}\right]-B\operatorname{Sin}\left[\frac{d x}{2}\right]+C\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{8 C\operatorname{Sec}[c]\operatorname{Sec}[c+d x]\operatorname{Sin}[d x]}{d}\Bigg)\Bigg) \Bigg/$$

$$((A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\,(a+a\operatorname{Sec}[c+d x]))-$$

$$\Bigg(2 A\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]\sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2}\operatorname{Sin}[c]\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Bigg/$$

$$\left(d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\sqrt{1+\operatorname{Cot}[c]^2}\,(a+a\operatorname{Sec}[c+d x])\right)-$$

$$\Bigg(2 B\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]\sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2}\operatorname{Sin}[c]\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Bigg/$$

$$\left(d\,(A+2 C+2 B\operatorname{Cos}[c+d x]+A\operatorname{Cos}[2 c+2 d x])\sqrt{1+\operatorname{Cot}[c]^2}\,(a+a\operatorname{Sec}[c+d x])\right)+$$

$$\Bigg(2 C\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]\left(A+B\operatorname{Sec}[c+d x]+C\operatorname{Sec}[c+d x]^2\right)\operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]\sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1222: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\ (a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 165 leaves, 7 steps):

$$\frac{(A-3\,B+3\,C)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),\,2\right]}{a\,d}+\frac{(3\,A-3\,B+5\,C)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),\,2\right]}{3\,a\,d}+$$
$$\frac{(3\,A-3\,B+5\,C)\ \text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{(A-3\,B+3\,C)\ \text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B+C)\ \text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\ (a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 2052 leaves):

$$\frac{1}{2\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])}$$
$$i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\ \text{Csc}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\ (\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right)\sqrt{e^{-i\,d\,x}\ \left(2\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\ (\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\ \left(2\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(-i\,d\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$
$$\frac{1}{2\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\ \text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\ (\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right)\sqrt{e^{-i\,d\,x}\ \left(2\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\ (\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\ \left(2\ \left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\ \left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x])} 3 i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \Bigg(-\frac{2 (-2 B+2 C+A \text{Cos}[c]-B \text{Cos}[c]+C \text{Cos}[c]) \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c]}{d}-$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{8 C \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{3 d}+$$

$$\frac{8 \text{Sec}[c] \text{Sec}[c+d x] (C \text{Sin}[c]+3 B \text{Sin}[d x]-3 C \text{Sin}[d x])}{3 d}\Bigg)\Bigg) \Big/ ((A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) (a+a \text{Sec}[c+d x]))-$$

$$\Bigg(2 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2} (a+a \text{Sec}[c+d x])\right)+$$

$$\Bigg(2 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Cos}[c+d x] \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$

$$\Bigg(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1223: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])}\,dx$$

Optimal (type 4, 210 leaves, 8 steps) :

$$-\frac{3\,(5\,A-5\,B+7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}-\frac{(3\,A-5\,B+5\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}+$$
$$\frac{(5\,A-5\,B+7\,C)\,\text{Sin}[c+d\,x]}{5\,a\,d\,\text{Cos}[c+d\,x]^{5/2}}-\frac{(3\,A-5\,B+5\,C)\,\text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{3\,(5\,A-5\,B+7\,C)\,\text{Sin}[c+d\,x]}{5\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 2111 leaves) :

$$-\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}$$

$$3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)+$$

$$\frac{1}{2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{10\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,21\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\frac{2\,(10\,A-10\,B+16\,C+5\,A\,\text{Cos}[c]-5\,B\,\text{Cos}[c]+5\,C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]}{5\,d}+\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{8\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}-$$
$$\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(-5\,B\,\text{Sin}[c]+5\,C\,\text{Sin}[c]-15\,A\,\text{Sin}[d\,x]+15\,B\,\text{Sin}[d\,x]-24\,C\,\text{Sin}[d\,x])}{15\,d}+$$
$$\left.\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,C\,\text{Sin}[c]+5\,B\,\text{Sin}[d\,x]-5\,C\,\text{Sin}[d\,x])}{15\,d}\right)+$$

$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)-$$
$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)+$$
$$\left(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])\right)$$

- **Problem 1224: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{7/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 258 leaves, 9 steps) :

$$-\frac{7\,(11\,A-8\,B+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,a^2\,d}+\frac{5\,(30\,A-21\,B+14\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,a^2\,d}+$$
$$\frac{5\,(30\,A-21\,B+14\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{21\,a^2\,d}-\frac{7\,(11\,A-8\,B+5\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a^2\,d}+$$
$$\frac{(30\,A-21\,B+14\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,a^2\,d}-\frac{(11\,A-8\,B+5\,C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 2174 leaves):

$$-\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,77\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,56\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,7\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(200\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\left(20\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)-$$

$$\left(40\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{8\,(25\,A-20\,B+15\,C+52\,A\,\text{Cos}[c]-36\,B\,\text{Cos}[c]+20\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{4\,(107\,A-56\,B+28\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}-\right.$$

$$\frac{8\,(2A-B)\,\text{Cos}[2dx]\,\text{Sin}[2c]}{5d}+\frac{4A\,\text{Cos}[3dx]\,\text{Sin}[3c]}{7d}-\frac{4\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]^3\,(A\,\text{Sin}[\frac{dx}{2}]-B\,\text{Sin}[\frac{dx}{2}]+C\,\text{Sin}[\frac{dx}{2}])}{3d}+\frac{8\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,(5A\,\text{Sin}[\frac{dx}{2}]-4B\,\text{Sin}[\frac{dx}{2}]+3C\,\text{Sin}[\frac{dx}{2}])}{d}+\frac{4\,(107A-56B+28C)\,\text{Cos}[c]\,\text{Sin}[dx]}{21d}-\frac{8\,(2A-B)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{5d}+\frac{4A\,\text{Cos}[3c]\,\text{Sin}[3dx]}{7d}-\frac{4\,(A-B+C)\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]^2\,\text{Tan}[\frac{c}{2}]}{3d}\Bigg)$$

- **Problem 1225: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+dx]^{5/2}\,(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)}{(a+a\,\text{Sec}[c+dx])^2}\,dx$$

Optimal (type 4, 214 leaves, 8 steps):

$$\frac{(56A-35B+20C)\,\text{EllipticE}[\frac{1}{2}(c+dx),2]}{5a^2d}-\frac{5\,(3A-2B+C)\,\text{EllipticF}[\frac{1}{2}(c+dx),2]}{3a^2d}-\frac{5\,(3A-2B+C)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{3a^2d}+\frac{(56A-35B+20C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{15a^2d}-\frac{(3A-2B+C)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{a^2d\,(1+\text{Cos}[c+dx])}-\frac{(A-B+C)\,\text{Cos}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 5, 2120 leaves):

$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}56\,i\,A\,\text{Cos}[\frac{c}{2}+\frac{dx}{2}]^4\,\text{Csc}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}]\,(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)$$
$$\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2]\,\sqrt{e^{-idx}\,(2\,(1+e^{2idx})\,\text{Cos}[c]+2i\,(-1+e^{2idx})\,\text{Sin}[c])}$$
$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2idx})\,\text{Cos}[c]-3d\,(-1+e^{2idx})\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2]\,\sqrt{e^{-idx}\,(2\,(1+e^{2idx})\,\text{Cos}[c]+2i\,(-1+e^{2idx})\,\text{Sin}[c])}$$
$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2idx})\,\text{Cos}[c]+d\,(-1+e^{2idx})\,\text{Sin}[c]\right)\Bigg)-$$
$$\frac{1}{(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^2}7\,i\,B\,\text{Cos}[\frac{c}{2}+\frac{dx}{2}]^4\,\text{Csc}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}]$$
$$(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)$$
$$\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2]\,\sqrt{e^{-idx}\,(2\,(1+e^{2idx})\,\text{Cos}[c]+2i\,(-1+e^{2idx})\,\text{Sin}[c])}$$
$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2idx})\,\text{Cos}[c]-3d\,(-1+e^{2idx})\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,(a+a\,\text{Sec}[c+d x])^2}\,4\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^2\right)-$$

$$\left(40\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^2\right)+$$

$$\left(20\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\ \mathrm{Sin}[c]\ \mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\ \sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^2\right)+$$

$$\frac{1}{(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2}$$

$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-\frac{8\,(20\,A-15\,B+10\,C+36\,A\,\mathrm{Cos}[c]-20\,B\,\mathrm{Cos}[c]+10\,C\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{5\,d}-\frac{16\,(2\,A-B)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\frac{8\,A\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}+$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(4\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-3\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+2\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$

$$\frac{16\,(2\,A-B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{8\,A\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}+\frac{4\,(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)$$

- **Problem 1226: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cos}[c+d\,x]^{3/2}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 180 leaves, 7 steps):

$$-\frac{(7\,A-4\,B+C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a^2\,d}+\frac{(10\,A-5\,B+2\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a^2\,d}+$$

$$\frac{(10\,A-5\,B+2\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(7\,A-4\,B+C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2}$$

Result (type 5, 2064 leaves):

$$-\frac{1}{(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^2}\,7\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Bigg/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\Bigg(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a+a \operatorname{Sec}[c+d x])^2} 4 i B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])(a+a \operatorname{Sec}[c+d x])^2} i C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)-$$

$$\Bigg(40 A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\},\left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$

$$\left(3 d(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2}(a+a \operatorname{Sec}[c+d x])^2\right)+$$

$$\Bigg(20 B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\},\left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d\ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a \text{Sec}[c+d x])^2\right)-$$

$$\Bigg(8 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d\ (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a \text{Sec}[c+d x])^2\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\ \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\frac{8\ (3 A-2 B+C+4 A \text{Cos}[c]-2 B \text{Cos}[c])\ \text{Csc}[c]}{d}+\frac{16 A \text{Cos}[d x]\ \text{Sin}[c]}{3 d}+\frac{8 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(3 A \text{Sin}\left[\frac{d x}{2}\right]-2 B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{16 A \text{Cos}[c]\ \text{Sin}[d x]}{3 d}-\frac{4\ (A-B+C)\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{3 d}\Bigg)\Bigg) \Big/$$

$$\left((A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ (a+a \text{Sec}[c+d x])^2\right)$$

- **Problem 1227: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\ \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+a \text{Sec}[c+d x])^2}\, dx$$

Optimal (type 4, 144 leaves, 6 steps):

$$\frac{(4 A-B)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d x),2\right]}{a^2 d}-\frac{(5 A-2 B-C)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d x),2\right]}{3 a^2 d}-$$

$$\frac{(5 A-2 B-C)\ \sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{3 a^2 d\ (1+\text{Cos}[c+d x])}-\frac{(A-B+C)\ \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 d\ (a+a \text{Cos}[c+d x])^2}$$

Result (type 5, 1628 leaves):

$$\frac{1}{(A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\ (a+a \text{Sec}[c+d x])^2}\ 4 i A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\Big[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\bigg(2\, \text{Hypergeometric2F1}\Big[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) -$$

$$\frac{1}{(A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x])\, (a + a\, \text{Sec}[c + d x])^2}\, i B\, \text{Cos}\Big[\frac{c}{2} + \frac{d x}{2}\Big]^4 \text{Csc}\Big[\frac{c}{2}\Big] \text{Sec}\Big[\frac{c}{2}\Big]$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)$$

$$\Bigg(\bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\Big[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\bigg(2\, \text{Hypergeometric2F1}\Big[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) +$$

$$\Bigg(20 A\, \text{Cos}\Big[\frac{c}{2} + \frac{d x}{2}\Big]^4 \text{Csc}\Big[\frac{c}{2}\Big]\, \text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4}, \frac{1}{2}\Big\}, \Big\{\frac{5}{4}\Big\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\Big]\, \text{Sec}\Big[\frac{c}{2}\Big]$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\, \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d\, (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^2\right) -$$

$$\Bigg(8 B\, \text{Cos}\Big[\frac{c}{2} + \frac{d x}{2}\Big]^4 \text{Csc}\Big[\frac{c}{2}\Big]\, \text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4}, \frac{1}{2}\Big\}, \Big\{\frac{5}{4}\Big\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\Big]\, \text{Sec}\Big[\frac{c}{2}\Big]$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\, \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d\, (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^2\right) -$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,\,(a+a\,\text{Sec}[c+d\,x])^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\sqrt{\text{Cos}[c+d\,x]}\,\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(-\frac{8\,(2\,A-B+2\,A\,\text{Cos}[c])\,\text{Csc}[c]}{d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\right.$$
$$\left.\left.\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/$$
$$\left((A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2\right)$$

- **Problem 1228: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 133 leaves, 6 steps):

$$-\frac{(A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a^2\,d}+\frac{(2\,A+B+2\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a^2\,d}+$$
$$\frac{(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1620 leaves):

$$-\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{\left(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]\right)\left(a+a\,\text{Sec}[c+d x]\right)^2}\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3 i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\Bigg(8\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3 d\left(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]\right)\sqrt{1+\text{Cot}[c]^2}\,\left(a+a\,\text{Sec}[c+d x]\right)^2\right)-$$

$$\Bigg(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3 d\left(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x]\right)\sqrt{1+\text{Cot}[c]^2}\,\left(a+a\,\text{Sec}[c+d x]\right)^2\right)-$$

$$\Bigg(8\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Bigg/ \left(3 d\ (A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\ \text{Sec}[c+d x])^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\ (A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2)\left(\frac{8 (A-C)\ \text{Csc}[c]}{d}+\frac{8\ \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\ \text{Sin}\left[\frac{d x}{2}\right]-C\ \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-\frac{4\ \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\ \text{Sin}\left[\frac{d x}{2}\right]-B\ \text{Sin}\left[\frac{d x}{2}\right]+C\ \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}-\frac{4 (A-B+C)\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right) \Big/ \left((A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x])\ (a+a\ \text{Sec}[c+d x])^2\right)$$

- **Problem 1229: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2}{\text{Cos}[c+d x]^{3/2}\ (a+a\ \text{Sec}[c+d x])^2}\, dx$$

Optimal (type 4, 167 leaves, 7 steps):

$$\frac{(B-4 C)\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a^2 d}+\frac{(A+2 B-5 C)\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a^2 d}-\frac{(B-4 C)\ \text{Sin}[c+d x]}{a^2 d \sqrt{\text{Cos}[c+d x]}}+\frac{(A+2 B-5 C)\ \text{Sin}[c+d x]}{3 a^2 d \sqrt{\text{Cos}[c+d x]}\ (1+\text{Cos}[c+d x])}-\frac{(A-B+C)\ \text{Sin}[c+d x]}{3 d \sqrt{\text{Cos}[c+d x]}\ (a+a\ \text{Cos}[c+d x])^2}$$

Result (type 5, 1660 leaves):

$$\frac{1}{(A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x])\ (a+a\ \text{Sec}[c+d x])^2}\ i\ B\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] (A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2)$$

$$\Bigg(\Bigg(2\ e^{2 i d x}\ \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\ (\text{Cos}[c]+i\ \text{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\ \text{Cos}[2 c]+i\ e^{2 i d x}\ \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d\left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\ (\text{Cos}[c]+i\ \text{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\ \text{Cos}[2 c]+i\ e^{2 i d x}\ \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \text{Cos}[c]+d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x])\ (a+a\ \text{Sec}[c+d x])^2}\ 4 i\ C\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$

$$(A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) -$$

$$\left(4\, A\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(3\, d\, (A + 2\, C + 2\, B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^2\right) -$$

$$\left(8\, B\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(3\, d\, (A + 2\, C + 2\, B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^2\right) +$$

$$\left(20\, C\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right) \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(3\, d\, (A + 2\, C + 2\, B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x]) \sqrt{1 + \text{Cot}[c]^2}\, (a + a\, \text{Sec}[c + d x])^2\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c + d x]}\, \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)\right.$$

$$\left(\frac{4\,(2\,C-B\,Cos[c]+2\,C\,Cos[c])\,Csc[\frac{c}{2}]\,Sec[\frac{c}{2}]\,Sec[c]}{d}+\frac{4\,Sec[\frac{c}{2}]\,Sec[\frac{c}{2}+\frac{d\,x}{2}]^3\,(A\,Sin[\frac{d\,x}{2}]-B\,Sin[\frac{d\,x}{2}]+C\,Sin[\frac{d\,x}{2}])}{3\,d}+\frac{8\,Sec[\frac{c}{2}]\,Sec[\frac{c}{2}+\frac{d\,x}{2}]\,(-B\,Sin[\frac{d\,x}{2}]+2\,C\,Sin[\frac{d\,x}{2}])}{d}+\frac{16\,C\,Sec[c]\,Sec[c+d\,x]\,Sin[d\,x]}{d}+\frac{4\,(A-B+C)\,Sec[\frac{c}{2}+\frac{d\,x}{2}]^2\,Tan[\frac{c}{2}]}{3\,d}\right)\right)\Big/\left((A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+a\,Sec[c+d\,x])^2\right)$$

- **Problem 1230: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2}{Cos[c+d\,x]^{5/2}\,(a+a\,Sec[c+d\,x])^2}\,dx$$

Optimal (type 4, 211 leaves, 8 steps):

$$\frac{(A-4\,B+7\,C)\,EllipticE[\frac{1}{2}\,(c+d\,x),\,2]}{a^2\,d}+\frac{(2\,A-5\,B+10\,C)\,EllipticF[\frac{1}{2}\,(c+d\,x),\,2]}{3\,a^2\,d}+\frac{(2\,A-5\,B+10\,C)\,Sin[c+d\,x]}{3\,a^2\,d\,Cos[c+d\,x]^{3/2}}-\frac{(A-4\,B+7\,C)\,Sin[c+d\,x]}{a^2\,d\,\sqrt{Cos[c+d\,x]}}-\frac{(A-4\,B+7\,C)\,Sin[c+d\,x]}{3\,a^2\,d\,Cos[c+d\,x]^{3/2}\,(1+Cos[c+d\,x])}-\frac{(A-B+C)\,Sin[c+d\,x]}{3\,d\,Cos[c+d\,x]^{3/2}\,(a+a\,Cos[c+d\,x])^2}$$

Result (type 5, 2107 leaves):

$$\frac{1}{(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+a\,Sec[c+d\,x])^2}\,i\,A\,Cos[\frac{c}{2}+\frac{d\,x}{2}]^4\,Csc[\frac{c}{2}]\,Sec[\frac{c}{2}]\,(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,Hypergeometric2F1[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(Cos[c]+i\,Sin[c])^2]\,\sqrt{e^{-i\,d\,x}\,(2\,(1+e^{2\,i\,d\,x})\,Cos[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,Sin[c])}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,Cos[2\,c]+i\,e^{2\,i\,d\,x}\,Sin[2\,c]}\right)\Big/\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,Cos[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,Sin[c]\right)-$$
$$\left(2\,Hypergeometric2F1[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(Cos[c]+i\,Sin[c])^2]\,\sqrt{e^{-i\,d\,x}\,(2\,(1+e^{2\,i\,d\,x})\,Cos[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,Sin[c])}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,Cos[2\,c]+i\,e^{2\,i\,d\,x}\,Sin[2\,c]}\right)\Big/\left(-i\,d\,(1+e^{2\,i\,d\,x})\,Cos[c]+d\,(-1+e^{2\,i\,d\,x})\,Sin[c]\right)\right)-$$
$$\frac{1}{(A+2\,C+2\,B\,Cos[c+d\,x]+A\,Cos[2\,c+2\,d\,x])\,(a+a\,Sec[c+d\,x])^2}\,4\,i\,B\,Cos[\frac{c}{2}+\frac{d\,x}{2}]^4\,Csc[\frac{c}{2}]\,Sec[\frac{c}{2}]$$
$$(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,Hypergeometric2F1[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(Cos[c]+i\,Sin[c])^2]\,\sqrt{e^{-i\,d\,x}\,(2\,(1+e^{2\,i\,d\,x})\,Cos[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,Sin[c])}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,Cos[2\,c]+i\,e^{2\,i\,d\,x}\,Sin[2\,c]}\right)\Big/\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,Cos[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,Sin[c]\right)-$$
$$\left(2\,Hypergeometric2F1[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(Cos[c]+i\,Sin[c])^2]\,\sqrt{e^{-i\,d\,x}\,(2\,(1+e^{2\,i\,d\,x})\,Cos[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,Sin[c])}\right.$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Big) \Big/ \left(-i d \left(1+e^{2 i d x}\right) Cos[c]+d \left(-1+e^{2 i d x}\right) Sin[c]\right)\Big) +$$

$$\frac{1}{(A+2 C+2 B Cos[c+d x]+A Cos[2 c+2 d x]) (a+a Sec[c+d x])^2} 7 i C Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^4 Csc\left[\frac{c}{2}\right] Sec\left[\frac{c}{2}\right]$$

$$\left(A+B Sec[c+d x]+C Sec[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} Hypergeometric2F1\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (Cos[c]+i Sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) Cos[c]+2 i \left(-1+e^{2 i d x}\right) Sin[c]\right)}$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) Cos[c]-3 d \left(-1+e^{2 i d x}\right) Sin[c]\right) -$$

$$\Bigg(2 Hypergeometric2F1\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (Cos[c]+i Sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) Cos[c]+2 i \left(-1+e^{2 i d x}\right) Sin[c]\right)}$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) Cos[c]+d \left(-1+e^{2 i d x}\right) Sin[c]\right)\Bigg) -$$

$$\Bigg(8 A Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^4 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right]$$

$$\left(A+B Sec[c+d x]+C Sec[c+d x]^2\right) Sec[d x-ArcTan[Cot[c]]] \sqrt{1-Sin[d x-ArcTan[Cot[c]]]}$$

$$\sqrt{-\sqrt{1+Cot[c]^2} Sin[c] Sin[d x-ArcTan[Cot[c]]]} \sqrt{1+Sin[d x-ArcTan[Cot[c]]]}\Bigg) \Big/$$

$$\left(3 d (A+2 C+2 B Cos[c+d x]+A Cos[2 c+2 d x]) \sqrt{1+Cot[c]^2} (a+a Sec[c+d x])^2\right) +$$

$$\Bigg(20 B Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^4 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right]$$

$$\left(A+B Sec[c+d x]+C Sec[c+d x]^2\right) Sec[d x-ArcTan[Cot[c]]] \sqrt{1-Sin[d x-ArcTan[Cot[c]]]}$$

$$\sqrt{-\sqrt{1+Cot[c]^2} Sin[c] Sin[d x-ArcTan[Cot[c]]]} \sqrt{1+Sin[d x-ArcTan[Cot[c]]]}\Bigg) \Big/$$

$$\left(3 d (A+2 C+2 B Cos[c+d x]+A Cos[2 c+2 d x]) \sqrt{1+Cot[c]^2} (a+a Sec[c+d x])^2\right) -$$

$$\Bigg(40 C Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^4 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right]$$

$$\left(A+B Sec[c+d x]+C Sec[c+d x]^2\right) Sec[d x-ArcTan[Cot[c]]] \sqrt{1-Sin[d x-ArcTan[Cot[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])^2}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{4\,(-2\,B+4\,C+A\,\text{Cos}[c]-2\,B\,\text{Cos}[c]+3\,C\,\text{Cos}[c])\ \text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{16\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$

$$\left.\frac{16\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\ (C\,\text{Sin}[c]+3\,B\,\text{Sin}[d\,x]-6\,C\,\text{Sin}[d\,x])}{3\,d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

- **Problem 1231: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^2}\,dx$$

Optimal (type 4, 250 leaves, 9 steps):

$$-\frac{(20\,A-35\,B+56\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,a^2\,d}-\frac{5\,(A-2\,B+3\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a^2\,d}+\frac{(20\,A-35\,B+56\,C)\ \text{Sin}[c+d\,x]}{15\,a^2\,d\,\text{Cos}[c+d\,x]^{5/2}}-$$

$$\frac{5\,(A-2\,B+3\,C)\ \text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{(20\,A-35\,B+56\,C)\ \text{Sin}[c+d\,x]}{5\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-2\,B+3\,C)\ \text{Sin}[c+d\,x]}{a^2\,d\,\text{Cos}[c+d\,x]^{5/2}\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\ \text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 2164 leaves):

$$-\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])^2}\,4\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Big) +$$

$$\frac{1}{(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\,(a+a \operatorname{Sec}[c+d x])^2}\, 7 i B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\Bigg(\bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right) -$$

$$\bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg) -$$

$$\frac{1}{5\,(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])\,(a+a \operatorname{Sec}[c+d x])^2}\, 56 i C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\Bigg(\bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right) -$$

$$\bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg) +$$

$$\Bigg(20 A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$

$$\left(3 d\,(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2}\,(a+a \operatorname{Sec}[c+d x])^2\right) -$$

$$\Bigg(40 B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\left(20\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^2\right)+$$

$$\frac{1}{(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^2}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{4\,(10\,A-20\,B+36\,C+10\,A\,\text{Cos}[c]-15\,B\,\text{Cos}[c]+20\,C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{5\,d}+\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-3\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+4\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\frac{16\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}-\frac{16\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(-5\,B\,\text{Sin}[c]+10\,C\,\text{Sin}[c]-15\,A\,\text{Sin}[d\,x]+30\,B\,\text{Sin}[d\,x]-54\,C\,\text{Sin}[d\,x])}{15\,d}+$$

$$\left.\frac{16\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,C\,\text{Sin}[c]+5\,B\,\text{Sin}[d\,x]-10\,C\,\text{Sin}[d\,x])}{15\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

- **Problem 1232: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 273 leaves, 9 steps) :

$$\frac{7\,(33\,A-17\,B+7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}-\frac{(63\,A-33\,B+13\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-$$
$$\frac{(63\,A-33\,B+13\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{6\,a^3\,d}+\frac{7\,(33\,A-17\,B+7\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{30\,a^3\,d}-$$
$$\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(12\,A-7\,B+2\,C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(63\,A-33\,B+13\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 2257 leaves) :

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}$$
$$231\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,119\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,49\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\Bigg(84\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$

$$\Bigg(44\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(52\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{8\,(99A-59B+29C+132A\,\text{Cos}[c]-60B\,\text{Cos}[c]+20C\,\text{Cos}[c])\,\text{Csc}[c]}{5d}-\frac{32\,(3A-B)\,\text{Cos}[dx]\,\text{Sin}[c]}{3d}+\frac{16A\,\text{Cos}[2dx]\,\text{Sin}[2c]}{5d}-\frac{4\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]^5\,(A\,\text{Sin}[\frac{dx}{2}]-B\,\text{Sin}[\frac{dx}{2}]+C\,\text{Sin}[\frac{dx}{2}])}{5d}+\frac{8\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]^3\,(24A\,\text{Sin}[\frac{dx}{2}]-19B\,\text{Sin}[\frac{dx}{2}]+14C\,\text{Sin}[\frac{dx}{2}])}{15d}-\frac{8\,\text{Sec}[\frac{c}{2}]\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,(99A\,\text{Sin}[\frac{dx}{2}]-59B\,\text{Sin}[\frac{dx}{2}]+29C\,\text{Sin}[\frac{dx}{2}])}{5d}-\frac{32\,(3A-B)\,\text{Cos}[c]\,\text{Sin}[dx]}{3d}+\frac{16A\,\text{Cos}[2c]\,\text{Sin}[2dx]}{5d}+\frac{8\,(24A-19B+14C)\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]^2\,\text{Tan}[\frac{c}{2}]}{15d}-\frac{4\,(A-B+C)\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]^4\,\text{Tan}[\frac{c}{2}]}{5d}\right)\right)\Big/\left(\sqrt{\text{Cos}[c+dx]}\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3\right)$$

- **Problem 1233: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[c+dx]^{3/2}\,(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)}{(a+a\,\text{Sec}[c+dx])^3}\,dx$$

Optimal (type 4, 234 leaves, 8 steps):

$$-\frac{(119A-49B+9C)\,\text{EllipticE}[\frac{1}{2}(c+dx),2]}{10a^3d}+\frac{(33A-13B+3C)\,\text{EllipticF}[\frac{1}{2}(c+dx),2]}{6a^3d}+\frac{(33A-13B+3C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{6a^3d}-\frac{(A-B+C)\,\text{Cos}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}-\frac{(2A-B)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{3ad\,(a+a\,\text{Cos}[c+dx])^2}-\frac{(119A-49B+9C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{30d\,(a^3+a^3\,\text{Cos}[c+dx])}$$

Result (type 5, 2206 leaves):

$$-\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\,119\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\,(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2)$$
$$\left(\left(\left(2e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\,(1+e^{2idx})\,\text{Cos}[c]+2i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3id\,(1+e^{2idx})\,\text{Cos}[c]-3d\,(-1+e^{2idx})\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\,(1+e^{2idx})\,\text{Cos}[c]+2i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-id\,(1+e^{2idx})\,\text{Cos}[c]+d\,(-1+e^{2idx})\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])\,(a+a\,\text{Sec}[c+dx])^3}\,49\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,9\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\left(44\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\left(52\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)-$$

$$\left(4\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\right.$$

$$\mathrm{Sec}[c+d\,x]\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\frac{8\,(59\,A-29\,B+9\,C+60\,A\,\mathrm{Cos}[c]-20\,B\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{5\,d}+\frac{32\,A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.$$

$$\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(59\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-29\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+9\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(19\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-14\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+9\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$

$$\left.\left.\frac{32\,A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}-\frac{8\,(19\,A-14\,B+9\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/$$

$$\left(\sqrt{\mathrm{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3\right)$$

- **Problem 1234: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 201 leaves, 7 steps):

$$\frac{(49\,A-9\,B-C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}-\frac{(13\,A-3\,B-C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-$$

$$\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}-\frac{(8\,A-3\,B-2\,C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2}-\frac{(13\,A-3\,B-C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)}$$

Result (type 5, 2175 leaves):

$$\frac{1}{5\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^3}$$

$$49\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,9\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$
$$\left(52\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$

$$\Bigg(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)-$$

$$\Bigg(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{8\,(29\,A-9\,B-C+20\,A\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(29\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(14\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+4\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$

$$\left.\frac{8\,(14\,A-9\,B+4\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\Bigg)\Bigg/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 1235: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 193 leaves, 7 steps):

$$-\frac{(9\,A+B-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(3\,A+B+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(6\,A-B-4\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{(9\,A+B-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 2167 leaves):

$$-\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}$$
$$9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3}\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\, i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\bigg)\Big/\left(3\, i\, d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\, d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\, i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\bigg)\Big/\left(-i\, d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\bigg(4\, A\, \text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^6 \text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[c+d x]$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\bigg)\Big/$$

$$\left(d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\bigg(4\, B\, \text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^6 \text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\text{Sec}[c+d x]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\bigg)\Big/$$

$$\left(3\, d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\bigg(4\, C\, \text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^6 \text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\text{Sec}[c+d x]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\bigg)\Big/$$

$$\left(3\, d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)+$$

$$\Bigg(\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^6\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\Bigg(\frac{8\,(9 A+B-C)\,\text{Csc}[c]}{5 d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(9 A\,\text{Sin}\left[\frac{d x}{2}\right]-4 B\,\text{Sin}\left[\frac{d x}{2}\right]-C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$

$$\left.\left.\frac{8\,(9\,A-4\,B-C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3\right)$$

Problem 1236: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 191 leaves, 7 steps):

$$-\frac{(A-B-9\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(A+B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-$$

$$\frac{(A-B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}+\frac{(4\,A+B-6\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{(A-B-9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 2164 leaves):

$$-\frac{1}{5\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3}$$

$$i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\frac{1}{5\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3}\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{5\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,(a+a\,\text{Sec}[c+d x])^3}\,9\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d x]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\left(\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)-$$

$$\left(4 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d x]\right.$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\left(4 B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d x]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d x])^3\right)-$$

$$\left(4 C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d x]\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ \sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\frac{8\,(A-B-9\,C)\,\text{Csc}[c]}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]-6\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\left.\left.\frac{8\,(4\,A+B-6\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Bigg/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 1237: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\ (a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 229 leaves, 8 steps):

$$\frac{(A+9\,B-49\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(A+3\,B-13\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-\frac{(A+9\,B-49\,C)\,\text{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}}-$$

$$\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Cos}[c+d\,x])^3}+\frac{(2\,A+3\,B-8\,C)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Cos}[c+d\,x])^2}+\frac{(A+3\,B-13\,C)\,\text{Sin}[c+d\,x]}{6\,d\,\sqrt{\text{Cos}[c+d\,x]}\ (a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 2205 leaves):

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\ (a+a\,\text{Sec}[c+d\,x])^3}$$

$$i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Bigg/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) Cos[c]+d \left(-1+e^{2 i d x}\right) Sin[c]\right)\Bigg)+$$

$$\frac{1}{5 (A+2 C+2 B Cos[c+d x]+A Cos[2 c+2 d x]) (a+a Sec[c+d x])^3} 9 i B Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^6 Csc\left[\frac{c}{2}\right] Sec\left[\frac{c}{2}\right]$$

$$Sec[c+d x] \left(A+B Sec[c+d x]+C Sec[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} Hypergeometric2F1\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (Cos[c]+i Sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) Cos[c]+2 i \left(-1+e^{2 i d x}\right) Sin[c]\right)}$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) Cos[c]-3 d \left(-1+e^{2 i d x}\right) Sin[c]\right)-$$

$$\Bigg(2 Hypergeometric2F1\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (Cos[c]+i Sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) Cos[c]+2 i \left(-1+e^{2 i d x}\right) Sin[c]\right)}$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) Cos[c]+d \left(-1+e^{2 i d x}\right) Sin[c]\right)\Bigg)-$$

$$\frac{1}{5 (A+2 C+2 B Cos[c+d x]+A Cos[2 c+2 d x]) (a+a Sec[c+d x])^3} 49 i C Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^6 Csc\left[\frac{c}{2}\right] Sec\left[\frac{c}{2}\right]$$

$$Sec[c+d x] \left(A+B Sec[c+d x]+C Sec[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} Hypergeometric2F1\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (Cos[c]+i Sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) Cos[c]+2 i \left(-1+e^{2 i d x}\right) Sin[c]\right)}$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) Cos[c]-3 d \left(-1+e^{2 i d x}\right) Sin[c]\right)-$$

$$\Bigg(2 Hypergeometric2F1\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (Cos[c]+i Sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) Cos[c]+2 i \left(-1+e^{2 i d x}\right) Sin[c]\right)}$$

$$\sqrt{1+e^{2 i d x} Cos[2 c]+i e^{2 i d x} Sin[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) Cos[c]+d \left(-1+e^{2 i d x}\right) Sin[c]\right)\Bigg)-$$

$$\Bigg(4 A Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^6 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right] Sec[c+d x]$$

$$\left(A+B Sec[c+d x]+C Sec[c+d x]^2\right) Sec[d x-ArcTan[Cot[c]]] \sqrt{1-Sin[d x-ArcTan[Cot[c]]]}$$

$$\sqrt{-\sqrt{1+Cot[c]^2} Sin[c] Sin[d x-ArcTan[Cot[c]]]} \sqrt{1+Sin[d x-ArcTan[Cot[c]]]}\Bigg) \Big/$$

$$\left(3 d (A+2 C+2 B Cos[c+d x]+A Cos[2 c+2 d x]) \sqrt{1+Cot[c]^2} (a+a Sec[c+d x])^3\right)-$$

$$\Bigg(4 B Cos\left[\frac{c}{2}+\frac{d x}{2}\right]^6 Csc\left[\frac{c}{2}\right] HypergeometricPFQ\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, Sin[d x-ArcTan[Cot[c]]]^2\right] Sec\left[\frac{c}{2}\right]$$

$$Sec[c+d x] \left(A+B Sec[c+d x]+C Sec[c+d x]^2\right) Sec[d x-ArcTan[Cot[c]]] \sqrt{1-Sin[d x-ArcTan[Cot[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(52\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^3\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\frac{4\,(20\,C-A\,\text{Cos}[c]-9\,B\,\text{Cos}[c]+29\,C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+11\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$

$$\frac{32\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+\frac{8\,(A-6\,B+11\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{\text{Cos}[c+d\,x]}\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^3\right)$$

- **Problem 1238: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^3}\,dx$$

Optimal (type 4, 268 leaves, 9 steps):

$$\frac{(9A-49B+119C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{10a^3d}+\frac{(3A-13B+33C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{6a^3d}+$$
$$\frac{(3A-13B+33C)\,\text{Sin}[c+dx]}{6a^3d\,\text{Cos}[c+dx]^{3/2}}-\frac{(9A-49B+119C)\,\text{Sin}[c+dx]}{10a^3d\sqrt{\text{Cos}[c+dx]}}-\frac{(A-B+C)\,\text{Sin}[c+dx]}{5d\,\text{Cos}[c+dx]^{3/2}(a+a\,\text{Cos}[c+dx])^3}+$$
$$\frac{(B-2C)\,\text{Sin}[c+dx]}{3ad\,\text{Cos}[c+dx]^{3/2}(a+a\,\text{Cos}[c+dx])^2}-\frac{(9A-49B+119C)\,\text{Sin}[c+dx]}{30d\,\text{Cos}[c+dx]^{3/2}\left(a^3+a^3\,\text{Cos}[c+dx]\right)}$$

Result (type 5, 2248 leaves) :

$$\frac{1}{5(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])(a+a\,\text{Sec}[c+dx])^3}$$
$$9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3id\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-id\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])(a+a\,\text{Sec}[c+dx])^3}49\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3id\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-id\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2c+2dx])(a+a\,\text{Sec}[c+dx])^3}119\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+dx]\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)-$$

$$\Bigg(4 A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c+d x]$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2} (a+a \operatorname{Sec}[c+d x])^3\right)+$$

$$\Bigg(52 B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\operatorname{Sec}[c+d x] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2} (a+a \operatorname{Sec}[c+d x])^3\right)-$$

$$\Bigg(44 C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\operatorname{Sec}[c+d x] \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2} (a+a \operatorname{Sec}[c+d x])^3\right)+$$

$$\Bigg(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \Bigg(-\frac{4 (-20 B+60 C+9 A \operatorname{Cos}[c]-29 B \operatorname{Cos}[c]+59 C \operatorname{Cos}[c]) \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c]}{5 d}-$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-11\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+59\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{32\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$

$$\frac{32\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(C\,\text{Sin}[c]+3\,B\,\text{Sin}[d\,x]-9\,C\,\text{Sin}[d\,x]\right)}{3\,d}-\frac{8\,\left(6\,A-11\,B+16\,C\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$

$$\left.\left.\frac{4\,\left(A-B+C\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\bigg/\left(\sqrt{\text{Cos}[c+d\,x]}\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^3\right)$$

Problem 1239: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\left(a+a\,\text{Sec}[c+d\,x]\right)^4}\,dx$$

Optimal (type 4, 278 leaves, 9 steps):

$$-\frac{\left(176\,A-57\,B+8\,C\right)\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{10\,a^4\,d}+\frac{\left(339\,A-108\,B+17\,C\right)\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{42\,a^4\,d}+$$

$$\frac{\left(339\,A-108\,B+17\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{42\,a^4\,d}-\frac{\left(43\,A-15\,B+C\right)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{42\,a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}-$$

$$\frac{\left(176\,A-57\,B+8\,C\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{30\,a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)}-\frac{\left(A-B+C\right)\,\text{Cos}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{7\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^4}-\frac{\left(13\,A-6\,B-C\right)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{35\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}$$

Result (type 5, 2319 leaves):

$$-\frac{1}{5\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^4}$$

$$352\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\bigg/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\bigg/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\frac{1}{5\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(a+a\,\text{Sec}[c+d\,x]\right)^4}\,114\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,16\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$

$$\left(904\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\left(288\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(7\, d\, (A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^4\right)-$$

$$\left(136\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\right.$$
$$\mathrm{Sec}[c+d\,x]^2\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(21\, d\, (A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\,(a+a\,\mathrm{Sec}[c+d\,x])^4\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\left(\frac{16\,(96A-37B+8C+80A\,\mathrm{Cos}[c]-20B\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{5d}+\frac{64A\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3d}-\right.\right.$$
$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{7d}+\frac{16\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(96A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-37B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+8C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5d}+$$
$$\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(33A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-26B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+19C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{35d}-$$
$$\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(629A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-363B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+167C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{105d}+\frac{64A\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3d}-$$
$$\left.\left.\frac{8\,(629A-363B+167C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{105d}+\frac{8\,(33A-26B+19C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{35d}-\frac{4\,(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Tan}\left[\frac{c}{2}\right]}{7d}\right)\right)\Big/$$
$$\left(\mathrm{Cos}[c+d\,x]^{3/2}\,(A+2C+2B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2c+2d\,x])\,(a+a\,\mathrm{Sec}[c+d\,x])^4\right)$$

- **Problem 1240: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\sqrt{\mathrm{Cos}[c+d\,x]}\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{(a+a\,\mathrm{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 4, 244 leaves, 8 steps):

$$\frac{(57A-8B-C)\,\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10a^4d}-\frac{(108A-17B-4C)\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{42a^4d}-\frac{(141A-29B-13C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{210a^4d\,(1+\mathrm{Cos}[c+d\,x])^2}-$$
$$\frac{(108A-17B-4C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{42a^4d\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{7d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}-\frac{(11A-4B-3C)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{35a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}$$

Result (type 5, 2286 leaves):

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}$$
$$114\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,16\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{5\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,2\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\Bigg(288\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(7\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\,\,(a + a\,\text{Sec}[c + d\,x])^4\right) -$$

$$\left(136\,B\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c + d\,x]^2\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(21\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\,\,(a + a\,\text{Sec}[c + d\,x])^4\right) -$$

$$\left(32\,C\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c + d\,x]^2\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(21\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\,\,(a + a\,\text{Sec}[c + d\,x])^4\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\right.$$

$$\left(-\frac{16\,(37\,A - 8\,B - C + 20\,A\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d} - \frac{16\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]\,\left(37\,A\,\text{Sin}\left[\frac{d\,x}{2}\right] - 8\,B\,\text{Sin}\left[\frac{d\,x}{2}\right] - C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d} +\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^7\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right] - B\,\text{Sin}\left[\frac{d\,x}{2}\right] + C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{7\,d} - \frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^5\,\left(26\,A\,\text{Sin}\left[\frac{d\,x}{2}\right] - 19\,B\,\text{Sin}\left[\frac{d\,x}{2}\right] + 12\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{35\,d} +$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^3\,\left(363\,A\,\text{Sin}\left[\frac{d\,x}{2}\right] - 167\,B\,\text{Sin}\left[\frac{d\,x}{2}\right] + 41\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{105\,d} + \frac{8\,(363\,A - 167\,B + 41\,C)\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{105\,d} -$$

$$\left.\left.\frac{8\,(26\,A - 19\,B + 12\,C)\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{35\,d} + \frac{4\,(A - B + C)\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6\,\text{Tan}\left[\frac{c}{2}\right]}{7\,d}\right)\right) \Big/$$

$$\left(\text{Cos}[c + d\,x]^{3/2}\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + a\,\text{Sec}[c + d\,x])^4\right)$$

Problem 1241: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 4, 232 leaves, 8 steps):

$$-\frac{(8A+B)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^4\,d}+\frac{(17A+4B+3C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{42\,a^4\,d}-\frac{(83A+B-15C)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{210\,a^4\,d\,(1+\text{Cos}[c+d\,x])^2}+\frac{(8A+B)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,a^4\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d\,(a+a\,\text{Cos}[c+d\,x])^4}-\frac{(9A-2B-5C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{35\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^3}$$

Result (type 5, 1862 leaves):

$$-\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}16\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}2\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\left(136\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2\right.$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(21\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\,(a + a\,\text{Sec}[c + d\,x])^4\right) -$$

$$\left(32\,B\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c + d\,x]^2 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(21\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\,(a + a\,\text{Sec}[c + d\,x])^4\right) -$$

$$\left(8\,C\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c + d\,x]^2 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(7\,d\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\,(a + a\,\text{Sec}[c + d\,x])^4\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^8 \left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \left(\frac{16\,(8\,A + B)\,\text{Csc}[c]}{5\,d} + \frac{16\,\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right] \left(8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right] + B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d} -\right.\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^3 \left(167\,A\,\text{Sin}\left[\frac{d\,x}{2}\right] - 41\,B\,\text{Sin}\left[\frac{d\,x}{2}\right] - 15\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{105\,d} - \frac{4\,\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^7 \left(A\,\text{Sin}\left[\frac{d\,x}{2}\right] - B\,\text{Sin}\left[\frac{d\,x}{2}\right] + C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{7\,d} +$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^5 \left(19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right] - 12\,B\,\text{Sin}\left[\frac{d\,x}{2}\right] + 5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{35\,d} - \frac{8\,(167\,A - 41\,B - 15\,C)\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{105\,d} +$$

$$\left.\left.\frac{8\,(19\,A - 12\,B + 5\,C)\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4 \text{Tan}\left[\frac{c}{2}\right]}{35\,d} - \frac{4\,(A - B + C)\,\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6 \text{Tan}\left[\frac{c}{2}\right]}{7\,d}\right)\right) \Big/$$

$$\left(\text{Cos}[c + d\,x]^{3/2}\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,(a + a\,\text{Sec}[c + d\,x])^4\right)$$

- **Problem 1242: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + B\,\text{Sec}[c+d\,x] + C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a + a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 4, 229 leaves, 8 steps):

$$-\frac{(A-C)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^4\,d}+\frac{(4A+3B+4C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{42\,a^4\,d}+\frac{(41A+15B-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{210\,a^4\,d\,(1+\text{Cos}[c+d\,x])^2}+\frac{(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,a^4\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{7\,d\,(a+a\,\text{Cos}[c+d\,x])^4}-\frac{(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^3}$$

Result (type 5, 1862 leaves):

$$-\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}$$
$$2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,2\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3\,d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$
$$\left(32\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\Bigg(8\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\Bigg(32\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\ (a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\frac{16\,(A-C)\,\text{Csc}[c]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(12\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-5\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{35\,d}+\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(41\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+15\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{105\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{7\,d}+$$

$$\frac{8\,(41\,A+15\,B-C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{105\,d}-\frac{8\,(12\,A-5\,B-2\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{35\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Tan}\left[\frac{c}{2}\right]}{7\,d}\Bigg)\Bigg)\Big/$$

$$\left(\text{Cos}[c+d\,x]^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)$$

- **Problem 1243: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2}{\text{Cos}[c + d x]^{5/2}\,(a + a\,\text{Sec}[c + d x])^4}\,dx$$

Optimal (type 4, 234 leaves, 8 steps):

$$\frac{(B + 8 C)\,\text{EllipticE}\left[\frac{1}{2}(c + d x), 2\right]}{10 a^4 d} + \frac{(3 A + 4 B + 17 C)\,\text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right]}{42 a^4 d} + \frac{(15 A - B - 83 C)\,\sqrt{\text{Cos}[c + d x]}\,\text{Sin}[c + d x]}{210 a^4 d\,(1 + \text{Cos}[c + d x])^2} - \frac{(B + 8 C)\,\sqrt{\text{Cos}[c + d x]}\,\text{Sin}[c + d x]}{10 a^4 d\,(1 + \text{Cos}[c + d x])} - \frac{(A - B + C)\,\sqrt{\text{Cos}[c + d x]}\,\text{Sin}[c + d x]}{7 d\,(a + a\,\text{Cos}[c + d x])^4} + \frac{(5 A + 2 B - 9 C)\,\sqrt{\text{Cos}[c + d x]}\,\text{Sin}[c + d x]}{35 a d\,(a + a\,\text{Cos}[c + d x])^3}$$

Result (type 5, 1862 leaves):

$$\frac{1}{5\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])\,(a + a\,\text{Sec}[c + d x])^4}\,2\,i\,B\,\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c + d x]^2\left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)$$
$$\left(\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1 + e^{2 i d x}\right)\text{Cos}[c] + 2\,i\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\left.\sqrt{1 + e^{2 i d x}\,\text{Cos}[2 c] + i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1 + e^{2 i d x}\right)\text{Cos}[c] - 3\,d\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right) -$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1 + e^{2 i d x}\right)\text{Cos}[c] + 2\,i\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1 + e^{2 i d x}\,\text{Cos}[2 c] + i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1 + e^{2 i d x}\right)\text{Cos}[c] + d\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right)\right) +$$
$$\frac{1}{5\,(A + 2 C + 2 B\,\text{Cos}[c + d x] + A\,\text{Cos}[2 c + 2 d x])\,(a + a\,\text{Sec}[c + d x])^4}\,16\,i\,C\,\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c + d x]^2\left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)$$
$$\left(\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1 + e^{2 i d x}\right)\text{Cos}[c] + 2\,i\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\left.\sqrt{1 + e^{2 i d x}\,\text{Cos}[2 c] + i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1 + e^{2 i d x}\right)\text{Cos}[c] - 3\,d\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right) -$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x}\,(\text{Cos}[c] + i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1 + e^{2 i d x}\right)\text{Cos}[c] + 2\,i\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1 + e^{2 i d x}\,\text{Cos}[2 c] + i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1 + e^{2 i d x}\right)\text{Cos}[c] + d\left(-1 + e^{2 i d x}\right)\text{Sin}[c]\right)\right) -$$
$$\left(8\,A\,\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c + d x]^2\right.$$
$$\left(A + B\,\text{Sec}[c + d x] + C\,\text{Sec}[c + d x]^2\right)\text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\Bigg(32\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\Bigg(136\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\Bigg(-\frac{16\,(B+8\,C)\,\text{Csc}[c]}{5\,d}+$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(15\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]-83\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{105\,d}+\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(5\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{35\,d}-$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{7\,d}-\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(B\,\text{Sin}\left[\frac{d\,x}{2}\right]+8\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{8\,(15\,A-B-83\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{105\,d}+\frac{8\,(5\,A+2\,B-9\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{35\,d}-\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Tan}\left[\frac{c}{2}\right]}{7\,d}\Bigg)\Bigg)\Bigg/$$

$$\left(\text{Cos}[c+d\,x]^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)$$

- **Problem 1244: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^4}\,dx$$

Optimal (type 4, 276 leaves, 9 steps):

$$\frac{(A+8B-57C)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^4\,d}+\frac{(4A+17B-108C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{42\,a^4\,d}-\frac{(A+8B-57C)\,\text{Sin}[c+d\,x]}{10\,a^4\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{(13A+29B-141C)\,\text{Sin}[c+d\,x]}{210\,a^4\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])^2}+\frac{(4A+17B-108C)\,\text{Sin}[c+d\,x]}{42\,a^4\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{7\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^4}+\frac{(3A+4B-11C)\,\text{Sin}[c+d\,x]}{35\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3}$$

Result (type 5, 2316 leaves):

$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,16\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[c+d\,x]^2\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{5\,(A+2C+2B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2c+2d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4}\,114\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$

$$\left(32\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c+d\,x]^2\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^4\right)-$$

$$\left(136\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\left(288\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\text{Sec}[c+d\,x]^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(7\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\,(a+a\,\text{Sec}[c+d\,x])^4\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8 (A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2)\right.$$
$$\left(\frac{8\,(20\,C-A\,\text{Cos}[c]-8\,B\,\text{Cos}[c]+37\,C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+83\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-237\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{105\,d}-\right.$$
$$\frac{16\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+8\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-37\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{7\,d}+$$
$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{35\,d}+\frac{64\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}-$$
$$\left.\left.\frac{8\,(A+83\,B-237\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{105\,d}+\frac{8\,(2\,A-9\,B+16\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{35\,d}+\frac{4\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Tan}\left[\frac{c}{2}\right]}{7\,d}\right)\right)\Big/$$
$$\left(\text{Cos}[c+d\,x]^{3/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a+a\,\text{Sec}[c+d\,x])^4\right)$$

- **Problem 1248: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2)\,dx$$

Optimal (type 3, 140 leaves, 5 steps):

$$\frac{2\sqrt{a}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a\,(A+3\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 192 leaves):

$$\left(4\sqrt{\text{Cos}[c+d\,x]}\,(C+B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[c+d\,x]^2)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}\right.$$
$$\left(-3\,i\,C\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,C\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\right.$$
$$\left.\left.(2\,A+3\,B+A\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(3\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])\right)$$

- **Problem 1249: Result unnecessarily involves higher level functions.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2)\,dx$$

Optimal (type 3, 139 leaves, 5 steps):

$$\frac{\sqrt{a}\,(2B+C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{d}+\frac{a\,(2A-C)\,\text{Sin}[c+dx]}{d\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{C\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{d\,\sqrt{\text{Cos}[c+dx]}}$$

Result (type 5, 209 leaves) :

$$\left(2\left(C+B\,\text{Cos}[c+dx]+A\,\text{Cos}[c+dx]^2\right)\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a\,(1+\text{Sec}[c+dx])}\left(-3\,i\,(2B+C)\,e^{\frac{1}{2}i(c+dx)}\,\text{Cos}[c+dx]\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+dx)}\right]-i\,(2B+C)\,e^{\frac{3}{2}i(c+dx)}\,\text{Cos}[c+dx]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+dx)}\right]+3\,(C+2A\,\text{Cos}[c+dx])\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(3\,d\,\sqrt{\text{Cos}[c+dx]}\,(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2(c+dx)])\right)$$

Problem 1250: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+dx]}\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{\sqrt{\text{Cos}[c+dx]}}\,dx$$

Optimal (type 3, 151 leaves, 5 steps) :

$$\frac{\sqrt{a}\,(8A+4B+3C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{4d}+\frac{a\,(4B+C)\,\text{Sin}[c+dx]}{4\,d\,\text{Cos}[c+dx]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{C\,\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2\,d\,\text{Cos}[c+dx]^{3/2}}$$

Result (type 5, 172 leaves) :

$$\frac{1}{12d}\sqrt{\text{Cos}[c+dx]}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{a\,(1+\text{Sec}[c+dx])}\left(-3\,i\,(8A+4B+3C)\,e^{\frac{1}{2}i(c+dx)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+dx)}\right]-i\,(8A+4B+3C)\,e^{\frac{3}{2}i(c+dx)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+dx)}\right]+3\,\text{Sec}[c+dx]\,(4B+3C+2C\,\text{Sec}[c+dx])\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)$$

Problem 1251: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+dx]}\,\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)}{\text{Cos}[c+dx]^{3/2}}\,dx$$

Optimal (type 3, 199 leaves, 6 steps) :

$$\frac{\sqrt{a}\,(8A+6B+5C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+$$

$$\frac{a\,(6B+C)\,\text{Sin}[c+d\,x]}{12\,d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(8A+6B+5C)\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 194 leaves) :

$$\frac{1}{24\,d}\sqrt{\text{Cos}[c+d\,x]}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-3\,i\,(8A+6B+5C)\,e^{\frac{1}{2}i(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+d\,x)}\right]-i\,(8A+6B+5C)\,e^{\frac{3}{2}i(c+d\,x)}\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+d\,x)}\right]+\text{Sec}[c+d\,x]\left(3\,(8A+6B+5C)+2\,(6B+5C)\,\text{Sec}[c+d\,x]+8\,C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

- **Problem 1252: Result unnecessarily involves higher level functions.**

$$\int\frac{\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 247 leaves, 7 steps) :

$$\frac{\sqrt{a}\,(48A+40B+35C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+\frac{a\,(8B+C)\,\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{7/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$

$$\frac{a\,(48A+40B+35C)\,\text{Sin}[c+d\,x]}{96\,d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(48A+40B+35C)\,\text{Sin}[c+d\,x]}{64\,d\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{C\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 334 leaves) :

$$\frac{1}{128\,d}(48A+40B+35C)\sqrt{\text{Cos}[c+d\,x]}$$
$$\left(-2\,i\,e^{\frac{1}{2}i(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+d\,x)}\right]-\frac{2}{3}\,i\,e^{\frac{3}{2}i(c+d\,x)}\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(\frac{1}{4}C\,\text{Sec}[c+d\,x]^4\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{24}\text{Sec}[c+d\,x]^3\left(8\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+7\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)+\right.$$
$$\frac{1}{64}\text{Sec}[c+d\,x]\left(48\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+35\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$
$$\left.\frac{1}{96}\text{Sec}[c+d\,x]^2\left(48\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+35\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)$$

Problem 1256: Result unnecessarily involves higher level functions.

$$\int \text{Cos}[c+d x]^{5/2} (a+a \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 192 leaves, 6 steps):

$$\frac{2 a^{3/2} C \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{d}+\frac{2 a^2 (12 A+20 B+15 C) \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Sec}[c+d x]}}+$$
$$\frac{2 a (3 A+5 B) \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{15 d}+\frac{2 A \text{Cos}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 5, 224 leaves):

$$\frac{1}{15 d (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)])} a \sqrt{\text{Cos}[c+d x]} (1+\text{Cos}[c+d x]) \left(C+B \text{Cos}[c+d x]+A \text{Cos}[c+d x]^2\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3$$
$$\sqrt{a (1+\text{Sec}[c+d x])} \left(-30 i C e^{\frac{1}{2} i (c+d x)} \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-10 i C e^{\frac{3}{2} i (c+d x)} \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]+\right.$$
$$\left.(39 A+50 B+30 C+2 (9 A+5 B) \text{Cos}[c+d x]+3 A \text{Cos}[2 (c+d x)]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 1257: Result unnecessarily involves higher level functions.

$$\int \text{Cos}[c+d x]^{3/2} (a+a \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \, dx$$

Optimal (type 3, 197 leaves, 6 steps):

$$\frac{a^{3/2} (2 B+3 C) \text{ArcSinh}\left[\frac{\sqrt{a} \text{Tan}[c+d x]}{\sqrt{a+a \text{Sec}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{d}+\frac{a^2 (8 A+6 B-3 C) \text{Sin}[c+d x]}{3 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Sec}[c+d x]}}-$$
$$\frac{a (2 A-3 C) \sqrt{a+a \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 A \sqrt{\text{Cos}[c+d x]} (a+a \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d}$$

Result (type 5, 242 leaves):

$$\frac{1}{3 d \sqrt{\text{Cos}[c+d x]} (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)])} a (1+\text{Cos}[c+d x]) \left(C+B \text{Cos}[c+d x]+A \text{Cos}[c+d x]^2\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3$$
$$\sqrt{a (1+\text{Sec}[c+d x])} \left(-3 i (2 B+3 C) e^{\frac{1}{2} i (c+d x)} \text{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-i (2 B+3 C) e^{\frac{3}{2} i (c+d x)}\right.$$
$$\left.\text{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]+(A+3 C+2 (5 A+3 B) \text{Cos}[c+d x]+A \text{Cos}[2 (c+d x)]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 1258: Result unnecessarily involves higher level functions.

$$\int \sqrt{\cos[c+d x]}\ (a+a \operatorname{Sec}[c+d x])^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 203 leaves, 6 steps):

$$\frac{a^{3/2} (8 A+12 B+7 C) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right] \sqrt{\cos[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{4 d}+$$
$$\frac{a^2 (8 A-4 B-5 C) \operatorname{Sin}[c+d x]}{4 d \sqrt{\cos[c+d x]} \sqrt{a+a \operatorname{Sec}[c+d x]}}+\frac{a (4 B+3 C) \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d \sqrt{\cos[c+d x]}}+\frac{C (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{2 d \sqrt{\cos[c+d x]}}$$

Result (type 5, 256 leaves):

$$\frac{1}{12 d \cos[c+d x]^{3/2} (A+2 C+2 B \cos[c+d x]+A \cos[2 (c+d x)])}$$
$$a (1+\cos[c+d x]) \left(C+B \cos[c+d x]+A \cos[c+d x]^2\right) \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \sqrt{a (1+\operatorname{Sec}[c+d x])}$$
$$\Bigg(-3 i (8 A+12 B+7 C) e^{\frac{1}{2} i (c+d x)} \cos[c+d x]^2 \operatorname{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-i (8 A+12 B+7 C) e^{\frac{3}{2} i (c+d x)} \cos[c+d x]^2$$
$$\operatorname{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]+3 ((4 B+7 C) \cos[c+d x]+2 (2 A+C+2 A \cos[2 (c+d x)])) \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\Bigg)$$

Problem 1259: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \operatorname{Sec}[c+d x])^{3/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\sqrt{\cos[c+d x]}} dx$$

Optimal (type 3, 201 leaves, 6 steps):

$$\frac{a^{3/2} (24 A+14 B+11 C) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right] \sqrt{\cos[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{8 d}+$$
$$\frac{a^2 (24 A+30 B+19 C) \operatorname{Sin}[c+d x]}{24 d \cos[c+d x]^{3/2} \sqrt{a+a \operatorname{Sec}[c+d x]}}+\frac{a (2 B+C) \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{4 d \cos[c+d x]^{3/2}}+\frac{C (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{3 d \cos[c+d x]^{3/2}}$$

Result (type 5, 261 leaves):

$$\frac{1}{24\,d\,\mathrm{Cos}[c+d\,x]^{5/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,(c+d\,x)])}$$
$$a\,(1+\mathrm{Cos}[c+d\,x])\,\left(C+B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}$$
$$\left(-3\,i\,(24\,A+14\,B+11\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-i\,(24\,A+14\,B+11\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\mathrm{Cos}[c+d\,x]^3\right.$$
$$\left.\mathrm{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(8\,C+2\,(6\,B+11\,C)\,\mathrm{Cos}[c+d\,x]+3\,(8\,A+14\,B+11\,C)\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1260: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 253 leaves, 7 steps):

$$\frac{a^{3/2}\,(112\,A+88\,B+75\,C)\,\mathrm{ArcSinh}\left[\frac{\sqrt{a}\,\mathrm{Tan}[c+d\,x]}{\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}\right]\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{64\,d}+\frac{a^2\,(48\,A+56\,B+39\,C)\,\mathrm{Sin}[c+d\,x]}{96\,d\,\mathrm{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(112\,A+88\,B+75\,C)\,\mathrm{Sin}[c+d\,x]}{64\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}}+\frac{a\,(8\,B+3\,C)\,\sqrt{a+a\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\frac{C\,(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{4\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 281 leaves):

$$\frac{1}{192\,d\,\mathrm{Cos}[c+d\,x]^{7/2}\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,(c+d\,x)])}\,a\,(1+\mathrm{Cos}[c+d\,x])\,\left(C+B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[c+d\,x]^2\right)$$
$$\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{a\,(1+\mathrm{Sec}[c+d\,x])}\,\left(-3\,i\,(112\,A+88\,B+75\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$i\,(112\,A+88\,B+75\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.\left(48\,C+8\,(8\,B+15\,C)\,\mathrm{Cos}[c+d\,x]+2\,(48\,A+88\,B+75\,C)\,\mathrm{Cos}[c+d\,x]^2+3\,(112\,A+88\,B+75\,C)\,\mathrm{Cos}[c+d\,x]^3\right)\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1261: Result unnecessarily involves higher level functions.

$$\int\frac{(a+a\,\mathrm{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 303 leaves, 8 steps):

$$\frac{a^{3/2}\,(176\,A+150\,B+133\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{128\,d}+$$
$$\frac{a^2\,(80\,A+90\,B+67\,C)\,\text{Sin}[c+d\,x]}{240\,d\,\text{Cos}[c+d\,x]^{7/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Sin}[c+d\,x]}{128\,d\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a\,(10\,B+3\,C)\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 301 leaves):

$$\frac{1}{1920\,d\,\text{Cos}[c+d\,x]^{9/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])}$$
$$a\,(1+\text{Cos}[c+d\,x])\left(C+B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[c+d\,x]^2\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\Big(-15\,i\,(176\,A+150\,B+133\,C)\,e^{\frac{1}{2}i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^5\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-5\,i\,(176\,A+150\,B+133\,C)\,e^{\frac{3}{2}i\,(c+d\,x)}$$
$$\text{Cos}[c+d\,x]^5\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\Big(384\,C+48\,(10\,B+19\,C)\,\text{Cos}[c+d\,x]+8\,(80\,A+150\,B+133\,C)\,\text{Cos}[c+d\,x]^2+$$
$$10\,(176\,A+150\,B+133\,C)\,\text{Cos}[c+d\,x]^3+15\,(176\,A+150\,B+133\,C)\,\text{Cos}[c+d\,x]^4\Big)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\Big)$$

- **Problem 1265: Result unnecessarily involves higher level functions.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 3, 242 leaves, 7 steps):

$$\frac{2\,a^{5/2}\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a^3\,(160\,A+224\,B+245\,C)\,\text{Sin}[c+d\,x]}{105\,d\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{2\,a^2\,(40\,A+56\,B+35\,C)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,a\,(5\,A+7\,B)\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{35\,d}+\frac{2\,A\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 343 leaves):

$$\left(C \operatorname{Cos}[c+d x]^{9/2}\left(-2 i e^{\frac{1}{2} i (c+d x)} \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-\frac{2}{3} i e^{\frac{3}{2} i (c+d x)} \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]\right) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\operatorname{Sec}[c+d x]))^{5/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\right) \Big/ (2 d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))+\left(\operatorname{Cos}[c+d x]^{9/2} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 (a(1+\operatorname{Sec}[c+d x]))^{5/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)\left(\frac{5}{8}(3 A+4 B+4 C) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{24}(11 A+10 B+4 C) \operatorname{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{40}(5 A+2 B) \operatorname{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{56} A \operatorname{Sin}\left[\frac{7}{2}(c+d x)\right]\right)\right) \Big/ (d (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]))$$

Problem 1266: Result unnecessarily involves higher level functions.

$$\int \operatorname{Cos}[c+d x]^{5/2} (a+a \operatorname{Sec}[c+d x])^{5/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 243 leaves, 7 steps):

$$\frac{a^{5/2} (2 B+5 C) \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{d}+\frac{a^3 (64 A+70 B+15 C) \operatorname{Sin}[c+d x]}{15 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Sec}[c+d x]}}-\frac{a^2 (16 A+10 B-15 C) \sqrt{a+a \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{15 d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{2 a (A+B) \sqrt{\operatorname{Cos}[c+d x]} (a+a \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{3 d}+\frac{2 A \operatorname{Cos}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{5/2} \operatorname{Sin}[c+d x]}{5 d}$$

Result (type 5, 271 leaves):

$$\frac{1}{60 d \sqrt{\operatorname{Cos}[c+d x]} (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 (c+d x)])} a^2 (1+\operatorname{Cos}[c+d x])^2\left(C+B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \sqrt{a(1+\operatorname{Sec}[c+d x])}\left(-30 i (2 B+5 C) e^{\frac{1}{2} i (c+d x)} \operatorname{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, -e^{2 i (c+d x)}\right]-10 i (2 B+5 C) e^{\frac{3}{2} i (c+d x)} \operatorname{Cos}[c+d x] \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, -e^{2 i (c+d x)}\right]+(28 A+10 B+30 C+(181 A+160 B+60 C) \operatorname{Cos}[c+d x]+2(14 A+5 B) \operatorname{Cos}[2(c+d x)]+3 A \operatorname{Cos}[3(c+d x)]) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 1267: Result unnecessarily involves higher level functions.

$$\int \operatorname{Cos}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{5/2}\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 3, 253 leaves, 7 steps):

$$\frac{a^{5/2}(8A+20B+19C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{4d}+\frac{a^3(56A+12B-27C)\,\text{Sin}[c+dx]}{12d\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}}-\frac{a^2(8A-12B-21C)\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{12d\sqrt{\text{Cos}[c+dx]}}-\frac{a(4A-3C)(a+a\,\text{Sec}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{6d\sqrt{\text{Cos}[c+dx]}}+\frac{2A\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^{5/2}\,\text{Sin}[c+dx]}{3d}$$

Result (type 5, 282 leaves) :

$$\frac{1}{24d\,\text{Cos}[c+dx]^{3/2}(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2(c+dx)])}a^2(1+\text{Cos}[c+dx])^2\left(C+B\,\text{Cos}[c+dx]+A\,\text{Cos}[c+dx]^2\right)\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5\sqrt{a(1+\text{Sec}[c+dx])}\left(-3\,i\,(8A+20B+19C)\,e^{\frac{1}{2}i(c+dx)}\,\text{Cos}[c+dx]^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+dx)}\right]-i\,(8A+20B+19C)\,e^{\frac{3}{2}i(c+dx)}\,\text{Cos}[c+dx]^2\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+dx)}\right]+(32A+12B+6C+3(2A+4B+11C)\,\text{Cos}[c+dx]+4(8A+3B)\,\text{Cos}[2(c+dx)]+2A\,\text{Cos}[3(c+dx)])\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)$$

Problem 1268: Result unnecessarily involves higher level functions.

$$\int\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Sec}[c+dx])^{5/2}\left(A+B\,\text{Sec}[c+dx]+C\,\text{Sec}[c+dx]^2\right)dx$$

Optimal (type 3, 253 leaves, 7 steps) :

$$\frac{a^{5/2}(40A+38B+25C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+dx]}{\sqrt{a+a\,\text{Sec}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}}{8d}+\frac{a^3(24A-54B-49C)\,\text{Sin}[c+dx]}{24d\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Sec}[c+dx]}}+\frac{a^2(24A+42B+31C)\sqrt{a+a\,\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{24d\sqrt{\text{Cos}[c+dx]}}+\frac{a(6B+5C)(a+a\,\text{Sec}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{12d\sqrt{\text{Cos}[c+dx]}}+\frac{C(a+a\,\text{Sec}[c+dx])^{5/2}\,\text{Sin}[c+dx]}{3d\sqrt{\text{Cos}[c+dx]}}$$

Result (type 5, 276 leaves) :

$$\frac{1}{48d\,\text{Cos}[c+dx]^{5/2}(A+2C+2B\,\text{Cos}[c+dx]+A\,\text{Cos}[2(c+dx)])}a^2(1+\text{Cos}[c+dx])^2\left(C+B\,\text{Cos}[c+dx]+A\,\text{Cos}[c+dx]^2\right)\text{Sec}\left[\frac{1}{2}(c+dx)\right]^5\sqrt{a(1+\text{Sec}[c+dx])}\left(-3\,i\,(40A+38B+25C)\,e^{\frac{1}{2}i(c+dx)}\,\text{Cos}[c+dx]^3\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2i(c+dx)}\right]-i\,(40A+38B+25C)\,e^{\frac{3}{2}i(c+dx)}\,\text{Cos}[c+dx]^3\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2i(c+dx)}\right]+\left(8C+2(6B+17C)\,\text{Cos}[c+dx]+3(8A+22B+25C)\,\text{Cos}[c+dx]^2+48A\,\text{Cos}[c+dx]^3\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)$$

Problem 1269: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 253 leaves, 7 steps):

$$\frac{a^{5/2}\,(304\,A+200\,B+163\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+\frac{a^3\,(432\,A+392\,B+299\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(16\,A+24\,B+17\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{a\,(8\,B+5\,C)\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 283 leaves):

$$\frac{1}{384\,d\,\text{Cos}[c+d\,x]^{7/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\left(C+B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-3\,i\,(304\,A+200\,B+163\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^4\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$i\,(304\,A+200\,B+163\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^4\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.\left(48\,C+8\,(8\,B+23\,C)\,\text{Cos}[c+d\,x]+(96\,A+272\,B+326\,C)\,\text{Cos}[c+d\,x]^2+(528\,A+600\,B+489\,C)\,\text{Cos}[c+d\,x]^3\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1270: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 301 leaves, 8 steps):

$$\frac{a^{5/2}\,(400\,A+326\,B+283\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{128\,d}+\frac{a^3\,(1040\,A+950\,B+787\,C)\,\text{Sin}[c+d\,x]}{960\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^3\,(400\,A+326\,B+283\,C)\,\text{Sin}[c+d\,x]}{128\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^2\,(80\,A+110\,B+79\,C)\,\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$
$$\frac{a\,(2\,B+C)\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{8\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 305 leaves):

$$\frac{1}{3840\, d\, \text{Cos}[c+d\,x]^{9/2}\, (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])}\, a^2\, (1+\text{Cos}[c+d\,x])^2\, \left(C+B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[c+d\,x]^2\right)\, \text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5 \sqrt{a\,(1+\text{Sec}[c+d\,x])}$$
$$\left(-15\,i\,(400\,A+326\,B+283\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^5\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-5\,i\,(400\,A+326\,B+283\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\right.$$
$$\text{Cos}[c+d\,x]^5\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+\left(384\,C+48\,(10\,B+29\,C)\,\text{Cos}[c+d\,x]+8\,(80\,A+230\,B+283\,C)\,\text{Cos}[c+d\,x]^2+\right.$$
$$\left.\left.10\,(272\,A+326\,B+283\,C)\,\text{Cos}[c+d\,x]^3+15\,(400\,A+326\,B+283\,C)\,\text{Cos}[c+d\,x]^4\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 1271: Result unnecessarily involves higher level functions.**

$$\int \frac{(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 353 leaves, 9 steps):

$$\frac{a^{5/2}\,(1304\,A+1132\,B+1015\,C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{512\,d}+$$
$$\frac{a^3\,(680\,A+628\,B+545\,C)\,\text{Sin}[c+d\,x]}{960\,d\,\text{Cos}[c+d\,x]^{7/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(1304\,A+1132\,B+1015\,C)\,\text{Sin}[c+d\,x]}{768\,d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+\frac{a^3\,(1304\,A+1132\,B+1015\,C)\,\text{Sin}[c+d\,x]}{512\,d\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d\,x]}}+$$
$$\frac{a^2\,(120\,A+156\,B+115\,C)\sqrt{a+a\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{480\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{a\,(12\,B+5\,C)\,(a+a\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{60\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{C\,(a+a\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{6\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 328 leaves):

$$\frac{1}{15360\,d\,\text{Cos}[c+d\,x]^{11/2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,(c+d\,x)])}\,a^2\,(1+\text{Cos}[c+d\,x])^2\left(C+B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[c+d\,x]^2\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\left(-15\,i\,(1304\,A+1132\,B+1015\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^6\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]-\right.$$
$$5\,i\,(1304\,A+1132\,B+1015\,C)\,e^{\frac{3}{2}\,i\,(c+d\,x)}\,\text{Cos}[c+d\,x]^6\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left(1280\,C+128\,(12\,B+35\,C)\,\text{Cos}[c+d\,x]+48\,(40\,A+29\,(4\,B+5\,C))\,\text{Cos}[c+d\,x]^2+8\,(920\,A+1132\,B+1015\,C)\,\text{Cos}[c+d\,x]^3+\right.$$
$$\left.\left.10\,(1304\,A+1132\,B+1015\,C)\,\text{Cos}[c+d\,x]^4+15\,(1304\,A+1132\,B+1015\,C)\,\text{Cos}[c+d\,x]^5\right)\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

- **Problem 1275: Result more than twice size of optimal antiderivative.**

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 178 leaves, 7 steps) :

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{a}\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}$$

Result (type 3, 388 leaves) :

$$\frac{1}{2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a\,(1+\text{Sec}[c+d\,x])}\,\sqrt{\text{Sin}[c+d\,x]^2}}\,\text{Sin}[c+d\,x]\,\Big(2\,\sqrt{2}\,(A-B)\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}[1+\text{Cos}[c+d\,x]]-4\,C\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}\left[\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\right]+$$
$$\sqrt{2}\,C\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}\left[(1+\text{Cos}[c+d\,x])^2\right]-2\,\sqrt{2}\,A\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}\left[2\,\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]+$$
$$2\,\sqrt{2}\,B\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}\left[2\,\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]+$$
$$4\,C\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}\left[1+\text{Cos}[c+d\,x]+\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]^2}\right]-$$
$$\sqrt{2}\,C\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Log}\left[3+2\,\text{Cos}[c+d\,x]-\text{Cos}[c+d\,x]^2+2\,\sqrt{2}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{\text{Sin}[c+d\,x]^2}\right]+4\,A\,\sqrt{\text{Sin}[c+d\,x]^2}\Big)$$

- **Problem 1283: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 189 leaves, 7 steps) :

$$\frac{2\,C\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{a^{3/2}\,d}+\frac{(3\,A+B-5\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{2\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 572 leaves) :

$$-\left(2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/ \left(d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)-$$

$$\left(\sqrt{2}\,(3\,A+B-C)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\left(\text{Log}[1+\text{Cos}[c+d\,x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]\right)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\right)\Big/ \left(d\sqrt{1-\text{Cos}[c+d\,x]^2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)-$$

$$\left(2\,C\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d\,x])^2\right]+4\,\text{Log}\left[\sqrt{\text{Cos}[c+d\,x]}+\text{Cos}[c+d\,x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d\,x]+\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right]+\sqrt{2}\,\text{Log}\left[3+2\,\text{Cos}[c+d\,x]-\text{Cos}[c+d\,x]^2+2\sqrt{2}\,\sqrt{1+\text{Cos}[c+d\,x]}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\right]\right)\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sin}[c+d\,x]\right)\Big/ \left(d\sqrt{1-\text{Cos}[c+d\,x]^2}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{3/2}\right)$$

- **Problem 1289: Result more than twice size of optimal antiderivative.**

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 183 leaves, 5 steps):

$$\frac{(19\,A+5\,B+3\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{5/2}}-\frac{(9\,A-B-7\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^{3/2}}$$

Result (type 3, 379 leaves):

$$\left(\cos\left[\frac{1}{2}(c+d x)\right]^5 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^4 \left(A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]-B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\frac{1}{2} \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \left(-13 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+5 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right) \Big/ \left(d \sqrt{\operatorname{Cos}[c+d x]} \left(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]\right) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\right)-$$

$$\left((19 A+5 B+3 C) \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^4 \sqrt{1+\operatorname{Cos}[c+d x]} \left(\operatorname{Log}[1+\operatorname{Cos}[c+d x]]-\operatorname{Log}\left[2 \sqrt{1+\operatorname{Cos}[c+d x]}+\sqrt{2-2 \operatorname{Cos}[c+d x]^2}\right]\right) \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}[c+d x]\right) \Big/ \left(2 \sqrt{2}\, d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{1-\operatorname{Cos}[c+d x]^2} \left(A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]\right) (a (1+\operatorname{Sec}[c+d x]))^{5/2}\right)$$

- **Problem 1290: Result more than twice size of optimal antiderivative.**

$$\int \frac{A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2}{\operatorname{Cos}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 241 leaves, 8 steps):

$$\frac{2 C \operatorname{ArcSinh}\left[\frac{\sqrt{a} \operatorname{Tan}[c+d x]}{\sqrt{a+a \operatorname{Sec}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{a^{5/2} d}+\frac{(5 A+3 B-43 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Sec}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{16 \sqrt{2}\, a^{5/2} d}-\frac{(A-B+C) \operatorname{Sin}[c+d x]}{4 d \operatorname{Cos}[c+d x]^{5/2} (a+a \operatorname{Sec}[c+d x])^{5/2}}+\frac{(5 A+3 B-11 C) \operatorname{Sin}[c+d x]}{16 a d \operatorname{Cos}[c+d x]^{3/2} (a+a \operatorname{Sec}[c+d x])^{3/2}}$$

Result (type 3, 625 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(\frac{1}{2}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\left(5 A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+3 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-11 C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)+\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\left(-A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\right)\Big/\left(d\sqrt{\text{Cos}[c+d x]}\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,(a(1+\text{Sec}[c+d x]))^{5/2}\right)+$$

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\sqrt{\text{Sec}[c+d x]}\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\left(-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}\sqrt{2}\,(5 A+3 B-11 C)\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}\left(\text{Log}[1+\text{Cos}[c+d x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d x]}+\sqrt{2-2\,\text{Cos}[c+d x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]-\frac{1}{\sqrt{1-\text{Cos}[c+d x]^2}}16 C\sqrt{\text{Cos}[c+d x]}\sqrt{1+\text{Cos}[c+d x]}\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d x])^2\right]+4\,\text{Log}\left[\sqrt{\text{Cos}[c+d x]}+\text{Cos}[c+d x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d x]+\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]+\sqrt{2}\,\text{Log}\left[3+2\,\text{Cos}[c+d x]-\text{Cos}[c+d x]^2+2\sqrt{2}\sqrt{1+\text{Cos}[c+d x]}\sqrt{1-\text{Cos}[c+d x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]\right)\right)\Big/\left(4 d\,(A+2 C+2 B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])\,(a(1+\text{Sec}[c+d x]))^{5/2}\right)$$

Problem 1291: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2}{\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 294 leaves, 9 steps):

$$\frac{(2 B-5 C)\,\text{ArcSinh}\left[\frac{\sqrt{a}\,\text{Tan}[c+d x]}{\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{a^{5/2}\,d}+\frac{(3 A-43 B+115 C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Sec}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+d x]}{4 d\,\text{Cos}[c+d x]^{7/2}\,(a+a\,\text{Sec}[c+d x])^{5/2}}+\frac{(A+7 B-15 C)\,\text{Sin}[c+d x]}{16 a d\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Sec}[c+d x])^{3/2}}+\frac{(3 A-11 B+35 C)\,\text{Sin}[c+d x]}{16 a^2 d\,\text{Cos}[c+d x]^{3/2}\sqrt{a+a\,\text{Sec}[c+d x]}}$$

Result (type 3, 651 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5 \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(16\,C\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4\left(A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)+\right.$$
$$\left.\left.\frac{1}{2}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\left(3\,A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-11\,B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+19\,C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\Big/$$
$$\left(d\sqrt{\text{Cos}[c+d\,x]}\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)+$$
$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{1}{\sqrt{1-\text{Cos}[c+d\,x]^2}}\sqrt{2}\,(3\,A-11\,B+35\,C)\sqrt{\text{Cos}[c+d\,x]}\sqrt{1+\text{Cos}[c+d\,x]}\right.\right.$$
$$\left(\text{Log}[1+\text{Cos}[c+d\,x]]-\text{Log}\left[2\sqrt{1+\text{Cos}[c+d\,x]}+\sqrt{2-2\,\text{Cos}[c+d\,x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]-$$
$$\frac{1}{2\sqrt{1-\text{Cos}[c+d\,x]^2}}(32\,B-80\,C)\sqrt{\text{Cos}[c+d\,x]}\sqrt{1+\text{Cos}[c+d\,x]}\left(-\sqrt{2}\,\text{Log}\left[(1+\text{Cos}[c+d\,x])^2\right]+\right.$$
$$4\,\text{Log}\left[\sqrt{\text{Cos}[c+d\,x]}+\text{Cos}[c+d\,x]^{3/2}\right]-4\,\text{Log}\left[1+\text{Cos}[c+d\,x]+\sqrt{1+\text{Cos}[c+d\,x]}\sqrt{1-\text{Cos}[c+d\,x]^2}\right]+\sqrt{2}$$
$$\left.\left.\left.\text{Log}\left[3+2\,\text{Cos}[c+d\,x]-\text{Cos}[c+d\,x]^2+2\sqrt{2}\sqrt{1+\text{Cos}[c+d\,x]}\sqrt{1-\text{Cos}[c+d\,x]^2}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(4\,d\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,(a\,(1+\text{Sec}[c+d\,x]))^{5/2}\right)$$

- **Problem 1294: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 116 leaves, 6 steps):

$$\frac{2\,(3\,a\,A+5\,b\,B+5\,a\,C)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{5\,d}+\frac{2\,(A\,b+a\,B+3\,b\,C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+$$
$$\frac{2\,(A\,b+a\,B)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,A\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 1569 leaves):

$$\left(\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(-\frac{4\,(3\,a\,A+5\,b\,B+5\,a\,C)\,\text{Cot}[c]}{5\,d}+\frac{4\,(A\,b+a\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{2\,a\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{4\,(A\,b+a\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\right.$$
$$\left.\left.\frac{2\,a\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\right)\right)\Big/((b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\Bigg(4\,A\,b\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\Big)-$$

$$\Bigg(4\,a\,B\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\Big)-$$

$$\Bigg(4\,b\,C\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(d\,(b+a\,\mathrm{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\Big)-$$

$$\Bigg(6\,a\,A\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])\,\big(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\Big(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\Big)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (5\,d\ (b+a\,\text{Cos}[c+d\,x])\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(2\,b\,B\,\text{Cos}[c+d\,x]^3\ \text{Csc}[c]\ (a+b\,\text{Sec}[c+d\,x])\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (d\ (b+a\,\text{Cos}[c+d\,x])\ (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(2\,a\,C\,\text{Cos}[c+d\,x]^3\ \text{Csc}[c]\ (a+b\,\text{Sec}[c+d\,x])\ \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\ \text{Cos}[c]^2\ \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\ (d\ (b+a\ \text{Cos}[c+d x])\ (A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x]))$$

- **Problem 1295: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d x]^{3/2}\ (a+b\ \text{Sec}[c+d x])\ \left(A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2\right)\, dx$$

Optimal (type 4, 106 leaves, 6 steps):

$$\frac{2\ (A b+a B-b C)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d x),\ 2\right]}{d}+\frac{2\ (3 b B+a\ (A+3 C))\ \text{EllipticF}\left[\frac{1}{2}\ (c+d x),\ 2\right]}{3 d}+\frac{2 b C\ \text{Sin}[c+d x]}{d\ \sqrt{\text{Cos}[c+d x]}}+\frac{2 a A\ \sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{3 d}$$

Result (type 5, 1904 leaves):

$$\frac{1}{(b+a\ \text{Cos}[c+d x])\ (A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x])}\ i A b\ \text{Cos}[c+d x]^3\ \text{Csc}[c]\ (a+b\ \text{Sec}[c+d x])\ \left(A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2\right)$$

$$\left(\left(\left(2\ e^{2 i d x}\ \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\ (\text{Cos}[c]+i\ \text{Sin}[c])^2\right]\ \sqrt{e^{-i d x}\ \left(2\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]+2 i\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x}\ \text{Cos}[2 c]+i\ e^{2 i d x}\ \text{Sin}[2 c]}\right)\Big/\ \left(3 i d\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]-3 d\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)-$$

$$\left(2\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\ (\text{Cos}[c]+i\ \text{Sin}[c])^2\right]\ \sqrt{e^{-i d x}\ \left(2\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]+2 i\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x}\ \text{Cos}[2 c]+i\ e^{2 i d x}\ \text{Sin}[2 c]}\right)\Big/\ \left(-i d\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]+d\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a\ \text{Cos}[c+d x])\ (A+2 C+2 B\ \text{Cos}[c+d x]+A\ \text{Cos}[2 c+2 d x])}\ i a B\ \text{Cos}[c+d x]^3\ \text{Csc}[c]\ (a+b\ \text{Sec}[c+d x])$$

$$\left(A+B\ \text{Sec}[c+d x]+C\ \text{Sec}[c+d x]^2\right)$$

$$\left(\left(\left(2\ e^{2 i d x}\ \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\ (\text{Cos}[c]+i\ \text{Sin}[c])^2\right]\ \sqrt{e^{-i d x}\ \left(2\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]+2 i\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x}\ \text{Cos}[2 c]+i\ e^{2 i d x}\ \text{Sin}[2 c]}\right)\Big/\ \left(3 i d\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]-3 d\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)-$$

$$\left(2\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\ (\text{Cos}[c]+i\ \text{Sin}[c])^2\right]\ \sqrt{e^{-i d x}\ \left(2\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]+2 i\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x}\ \text{Cos}[2 c]+i\ e^{2 i d x}\ \text{Sin}[2 c]}\right)\Big/\ \left(-i d\ \left(1+e^{2 i d x}\right)\ \text{Cos}[c]+d\ \left(-1+e^{2 i d x}\right)\ \text{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,b\,C\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$

$$\left(\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\left(-\frac{2\,(A\,b+a\,B-2\,b\,C+A\,b\,\text{Cos}[2\,c]+a\,B\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{d}+\right.\right.$$

$$\left.\left.\frac{4\,a\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,a\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{4\,b\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\right)\right)\Big/$$

$$((b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(4\,a\,A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,b\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,a\,C\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1296: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 112 leaves, 6 steps):

$$-\frac{2\,(b\,B-a\,(A-C))\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{2\,(3\,A\,b+3\,a\,B+b\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,b\,C\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(b\,B+a\,C)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1909 leaves):

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,a\,A\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$
$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,b\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\mathbb{i}\,a\,C\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,\mathbb{i}\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\mathbb{i}\,d\,x}\,(\text{Cos}[c]+\mathbb{i}\,\text{Sin}[c])^2\right]\sqrt{e^{-\mathbb{i}\,d\,x}\left(2\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2\,\mathbb{i}\,d\,x}\,\text{Cos}[2\,c]+\mathbb{i}\,e^{2\,\mathbb{i}\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,\mathbb{i}\,d\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathbb{i}\,d\,x}\,(\text{Cos}[c]+\mathbb{i}\,\text{Sin}[c])^2\right]\sqrt{e^{-\mathbb{i}\,d\,x}\left(2\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,\mathbb{i}\,d\,x}\,\text{Cos}[2\,c]+\mathbb{i}\,e^{2\,\mathbb{i}\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-\mathbb{i}\,d\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\text{Sin}[c]\right)\right)+$$

$$\left(\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{2\,(a\,A-2\,b\,B-2\,a\,C+a\,A\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{d}+\right.\right.$$

$$\left.\left.\frac{4\,b\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(b\,C\,\text{Sin}[c]+3\,b\,B\,\text{Sin}[d\,x]+3\,a\,C\,\text{Sin}[d\,x])}{3\,d}\right)\right)\Big/$$

$$((b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]))-$$

$$\left(4\,A\,b\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,a\,B\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,b\,C\,\text{Cos}[c+d\,x]^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])\right.$$

$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$

$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$

$\left(3\,d\,(b + a\,\text{Cos}[c + d\,x])\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\right)$

- **Problem 1300: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c + d\,x]^{7/2}\,(a + b\,\text{Sec}[c + d\,x])^2\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,dx$$

Optimal (type 4, 202 leaves, 7 steps):

$$\frac{2\,\left(6\,a\,A\,b + 3\,a^2\,B + 5\,b^2\,B + 10\,a\,b\,C\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{5\,d} + \frac{2\,\left(14\,a\,b\,B + 7\,b^2\,(A + 3\,C) + a^2\,(5\,A + 7\,C)\right)\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]}{21\,d} + \frac{2\,\left(4\,A\,b^2 + 14\,a\,b\,B + a^2\,(5\,A + 7\,C)\right)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{21\,d} + \frac{2\,a\,(4\,A\,b + 7\,a\,B)\,\text{Cos}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{35\,d} + \frac{2\,A\,\sqrt{\text{Cos}[c + d\,x]}\,(b + a\,\text{Cos}[c + d\,x])^2\,\text{Sin}[c + d\,x]}{7\,d}$$

Result (type 5, 2361 leaves):

$\Bigg(\text{Cos}[c + d\,x]^{9/2}\,(a + b\,\text{Sec}[c + d\,x])^2\,\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,\Bigg(-\frac{4\,\left(6\,a\,A\,b + 3\,a^2\,B + 5\,b^2\,B + 10\,a\,b\,C\right)\,\text{Cot}[c]}{5\,d} +$

$\frac{\left(23\,a^2\,A + 28\,A\,b^2 + 56\,a\,b\,B + 28\,a^2\,C\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d} + \frac{2\,a\,(2\,A\,b + a\,B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d} + \frac{a^2\,A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d} +$

$\frac{\left(23\,a^2\,A + 28\,A\,b^2 + 56\,a\,b\,B + 28\,a^2\,C\right)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d} + \frac{2\,a\,(2\,A\,b + a\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d} + \frac{a^2\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\Bigg)\Bigg) \Big/$

$\left((b + a\,\text{Cos}[c + d\,x])^2\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\right) -$

$\Bigg(20\,a^2\,A\,\text{Cos}[c + d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a + b\,\text{Sec}[c + d\,x])^2$

$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right)\,\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$

$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$

$\left(21\,d\,(b + a\,\text{Cos}[c + d\,x])^2\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\right) -$

$$\left(4\,A\,b^2\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(8\,a\,b\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,a^2\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,b^2\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(12\,a\,A\,b\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\bigg(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\bigg)\Big/$$

$$\bigg(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Bigg/$$

$$\big(5\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\big)-$$

$$\Bigg(6\,a^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2\,\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)$$

$$\Bigg(\bigg(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\bigg)\Big/$$

$$\bigg(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Bigg/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\Bigg(2\,b^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\Bigg(4\,a\,b\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

Problem 1301: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 186 leaves, 7 steps):

$$\frac{2 \left(10 a b B+5 b^2 (A-C)+a^2 (3 A+5 C)\right) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{2 \left(a^2 B+3 b^2 B+2 a b (A+3 C)\right) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 d}+$$
$$\frac{2 a (2 A b+a B-6 b C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{3 d}+\frac{2 a^2 (A-5 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{5 d}+\frac{2 C (b+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 5, 3011 leaves):

$$\frac{1}{5 (b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])}$$
$$3 i a^2 A \text{Cos}[c+d x]^4 \text{Csc}[c] (a+b \text{Sec}[c+d x])^2 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)+$$
$$\frac{1}{(b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} i A b^2 \text{Cos}[c+d x]^4 \text{Csc}[c] (a+b \text{Sec}[c+d x])^2$$
$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)+$$
$$\frac{1}{(b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 2 i a b B \text{Cos}[c+d x]^4 \text{Csc}[c] (a+b \text{Sec}[c+d x])^2$$
$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\frac{1}{(b + a\, \text{Cos}[c + d x])^2 (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x])}\, i\, a^2\, C\, \text{Cos}[c + d x]^4\, \text{Csc}[c]\, (a + b\, \text{Sec}[c + d x])^2$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) -$$

$$\frac{1}{(b + a\, \text{Cos}[c + d x])^2 (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x])}\, i\, b^2\, C\, \text{Cos}[c + d x]^4\, \text{Csc}[c]\, (a + b\, \text{Sec}[c + d x])^2$$

$$\left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\left(\text{Cos}[c + d x]^{9/2} (a + b\, \text{Sec}[c + d x])^2 \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)\right.$$

$$\left(-1 / (5 d)\, 2 \left(3 a^2 A + 5 A b^2 + 10 a b B + 5 a^2 C - 10 b^2 C + 3 a^2 A\, \text{Cos}[2 c] + 5 A b^2\, \text{Cos}[2 c] + 10 a b B\, \text{Cos}[2 c] + 5 a^2 C\, \text{Cos}[2 c]\right) \text{Csc}[c]\, \text{Sec}[c] +\right.$$

$$\frac{4 a (2 A b + a B)\, \text{Cos}[d x]\, \text{Sin}[c]}{3 d} + \frac{2 a^2 A\, \text{Cos}[2 d x]\, \text{Sin}[2 c]}{5 d} + \frac{4 a (2 A b + a B)\, \text{Cos}[c]\, \text{Sin}[d x]}{3 d} + \frac{4 b^2 C\, \text{Sec}[c]\, \text{Sec}[c + d x]\, \text{Sin}[d x]}{d} +$$

$$\left.\left.\frac{2\,a^2\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\right)\right)\Big/\left((b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\Bigg(8\,a\,A\,b\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,b^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(8\,a\,b\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 1302: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 180 leaves, 7 steps):

$$\frac{2\left(a^2 B-b^2 B+2\,a\,b\,(A-C)\right)\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{2\left(6\,a\,b\,B+b^2\,(3\,A+C)+a^2\,(A+3\,C)\right)\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+$$
$$\frac{2\,b\,(3\,b\,B+4\,a\,C)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a^2\,(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 2779 leaves):

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}$$
$$2\,i\,a\,A\,b\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,a^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$
$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,b^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\bigg)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\bigg)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,2\,i\,a\,b\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\bigg)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\bigg)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)+$$

$$\bigg(\text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^2\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\bigg(-\frac{2\,\left(2\,a\,A\,b+a^2\,B-2\,b^2\,B-4\,a\,b\,C+2\,a\,A\,b\,\text{Cos}[2\,c]+a^2\,B\,\text{Cos}[2\,c]\right)\,\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{4\,a^2\,A\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,a^2\,A\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+$$

$$\frac{4\,b^2\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(b^2\,C\,\text{Sin}[c]+3\,b^2\,B\,\text{Sin}[d\,x]+6\,a\,b\,C\,\text{Sin}[d\,x]\right)}{3\,d}\bigg)\bigg)\Big/$$

$$\left((b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\bigg(4\,a^2\,A\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,A\,b^2\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(8\,a\,b\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(4\,a^2\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(4\,b^2\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1303: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \sqrt{\cos[c+d x]}\ (a+b \sec[c+d x])^2 \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right) dx$$

Optimal (type 4, 201 leaves, 7 steps) :

$$-\frac{2 \left(10 a b B-5 a^2 (A-C)+b^2 (5 A+3 C)\right) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{2 \left(3 a^2 B+b^2 B+2 a b (3 A+C)\right) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 d}+\frac{2 b (5 b B+4 a C) \sin[c+d x]}{15 d \cos[c+d x]^{3/2}}+\frac{2 \left(5 A b^2+10 a b B+4 a^2 C+3 b^2 C\right) \sin[c+d x]}{5 d \sqrt{\cos[c+d x]}}+\frac{2 C (b+a \cos[c+d x])^2 \sin[c+d x]}{5 d \cos[c+d x]^{5/2}}$$

Result (type 5, 3017 leaves) :

$$\frac{1}{(b+a \cos[c+d x])^2 (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])} \, i\, a^2 A \cos[c+d x]^4 \csc[c]\ (a+b \sec[c+d x])^2 \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)$$
$$\left(\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \cos[c]-3 d \left(-1+e^{2 i d x}\right) \sin[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \cos[c]+d \left(-1+e^{2 i d x}\right) \sin[c]\right)\right)-$$

$$\frac{1}{(b+a \cos[c+d x])^2 (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])} \, i\, A b^2 \cos[c+d x]^4 \csc[c]\ (a+b \sec[c+d x])^2$$
$$\left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)$$
$$\left(\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \cos[c]-3 d \left(-1+e^{2 i d x}\right) \sin[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \cos[c]+d \left(-1+e^{2 i d x}\right) \sin[c]\right)\right)-$$

$$\frac{1}{(b+a \cos[c+d x])^2 (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])} \, 2 i a b B \cos[c+d x]^4 \csc[c]\ (a+b \sec[c+d x])^2$$
$$\left(A+B \sec[c+d x]+C \sec[c+d x]^2\right)$$
$$\left(\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)}\right.\right.\right.$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} i a^2 C \text{Cos}[c+d x]^4 \text{Csc}[c] (a+b \text{Sec}[c+d x])^2$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{5 (b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 3 i b^2 C \text{Cos}[c+d x]^4 \text{Csc}[c] (a+b \text{Sec}[c+d x])^2$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(b+a \text{Cos}[c+d x])^2 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} \text{Cos}[c+d x]^{9/2} (a+b \text{Sec}[c+d x])^2$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(-\frac{2 \left(5 a^2 A-10 A b^2-20 a b B-10 a^2 C-6 b^2 C+5 a^2 A \text{Cos}[2 c]\right) \text{Csc}[c] \text{Sec}[c]}{5 d}+$$

$$\frac{4 b^2 C \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{5 d}+\frac{4 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(3 b^2 C \text{Sin}[c]+5 b^2 B \text{Sin}[d x]+10 a b C \text{Sin}[d x]\right)}{15 d}+\frac{1}{15 d}$$

$$4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(5\,b^2\,B\,\text{Sin}[c]+10\,a\,b\,C\,\text{Sin}[c]+15\,A\,b^2\,\text{Sin}[d\,x]+30\,a\,b\,B\,\text{Sin}[d\,x]+15\,a^2\,C\,\text{Sin}[d\,x]+9\,b^2\,C\,\text{Sin}[d\,x]\right)\Bigg)-$$

$$\Bigg(8\,a\,A\,b\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,b^2\,B\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(8\,a\,b\,C\,\text{Cos}[c+d\,x]^4\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^2$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^2\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1306: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 296 leaves, 8 steps):

$$\frac{2\left(27\,a^2\,b\,B+15\,b^3\,B+9\,a\,b^2\,(3\,A+5\,C)+a^3\,(7\,A+9\,C)\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+\frac{2\left(5\,a^3\,B+21\,a\,b^2\,B+7\,b^3\,(A+3\,C)+3\,a^2\,b\,(5\,A+7\,C)\right)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+\frac{2\left(8\,A\,b^3+15\,a^3\,B+54\,a\,b^2\,B+9\,a^2\,b\,(5\,A+7\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{63\,d}+\frac{2\,a\left(24\,A\,b^2+99\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{315\,d}+\frac{2\,(2\,A\,b+3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 3237 leaves):

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^{11/2}\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(-\frac{4\left(7\,a^3\,A+27\,a\,A\,b^2+27\,a^2\,b\,B+15\,b^3\,B+9\,a^3\,C+45\,a\,b^2\,C\right)\,\text{Cot}[c]}{15\,d}+\frac{\left(69\,a^2\,A\,b+28\,A\,b^3+23\,a^3\,B+84\,a\,b^2\,B+84\,a^2\,b\,C\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}+\frac{a\left(19\,a^2\,A+54\,A\,b^2+54\,a\,b\,B+18\,a^2\,C\right)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{45\,d}+\frac{a^2\,(3\,A\,b+a\,B)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+\frac{a^3\,A\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{18\,d}+\frac{\left(69\,a^2\,A\,b+28\,A\,b^3+23\,a^3\,B+84\,a\,b^2\,B+84\,a^2\,b\,C\right)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d}+\frac{a\left(19\,a^2\,A+54\,A\,b^2+54\,a\,b\,B+18\,a^2\,C\right)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{45\,d}+\frac{a^2\,(3\,A\,b+a\,B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}+\frac{a^3\,A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{18\,d}\right)-$$

$$\left(20\,a^2\,A\,b\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(7\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,A\,b^3\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(20\,a^3\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,a\,b^2\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,a^2\,b\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3\right.$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4 b^3 C \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] (a + b \operatorname{Sec}[c+d x])^3 \left(A + B \operatorname{Sec}[c+d x] + C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$

$$\left(d (b + a \operatorname{Cos}[c+d x])^3 (A + 2 C + 2 B \operatorname{Cos}[c+d x] + A \operatorname{Cos}[2 c + 2 d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right) -$$

$$\left(14 a^3 A \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a + b \operatorname{Sec}[c+d x])^3 \left(A + B \operatorname{Sec}[c+d x] + C \operatorname{Sec}[c+d x]^2\right) \left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/ \left(\sqrt{1 - \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1 + \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}} \sqrt{1+\operatorname{Tan}[c]^2}\right) - \frac{\frac{\operatorname{Sin}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]}{\sqrt{1+\operatorname{Tan}[c]^2}} + \frac{2 \operatorname{Cos}[c]^2 \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}{\operatorname{Cos}[c]^2 + \operatorname{Sin}[c]^2}}{\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}}\right)\right) \Big/$$

$$\left(15 d (b + a \operatorname{Cos}[c+d x])^3 (A + 2 C + 2 B \operatorname{Cos}[c+d x] + A \operatorname{Cos}[2 c + 2 d x])\right) -$$

$$\left(18 a A b^2 \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a + b \operatorname{Sec}[c+d x])^3 \left(A + B \operatorname{Sec}[c+d x] + C \operatorname{Sec}[c+d x]^2\right) \left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/\right.\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}\ \sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\ (b+a\,\mathrm{Cos}[c+d\,x])^3\ (A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(18\,a^2\,b\,B\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\ (a+b\,\mathrm{Sec}[c+d\,x])^3\ \left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\ \mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}\ \sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\ (b+a\,\mathrm{Cos}[c+d\,x])^3\ (A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(2\,b^3\,B\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\ (a+b\,\mathrm{Sec}[c+d\,x])^3\ \left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(6\,a^3\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(6\,a\,b^2\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1307: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 277 leaves, 8 steps):

$$\frac{2\left(3\,a^3\,B+15\,a\,b^2\,B+5\,b^3\,(A-C)+3\,a^2\,b\,(3\,A+5\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\left(21\,a^2\,b\,B+21\,b^3\,B+21\,a\,b^2\,(A+3\,C)+a^3\,(5\,A+7\,C)\right)\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{2\,a\left(21\,a\,b\,B+6\,b^2\,(3\,A-7\,C)+a^2\,(5\,A+7\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a^2\,(11\,A\,b+7\,a\,B-35\,b\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{35\,d}+\frac{2\,a\,(A-7\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 3915 leaves):

$$\frac{1}{5\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,9\,i\,a^2\,A\,b\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\,\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-\right.\right.$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} i A b^3 \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a+b \operatorname{Sec}[c+d x])^3$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)+$$

$$\frac{1}{5 (b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} 3 i a^3 B \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a+b \operatorname{Sec}[c+d x])^3$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} 3 i a b^2 B \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a+b \operatorname{Sec}[c+d x])^3$$

$$\left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} 3 i a^2 b C \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a+b \operatorname{Sec}[c+d x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,b^3\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^{11/2}\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{1}{5\,d}2\left(9\,a^2\,A\,b+5\,A\,b^3+3\,a^3\,B+15\,a\,b^2\,B+15\,a^2\,b\,C-10\,b^3\,C+9\,a^2\,A\,b\,\text{Cos}[2\,c]+5\,A\,b^3\,\text{Cos}[2\,c]+3\,a^3\,B\,\text{Cos}[2\,c]+\right.\right.$$

$$\left.15\,a\,b^2\,B\,\text{Cos}[2\,c]+15\,a^2\,b\,C\,\text{Cos}[2\,c]\right)\text{Csc}[c]\,\text{Sec}[c]+\frac{a\left(23\,a^2\,A+84\,A\,b^2+84\,a\,b\,B+28\,a^2\,C\right)\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}+$$

$$\frac{2\,a^2\,(3\,A\,b+a\,B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{a^3\,A\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+\frac{a\left(23\,a^2\,A+84\,A\,b^2+84\,a\,b\,B+28\,a^2\,C\right)\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d}+$$

$$\left.\frac{4\,b^3\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+\frac{2\,a^2\,(3\,A\,b+a\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{a^3\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\right)-$$

$$\left(20\,a^3\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])^3\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a\,A\,b^2\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^2\,b\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,b^3\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^3\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(12\,a\,b^2\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1308: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 267 leaves, 8 steps) :

$$\frac{2\left(15\,a^2\,b\,B-5\,b^3\,B+15\,a\,b^2\,(A-C)+a^3\,(3\,A+5\,C)\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+$$

$$\frac{2\left(a^3\,B+9\,a\,b^2\,B+b^3\,(3\,A+C)+3\,a^2\,b\,(A+3\,C)\right)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\left(a^2\,B-6\,b^2\,B+3\,a\,b\,(A-5\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d}+$$

$$\frac{2\,a^2\,(3\,a\,A-15\,b\,B-35\,a\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,(b\,B+2\,a\,C)\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 3868 leaves) :

$$\frac{1}{5\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}$$

$$3\,i\,a^3\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,3\,i\,a\,A\,b^2\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^3$$
$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,3\,i\,a^2\,b\,B\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^3$$
$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,i\,b^3\,B\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^3$$
$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a\,\mathrm{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])}\,i\,a^3\,C\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Csc}[c]\,(a+b\,\mathrm{Sec}[c+d\,x])^3$$
$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,3\,i\,a\,b^2\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^{11/2}\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(-\frac{1}{5\,d}2\,\big(3\,a^3\,A+15\,a\,A\,b^2+15\,a^2\,b\,B-10\,b^3\,B+5\,a^3\,C-30\,a\,b^2\,C+3\,a^3\,A\,\text{Cos}[2\,c]+15\,a\,A\,b^2\,\text{Cos}[2\,c]+15\,a^2\,b\,B\,\text{Cos}[2\,c]+5\,a^3\,C\,\text{Cos}[2\,c]\big)$$

$$\text{Csc}[c]\,\text{Sec}[c]+\frac{4\,a^2\,(3\,A\,b+a\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{2\,a^3\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{4\,a^2\,(3\,A\,b+a\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+$$

$$\frac{4\,b^3\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\left(b^3\,C\,\text{Sin}[c]+3\,b^3\,B\,\text{Sin}[d\,x]+9\,a\,b^2\,C\,\text{Sin}[d\,x]\right)}{3\,d}+\frac{2\,a^3\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\Bigg)-$$

$$\Bigg(4\,a^2\,A\,b\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,A\,b^3\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^3\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(12\,a\,b^2\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(12\,a^2\,b\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4 b^3 C \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] (a+b \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(3 d (b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right)$$

- **Problem 1309: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[c+d x]^{3/2} (a+b \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 274 leaves, 8 steps):

$$\frac{2 \left(5 a^3 B-15 a b^2 B+15 a^2 b (A-C)-b^3 (5 A+3 C)\right) \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{5 d}+\frac{2 \left(9 a^2 b B+b^3 B+3 a b^2 (3 A+C)+a^3 (A+3 C)\right) \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{3 d}+\frac{2 b \left(15 A b^2+35 a b B+24 a^2 C+9 b^2 C\right) \operatorname{Sin}[c+d x]}{15 d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{2 a^2 (5 a A-5 b B-9 a C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{15 d}+\frac{2 (5 b B+6 a C) (b+a \operatorname{Cos}[c+d x])^2 \operatorname{Sin}[c+d x]}{15 d \operatorname{Cos}[c+d x]^{3/2}}+\frac{2 C (b+a \operatorname{Cos}[c+d x])^3 \operatorname{Sin}[c+d x]}{5 d \operatorname{Cos}[c+d x]^{5/2}}$$

Result (type 5, 3871 leaves):

$$\frac{1}{(b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} 3 i a^2 A b \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a+b \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) \left(\left(\left(2 e^{2 i d x} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-\left(2 \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d \left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\right) -$$

$$\frac{1}{(b+a \operatorname{Cos}[c+d x])^3 (A+2 C+2 B \operatorname{Cos}[c+d x]+A \operatorname{Cos}[2 c+2 d x])} i A b^3 \operatorname{Cos}[c+d x]^5 \operatorname{Csc}[c] (a+b \operatorname{Sec}[c+d x])^3 \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,a^3\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,3\,i\,a\,b^2\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,3\,i\,a^2\,b\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2c]+i\,e^{2 i d x}\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Big)-$$
$$\frac{1}{5(b+a\,\text{Cos}[c+d x])^3(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}3 i b^3 C\,\text{Cos}[c+d x]^5\text{Csc}[c](a+b\,\text{Sec}[c+d x])^3$$
$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$
$$\left(\left(2\,e^{2 i d x}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2c]+i\,e^{2 i d x}\text{Sin}[2c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2 i d x}\text{Cos}[2c]+i\,e^{2 i d x}\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)+$$
$$\frac{1}{(b+a\,\text{Cos}[c+d x])^3(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])}\text{Cos}[c+d x]^{11/2}(a+b\,\text{Sec}[c+d x])^3$$
$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$
$$\left(-\frac{1}{5d}2\left(15a^2 A b-10 A b^3+5a^3 B-30 a b^2 B-30a^2 b C-6b^3 C+15a^2 A b\,\text{Cos}[2c]+5a^3 B\,\text{Cos}[2c]\right)\text{Csc}[c]\,\text{Sec}[c]+\frac{4a^3 A\,\text{Cos}[d x]\,\text{Sin}[c]}{3d}+\right.$$
$$\frac{4a^3 A\,\text{Cos}[c]\,\text{Sin}[d x]}{3d}+\frac{4b^3 C\,\text{Sec}[c]\,\text{Sec}[c+d x]^3\text{Sin}[d x]}{5d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\left(3b^3 C\,\text{Sin}[c]+5b^3 B\,\text{Sin}[d x]+15 a b^2 C\,\text{Sin}[d x]\right)}{15d}+$$
$$\left.\frac{1}{15d}4\,\text{Sec}[c]\,\text{Sec}[c+d x]\left(5b^3 B\,\text{Sin}[c]+15ab^2 C\,\text{Sin}[c]+15Ab^3\text{Sin}[d x]+45ab^2 B\,\text{Sin}[d x]+45a^2 b C\,\text{Sin}[d x]+9b^3 C\,\text{Sin}[d x]\right)\right)-$$
$$\left(4a^3 A\,\text{Cos}[c+d x]^5\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d x])^3\right.$$
$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3d(b+a\,\text{Cos}[c+d x])^3(A+2C+2B\,\text{Cos}[c+d x]+A\,\text{Cos}[2c+2d x])\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(12 a A b^2\,\text{Cos}[c+d x]^5\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d x])^3\right.$$

$$\left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Bigg/$$

$$\left(d (b + a \operatorname{Cos}[c + d x])^3 (A + 2 C + 2 B \operatorname{Cos}[c + d x] + A \operatorname{Cos}[2 c + 2 d x]) \sqrt{1 + \operatorname{Cot}[c]^2}\right) -$$

$$\Bigg(12 a^2 b B \operatorname{Cos}[c + d x]^5 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] (a + b \operatorname{Sec}[c + d x])^3$$

$$\left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Bigg/$$

$$\left(d (b + a \operatorname{Cos}[c + d x])^3 (A + 2 C + 2 B \operatorname{Cos}[c + d x] + A \operatorname{Cos}[2 c + 2 d x]) \sqrt{1 + \operatorname{Cot}[c]^2}\right) -$$

$$\Bigg(4 b^3 B \operatorname{Cos}[c + d x]^5 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] (a + b \operatorname{Sec}[c + d x])^3$$

$$\left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Bigg/$$

$$\left(3 d (b + a \operatorname{Cos}[c + d x])^3 (A + 2 C + 2 B \operatorname{Cos}[c + d x] + A \operatorname{Cos}[2 c + 2 d x]) \sqrt{1 + \operatorname{Cot}[c]^2}\right) -$$

$$\Bigg(4 a^3 C \operatorname{Cos}[c + d x]^5 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] (a + b \operatorname{Sec}[c + d x])^3$$

$$\left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\Bigg) \Bigg/$$

$$\left(d (b + a \operatorname{Cos}[c + d x])^3 (A + 2 C + 2 B \operatorname{Cos}[c + d x] + A \operatorname{Cos}[2 c + 2 d x]) \sqrt{1 + \operatorname{Cot}[c]^2}\right) -$$

$$\Bigg(4 a b^2 C \operatorname{Cos}[c + d x]^5 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] (a + b \operatorname{Sec}[c + d x])^3$$

$$\left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right) \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 1310: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 294 leaves, 8 steps):

$$-\frac{2\left(15\,a^2\,b\,B+3\,b^3\,B-5\,a^3\,(A-C)+3\,a\,b^2\,(5\,A+3\,C)\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+$$
$$\frac{2\left(21\,a^3\,B+21\,a\,b^2\,B+21\,a^2\,b\,(3\,A+C)+b^3\,(7\,A+5\,C)\right)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{2\,b\left(35\,A\,b^2+63\,a\,b\,B+24\,a^2\,C+25\,b^2\,C\right)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\left(98\,a^2\,b\,B+21\,b^3\,B+24\,a^3\,C+21\,a\,b^2\,(5\,A+3\,C)\right)\,\text{Sin}[c+d\,x]}{35\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,(7\,b\,B+6\,a\,C)\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 3933 leaves):

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}$$
$$i\,a^3\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)-$$
$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,3\,i\,a\,A\,b^2\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) -$$

$$\frac{1}{(b+a \text{Cos}[c+d x])^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 3 i a^2 b B \text{Cos}[c+d x]^5 \text{Csc}[c] (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) -$$

$$\frac{1}{5 (b+a \text{Cos}[c+d x])^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 3 i b^3 B \text{Cos}[c+d x]^5 \text{Csc}[c] (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) -$$

$$\frac{1}{(b+a \text{Cos}[c+d x])^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} i a^3 C \text{Cos}[c+d x]^5 \text{Csc}[c] (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Big) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Big) -$$

$$\frac{1}{5 (b+a \text{Cos}[c+d x])^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} 9 i a b^2 C \text{Cos}[c+d x]^5 \text{Csc}[c] (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) +$$

$$\frac{1}{(b+a \text{Cos}[c+d x])^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} \text{Cos}[c+d x]^{11/2} (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$

$$\Bigg(-\frac{2 \left(5 a^3 A-30 a A b^2-30 a^2 b B-6 b^3 B-10 a^3 C-18 a b^2 C+5 a^3 A \text{Cos}[2 c]\right) \text{Csc}[c] \text{Sec}[c]}{5 d}+\frac{4 b^3 C \text{Sec}[c] \text{Sec}[c+d x]^4 \text{Sin}[d x]}{7 d}+$$

$$\frac{4 \text{Sec}[c] \text{Sec}[c+d x]^3 \left(5 b^3 C \text{Sin}[c]+7 b^3 B \text{Sin}[d x]+21 a b^2 C \text{Sin}[d x]\right)}{35 d}+\frac{1}{105 d}4 \text{Sec}[c] \text{Sec}[c+d x] \left(35 A b^3 \text{Sin}[c]+105 a b^2 B \text{Sin}[c]+\right.$$

$$\left.105 a^2 b C \text{Sin}[c]+25 b^3 C \text{Sin}[c]+315 a A b^2 \text{Sin}[d x]+315 a^2 b B \text{Sin}[d x]+63 b^3 B \text{Sin}[d x]+105 a^3 C \text{Sin}[d x]+189 a b^2 C \text{Sin}[d x]\right)+$$

$$\frac{1}{105 d}4 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(21 b^3 B \text{Sin}[c]+63 a b^2 C \text{Sin}[c]+35 A b^3 \text{Sin}[d x]+105 a b^2 B \text{Sin}[d x]+105 a^2 b C \text{Sin}[d x]+25 b^3 C \text{Sin}[d x]\right)\Bigg) -$$

$$\Bigg(12 a^2 A b \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d (b+a \text{Cos}[c+d x])^3 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x]) \sqrt{1+\text{Cot}[c]^2}\right) -$$

$$\Bigg(4 A b^3 \text{Cos}[c+d x]^5 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] (a+b \text{Sec}[c+d x])^3$$

$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^3\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a\,b^2\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,a^2\,b\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(20\,b^3\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1311: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 357 leaves, 9 steps):

$$-\frac{2\left(15\,a^3\,B+27\,a\,b^2\,B+9\,a^2\,b\,(5\,A+3\,C)+b^3\,(9\,A+7\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+$$

$$\frac{2\left(21\,a^2\,b\,B+5\,b^3\,B+7\,a^3\,(3\,A+C)+3\,a\,b^2\,(7\,A+5\,C)\right)\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+\frac{2\,b\left(63\,A\,b^2+99\,a\,b\,B+24\,a^2\,C+49\,b^2\,C\right)\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$

$$\frac{2\left(54\,a^2\,b\,B+15\,b^3\,B+8\,a^3\,C+9\,a\,b^2\,(7\,A+5\,C)\right)\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\left(15\,a^3\,B+27\,a\,b^2\,B+9\,a^2\,b\,(5\,A+3\,C)+b^3\,(9\,A+7\,C)\right)\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$

$$\frac{2\,(3\,b\,B+2\,a\,C)\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}$$

Result (type 5, 3345 leaves):

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^{11/2}\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{4\left(45\,a^2\,A\,b+9\,A\,b^3+15\,a^3\,B+27\,a\,b^2\,B+27\,a^2\,b\,C+7\,b^3\,C\right)\text{Csc}[c]\,\text{Sec}[c]}{15\,d}+\frac{4\,b^3\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{9\,d}+\right.$$

$$\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\left(7\,b^3\,C\,\text{Sin}[c]+9\,b^3\,B\,\text{Sin}[d\,x]+27\,a\,b^2\,C\,\text{Sin}[d\,x]\right)}{63\,d}+\frac{1}{315\,d}4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(63\,A\,b^3\,\text{Sin}[c]+189\,a\,b^2\,B\,\text{Sin}[c]+\right.$$

$$\left.189\,a^2\,b\,C\,\text{Sin}[c]+49\,b^3\,C\,\text{Sin}[c]+315\,a\,A\,b^2\,\text{Sin}[d\,x]+315\,a^2\,b\,B\,\text{Sin}[d\,x]+75\,b^3\,B\,\text{Sin}[d\,x]+105\,a^3\,C\,\text{Sin}[d\,x]+225\,a\,b^2\,C\,\text{Sin}[d\,x]\right)+$$

$$\frac{1}{315\,d}4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\left(45\,b^3\,B\,\text{Sin}[c]+135\,a\,b^2\,C\,\text{Sin}[c]+63\,A\,b^3\,\text{Sin}[d\,x]+189\,a\,b^2\,B\,\text{Sin}[d\,x]+189\,a^2\,b\,C\,\text{Sin}[d\,x]+49\,b^3\,C\,\text{Sin}[d\,x]\right)+$$

$$\frac{1}{105\,d}4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(105\,a\,A\,b^2\,\text{Sin}[c]+105\,a^2\,b\,B\,\text{Sin}[c]+25\,b^3\,B\,\text{Sin}[c]+35\,a^3\,C\,\text{Sin}[c]+75\,a\,b^2\,C\,\text{Sin}[c]+\right.$$

$$\left.\left.315\,a^2\,A\,b\,\text{Sin}[d\,x]+63\,A\,b^3\,\text{Sin}[d\,x]+105\,a^3\,B\,\text{Sin}[d\,x]+189\,a\,b^2\,B\,\text{Sin}[d\,x]+189\,a^2\,b\,C\,\text{Sin}[d\,x]+49\,b^3\,C\,\text{Sin}[d\,x]\right)\right)-$$

$$\left(4\,a^3\,A\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3\right.$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(d\,(b + a\,\text{Cos}[c + d\,x])^3\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\left(4\,a\,A\,b^2\,\text{Cos}[c + d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a + b\,\text{Sec}[c + d\,x])^3\right.$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(d\,(b + a\,\text{Cos}[c + d\,x])^3\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\left(4\,a^2\,b\,B\,\text{Cos}[c + d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a + b\,\text{Sec}[c + d\,x])^3\right.$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(d\,(b + a\,\text{Cos}[c + d\,x])^3\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\left(20\,b^3\,B\,\text{Cos}[c + d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a + b\,\text{Sec}[c + d\,x])^3\right.$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(21\,d\,(b + a\,\text{Cos}[c + d\,x])^3\,(A + 2\,C + 2\,B\,\text{Cos}[c + d\,x] + A\,\text{Cos}[2\,c + 2\,d\,x])\,\sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\left(4\,a^3\,C\,\text{Cos}[c + d\,x]^5\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a + b\,\text{Sec}[c + d\,x])^3\right.$$

$$\left(A + B\,\text{Sec}[c + d\,x] + C\,\text{Sec}[c + d\,x]^2\right) \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(20\,a\,b^2\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^3$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(7\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\Bigg(6\,a^2\,A\,b\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Bigg/\ \left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\Bigg(6\,A\,b^3\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(2\,a^3\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(18\,a\,b^2\,B\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(18\,a^2\,b\,C\,\text{Cos}[c+d\,x]^5\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^3\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^3\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(14\, b^3\, C\, \text{Cos}[c+d\,x]^5\, \text{Csc}[c]\, (a+b\,\text{Sec}[c+d\,x])^3\, \left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(15\, d\, (b+a\,\text{Cos}[c+d\,x])^3\, (A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1313: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 377 leaves, 9 steps):

$$\frac{2\left(36\,a^3\,b\,B+60\,a\,b^3\,B+15\,b^4\,(A-C)+18\,a^2\,b^2\,(3\,A+5\,C)+a^4\,(7\,A+9\,C)\right)\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+$$

$$\frac{2\left(5\,a^4\,B+42\,a^2\,b^2\,B+21\,b^4\,B+28\,a\,b^3\,(A+3\,C)+4\,a^3\,b\,(5\,A+7\,C)\right)\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$

$$\frac{2\,a\left(15\,a^3\,B+117\,a\,b^2\,B+2\,b^3\,(31\,A-63\,C)+12\,a^2\,b\,(5\,A+7\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{63\,d}+$$

$$\frac{2\,a^2\left(162\,a\,b\,B+3\,b^2\,(41\,A-105\,C)+7\,a^2\,(7\,A+9\,C)\right)\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{315\,d}+$$

$$\frac{2\,a\,(5\,A\,b+3\,a\,B-21\,b\,C)\sqrt{\text{Cos}[c+d\,x]}\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{21\,d}+$$

$$\frac{2\,a\,(A-9\,C)\sqrt{\text{Cos}[c+d\,x]}\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 4114 leaves) :

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\text{Cos}[c+d\,x]^{13/2}\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{1}{15\,d}2\,\left(7\,a^4\,A+54\,a^2\,A\,b^2+15\,A\,b^4+36\,a^3\,b\,B+60\,a\,b^3\,B+9\,a^4\,C+90\,a^2\,b^2\,C-30\,b^4\,C+7\,a^4\,A\,\text{Cos}[2\,c]+54\,a^2\,A\,b^2\,\text{Cos}[2\,c]+\right.\right.$$

$$\left.15\,A\,b^4\,\text{Cos}[2\,c]+36\,a^3\,b\,B\,\text{Cos}[2\,c]+60\,a\,b^3\,B\,\text{Cos}[2\,c]+9\,a^4\,C\,\text{Cos}[2\,c]+90\,a^2\,b^2\,C\,\text{Cos}[2\,c]\right)\,\text{Csc}[c]\,\text{Sec}[c]+$$

$$\frac{a\,\left(92\,a^2\,A\,b+112\,A\,b^3+23\,a^3\,B+168\,a\,b^2\,B+112\,a^2\,b\,C\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}+\frac{a^2\,\left(19\,a^2\,A+108\,A\,b^2+72\,a\,b\,B+18\,a^2\,C\right)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{45\,d}+$$

$$\frac{a^3\,(4\,A\,b+a\,B)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+\frac{a^4\,A\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{18\,d}+$$

$$\frac{a\,\left(92\,a^2\,A\,b+112\,A\,b^3+23\,a^3\,B+168\,a\,b^2\,B+112\,a^2\,b\,C\right)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d}+\frac{4\,b^4\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+$$

$$\left.\frac{a^2\,\left(19\,a^2\,A+108\,A\,b^2+72\,a\,b\,B+18\,a^2\,C\right)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{45\,d}+\frac{a^3\,(4\,A\,b+a\,B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}+\frac{a^4\,A\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{18\,d}\right)-$$

$$\left(80\,a^3\,A\,b\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(16\,a\,A\,b^3\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(20\,a^4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(8\,a^2\,b^2\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,b^4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a^3\,b\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a\,b^3\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(14\,a^4\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(15\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\Bigg(36\,a^2\,A\,b^2\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(2\,A\,b^4\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(24\,a^3\,b\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(8\,a\,b^3\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(6\,a^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)-$$

$$\left(12\,a^2\,b^2\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(2\,b^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1314: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 371 leaves, 9 steps):

$$\frac{2\left(3\,a^4\,B+30\,a^2\,b^2\,B-5\,b^4\,B+20\,a\,b^3\,(A-C)+4\,a^3\,b\,(3\,A+5\,C)\right)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+$$
$$\frac{2\left(28\,a^3\,b\,B+84\,a\,b^3\,B+7\,b^4\,(3\,A+C)+42\,a^2\,b^2\,(A+3\,C)+a^4\,(5\,A+7\,C)\right)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{2\,a\left(28\,a^2\,b\,B-42\,b^3\,B+3\,a\,b^2\,(13\,A-49\,C)+a^3\,(5\,A+7\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{2\,a^2\left(54\,a\,A\,b+21\,a^2\,B-105\,b^2\,B-350\,a\,b\,C\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,a\,(a\,A-7\,b\,B-21\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d}+$$
$$\frac{2\,(3\,b\,B+8\,a\,C)\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,C\,(b+a\,\text{Cos}[c+d\,x])^4\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 4776 leaves):

$$\frac{1}{5\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}$$
$$12\,i\,a^3\,A\,b\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.\right.\right.$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)+$$
$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,4\,i\,a\,A\,b^3\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\frac{1}{5\, (b + a\, \text{Cos}[c + d\, x])^4\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])}\, 3\, i\, a^4\, B\, \text{Cos}[c + d\, x]^6\, \text{Csc}[c]\, (a + b\, \text{Sec}[c + d\, x])^4$$

$$\left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) +$$

$$\frac{1}{(b + a\, \text{Cos}[c + d\, x])^4\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])}\, 6\, i\, a^2\, b^2\, B\, \text{Cos}[c + d\, x]^6\, \text{Csc}[c]\, (a + b\, \text{Sec}[c + d\, x])^4$$

$$\left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\right) -$$

$$\frac{1}{(b + a\, \text{Cos}[c + d\, x])^4\, (A + 2\, C + 2\, B\, \text{Cos}[c + d\, x] + A\, \text{Cos}[2\, c + 2\, d\, x])}\, i\, b^4\, B\, \text{Cos}[c + d\, x]^6\, \text{Csc}[c]\, (a + b\, \text{Sec}[c + d\, x])^4$$

$$\left(A + B\, \text{Sec}[c + d\, x] + C\, \text{Sec}[c + d\, x]^2\right)$$

$$\left(\left(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\right) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])}\,4\,i\,a^3\,b\,C\,\text{Cos}[c+d x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d x])^4$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])}\,4\,i\,a\,b^3\,C\,\text{Cos}[c+d x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d x])^4$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d x]+A\,\text{Cos}[2 c+2 d x])}\,\text{Cos}[c+d x]^{13/2}\,(a+b\,\text{Sec}[c+d x])^4$$

$$\left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right)$$

$$\Bigg(-\frac{1}{5\,d}2\,\left(12\,a^3\,A\,b+20\,a\,A\,b^3+3\,a^4\,B+30\,a^2\,b^2\,B-10\,b^4\,B+20\,a^3\,b\,C-40\,a\,b^3\,C+12\,a^3\,A\,b\,\text{Cos}[2 c]+\right.$$

$$\left.20\,a\,A\,b^3\,\text{Cos}[2 c]+3\,a^4\,B\,\text{Cos}[2 c]+30\,a^2\,b^2\,B\,\text{Cos}[2 c]+20\,a^3\,b\,C\,\text{Cos}[2 c]\right)\text{Csc}[c]\,\text{Sec}[c]+$$

$$\frac{a^2\left(23\,a^2\,A+168\,A\,b^2+112\,a\,b\,B+28\,a^2\,C\right)\text{Cos}[d x]\,\text{Sin}[c]}{21\,d}+\frac{2\,a^3\,(4\,A\,b+a\,B)\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{5\,d}+\frac{a^4\,A\,\text{Cos}[3 d x]\,\text{Sin}[3 c]}{7\,d}+$$

$$\frac{a^2\left(23\,a^2\,A+168\,A\,b^2+112\,a\,b\,B+28\,a^2\,C\right)\text{Cos}[c]\,\text{Sin}[d x]}{21\,d}+\frac{4\,b^4\,C\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{3\,d}+$$

$$\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(b^4\,C\,\text{Sin}[c]+3\,b^4\,B\,\text{Sin}[d\,x]+12\,a\,b^3\,C\,\text{Sin}[d\,x]\right)}{3\,d}+\frac{2\,a^3\,(4\,A\,b+a\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{a^4\,A\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\Bigg)-$$

$$\Bigg(20\,a^4\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(8\,a^2\,A\,b^2\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,A\,b^4\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a^3\,b\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(16\,a\,b^3\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(4\,a^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(24\,a^2\,b^2\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(4\,b^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1315: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \cos[c+d x]^{5/2} (a+b \sec[c+d x])^4 \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right) dx$$

Optimal (type 4, 388 leaves, 9 steps) :

$$\frac{2 \left(20 a^3 b B-20 a b^3 B+30 a^2 b^2 (A-C)-b^4 (5 A+3 C)+a^4 (3 A+5 C)\right) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{5 d}+\frac{2 \left(a^4 B+18 a^2 b^2 B+b^4 B+4 a b^3 (3 A+C)+4 a^3 b (A+3 C)\right) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{3 d}+\frac{2 a \left(5 a^3 B-105 a b^2 B+4 a^2 b (5 A-33 C)-6 b^3 (5 A+3 C)\right) \sqrt{\cos[c+d x]} \sin[c+d x]}{15 d}-\frac{2 a^2 \left(50 a b B-a^2 (3 A-59 C)+3 b^2 (5 A+3 C)\right) \cos[c+d x]^{3/2} \sin[c+d x]}{15 d}+\frac{2 \left(5 A b^2+15 a b B+16 a^2 C+3 b^2 C\right) (b+a \cos[c+d x])^2 \sin[c+d x]}{5 d \sqrt{\cos[c+d x]}}+\frac{2 (5 b B+8 a C) (b+a \cos[c+d x])^3 \sin[c+d x]}{15 d \cos[c+d x]^{3/2}}+\frac{2 C (b+a \cos[c+d x])^4 \sin[c+d x]}{5 d \cos[c+d x]^{5/2}}$$

Result (type 5, 4960 leaves) :

$$\frac{1}{5 (b+a \cos[c+d x])^4 (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])} 3 i a^4 A \cos[c+d x]^6 \csc[c] (a+b \sec[c+d x])^4 \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right) \left(\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)} \sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \cos[c]-3 d \left(-1+e^{2 i d x}\right) \sin[c]\right)-\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)} \sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \cos[c]+d \left(-1+e^{2 i d x}\right) \sin[c]\right)\right)+$$

$$\frac{1}{(b+a \cos[c+d x])^4 (A+2 C+2 B \cos[c+d x]+A \cos[2 c+2 d x])} 6 i a^2 A b^2 \cos[c+d x]^6 \csc[c] (a+b \sec[c+d x])^4 \left(A+B \sec[c+d x]+C \sec[c+d x]^2\right) \left(\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)} \sqrt{1+e^{2 i d x} \cos[2 c]+i e^{2 i d x} \sin[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \cos[c]-3 d \left(-1+e^{2 i d x}\right) \sin[c]\right)-\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\cos[c]+i \sin[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \cos[c]+2 i \left(-1+e^{2 i d x}\right) \sin[c]\right)}\right.\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Big)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,A\,b^4\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(\Big(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Big(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Big)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,4\,i\,a^3\,b\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(\Big(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Big(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Big)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,4\,i\,a\,b^3\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Big(\Big(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\Big(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\right/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Big)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,a^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,6\,i\,a^2\,b^2\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{5\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,3\,i\,b^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.\right.$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right.$$

$$\left.\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,\text{Cos}[c+d\,x]^{13/2}\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\left(-\frac{1}{5\,d}2\,\left(3\,a^4\,A+30\,a^2\,A\,b^2-10\,A\,b^4+20\,a^3\,b\,B-40\,a\,b^3\,B+5\,a^4\,C-60\,a^2\,b^2\,C-6\,b^4\,C+3\,a^4\,A\,\text{Cos}[2\,c]+30\,a^2\,A\,b^2\,\text{Cos}[2\,c]+20\,a^3\,b\,B\,\text{Cos}[2\,c]+\right.\right.$$

$$5\,a^4\,C\,\text{Cos}[2\,c]\Big)\,\text{Csc}[c]\,\text{Sec}[c]+\frac{4\,a^3\,(4\,A\,b+a\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{2\,a^4\,A\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+\frac{4\,a^3\,(4\,A\,b+a\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+$$

$$\frac{4\,b^4\,C\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\big(3\,b^4\,C\,\text{Sin}[c]+5\,b^4\,B\,\text{Sin}[d\,x]+20\,a\,b^3\,C\,\text{Sin}[d\,x]\big)}{15\,d}+\frac{1}{15\,d}4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]$$

$$\big(5\,b^4\,B\,\text{Sin}[c]+20\,a\,b^3\,C\,\text{Sin}[c]+15\,A\,b^4\,\text{Sin}[d\,x]+60\,a\,b^3\,B\,\text{Sin}[d\,x]+90\,a^2\,b^2\,C\,\text{Sin}[d\,x]+9\,b^4\,C\,\text{Sin}[d\,x]\big)+\frac{2\,a^4\,A\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\Bigg)-$$

$$\Bigg(16\,a^3\,A\,b\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\Big)-$$

$$\Bigg(16\,a\,A\,b^3\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\Big)-$$

$$\Bigg(4\,a^4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\Big)-$$

$$\Bigg(24\,a^2\,b^2\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\big(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\big)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,b^4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a^3\,b\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a\,b^3\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

- **Problem 1316: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 384 leaves, 9 steps) :

$$\frac{2\left(5a^4B-30a^2b^2B-3b^4B+20a^3b(A-C)-4ab^3(5A+3C)\right)\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{5d}+$$

$$\frac{2\left(84a^3bB+28ab^3B+42a^2b^2(3A+C)+7a^4(A+3C)+b^4(7A+5C)\right)\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{21d}+$$

$$\frac{2b\left(413a^2bB+63b^3B+192a^3C+2ab^2(175A+101C)\right)\text{Sin}[c+dx]}{105d\sqrt{\text{Cos}[c+dx]}}-$$

$$\frac{2a^2\left(98abB-a^2(35A-87C)+5b^2(7A+5C)\right)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{105d}+$$

$$\frac{2\left(35Ab^2+77abB+48a^2C+25b^2C\right)(b+a\text{Cos}[c+dx])^2\text{Sin}[c+dx]}{105d\,\text{Cos}[c+dx]^{3/2}}+$$

$$\frac{2(7bB+8aC)(b+a\text{Cos}[c+dx])^3\text{Sin}[c+dx]}{35d\,\text{Cos}[c+dx]^{5/2}}+\frac{2C(b+a\text{Cos}[c+dx])^4\text{Sin}[c+dx]}{7d\,\text{Cos}[c+dx]^{7/2}}$$

Result (type 5, 4791 leaves) :

$$\frac{1}{(b+a\text{Cos}[c+dx])^4(A+2C+2B\text{Cos}[c+dx]+A\text{Cos}[2c+2dx])}$$
$$4\,i\,a^3Ab\,\text{Cos}[c+dx]^6\text{Csc}[c](a+b\text{Sec}[c+dx])^4\left(A+B\text{Sec}[c+dx]+C\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)-$$

$$\frac{1}{(b+a\text{Cos}[c+dx])^4(A+2C+2B\text{Cos}[c+dx]+A\text{Cos}[2c+2dx])}4\,i\,aAb^3\text{Cos}[c+dx]^6\text{Csc}[c](a+b\text{Sec}[c+dx])^4$$
$$\left(A+B\text{Sec}[c+dx]+C\text{Sec}[c+dx]^2\right)$$
$$\left(\left(2e^{2idx}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.\right.$$
$$\left.\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\right)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right.$$
$$\left.\left.\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\right)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\right)+$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,i\,a^4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,6\,i\,a^2\,b^2\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{5\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,3\,i\,b^4\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)-$$

$$\frac{1}{(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])}\,4\,i\,a^3\,b\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4$$
$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\Big[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) - \bigg(2\, \text{Hypergeometric2F1}\Big[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) -$$

$$\frac{1}{5\, (b + a\, \text{Cos}[c + d x])^4\, (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x])} 12\, i\, a\, b^3\, C\, \text{Cos}[c + d x]^6\, \text{Csc}[c]\, (a + b\, \text{Sec}[c + d x])^4 \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)$$

$$\Bigg(\bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\Big[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) - \bigg(2\, \text{Hypergeometric2F1}\Big[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\Big] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\bigg) \Big/ \left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg) +$$

$$\frac{1}{(b + a\, \text{Cos}[c + d x])^4\, (A + 2 C + 2 B\, \text{Cos}[c + d x] + A\, \text{Cos}[2 c + 2 d x])} \text{Cos}[c + d x]^{13/2}\, (a + b\, \text{Sec}[c + d x])^4 \left(A + B\, \text{Sec}[c + d x] + C\, \text{Sec}[c + d x]^2\right)$$

$$\Bigg(-\frac{1}{5 d} 2 \left(20\, a^3 A\, b - 40\, a\, A\, b^3 + 5\, a^4 B - 60\, a^2 b^2 B - 6\, b^4 B - 40\, a^3 b\, C - 24\, a\, b^3 C + 20\, a^3 A\, b\, \text{Cos}[2 c] + 5\, a^4 B\, \text{Cos}[2 c]\right) \text{Csc}[c]\, \text{Sec}[c] + \frac{4\, a^4 A\, \text{Cos}[d x]\, \text{Sin}[c]}{3 d} + \frac{4\, a^4 A\, \text{Cos}[c]\, \text{Sin}[d x]}{3 d} + \frac{4\, b^4 C\, \text{Sec}[c]\, \text{Sec}[c + d x]^4\, \text{Sin}[d x]}{7 d} + \frac{4\, \text{Sec}[c]\, \text{Sec}[c + d x]^3 \left(5\, b^4 C\, \text{Sin}[c] + 7\, b^4 B\, \text{Sin}[d x] + 28\, a\, b^3 C\, \text{Sin}[d x]\right)}{35 d} + \frac{1}{105 d} 4\, \text{Sec}[c]\, \text{Sec}[c + d x] \left(35\, A\, b^4 \text{Sin}[c] + 140\, a\, b^3 B\, \text{Sin}[c] + 210\, a^2 b^2 C\, \text{Sin}[c] + 25\, b^4 C\, \text{Sin}[c] + 420\, a\, A\, b^3 \text{Sin}[d x] + 630\, a^2 b^2 B\, \text{Sin}[d x] + 63\, b^4 B\, \text{Sin}[d x] + 420\, a^3 b\, C\, \text{Sin}[d x] + 252\, a\, b^3 C\, \text{Sin}[d x]\right) + \frac{1}{105 d} 4\, \text{Sec}[c]\, \text{Sec}[c + d x]^2 \left(21\, b^4 B\, \text{Sin}[c] + 84\, a\, b^3 C\, \text{Sin}[c] + 35\, A\, b^4 \text{Sin}[d x] + 140\, a\, b^3 B\, \text{Sin}[d x] + 210\, a^2 b^2 C\, \text{Sin}[d x] + 25\, b^4 C\, \text{Sin}[d x]\right)\Bigg) -$$

$$\Bigg(4\, a^4 A\, \text{Cos}[c + d x]^6\, \text{Csc}[c]\, \text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4}, \frac{1}{2}\Big\}, \Big\{\frac{5}{4}\Big\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\Big]\, (a + b\, \text{Sec}[c + d x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(24\,a^2\,A\,b^2\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(4\,A\,b^4\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a^3\,b\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(16\,a\,b^3\,B\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right](a+b\,\text{Sec}[c+d\,x])^4$$

$$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$

$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$

$\Bigg(4\,a^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$

$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$

$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$

$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$

$\Bigg(8\,a^2\,b^2\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$

$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$

$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$

$\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$

$\Bigg(20\,b^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4$

$\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$

$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$

$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$

- **Problem 1317: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^4\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$

Optimal (type 4, 401 leaves, 9 steps) :

$$-\frac{2\left(60 a^3 b B+36 a b^3 B-15 a^4 (A-C)+18 a^2 b^2 (5 A+3 C)+b^4 (9 A+7 C)\right) \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{15 d}+$$
$$\frac{2\left(21 a^4 B+42 a^2 b^2 B+5 b^4 B+28 a^3 b (3 A+C)+4 a b^3 (7 A+5 C)\right) \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21 d}+$$
$$\frac{2 b\left(261 a^2 b B+75 b^3 B+64 a^3 C+2 a b^2 (147 A+101 C)\right) \text{Sin}[c+d x]}{315 d \text{Cos}[c+d x]^{3/2}}+$$
$$\frac{2\left(1098 a^3 b B+756 a b^3 B+192 a^4 C+21 b^4 (9 A+7 C)+7 a^2 b^2 (261 A+155 C)\right) \text{Sin}[c+d x]}{315 d \sqrt{\text{Cos}[c+d x]}}+$$
$$\frac{2\left(63 A b^2+117 a b B+48 a^2 C+49 b^2 C\right) (b+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{315 d \text{Cos}[c+d x]^{5/2}}+$$
$$\frac{2 (9 b B+8 a C) (b+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{63 d \text{Cos}[c+d x]^{7/2}}+\frac{2 C (b+a \text{Cos}[c+d x])^4 \text{Sin}[c+d x]}{9 d \text{Cos}[c+d x]^{9/2}}$$

Result (type 5, 4150 leaves) :

$$\frac{1}{(b+a \text{Cos}[c+d x])^4 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])} \text{Cos}[c+d x]^{13/2} (a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)$$
$$\left(-\frac{1}{15 d} 2\left(15 a^4 A-180 a^2 A b^2-18 A b^4-120 a^3 b B-72 a b^3 B-30 a^4 C-108 a^2 b^2 C-14 b^4 C+15 a^4 A \text{Cos}[2 c]\right) \text{Csc}[c] \text{Sec}[c]+\right.$$
$$\frac{4 b^4 C \text{Sec}[c] \text{Sec}[c+d x]^5 \text{Sin}[d x]}{9 d}+\frac{4 \text{Sec}[c] \text{Sec}[c+d x]^4 \left(7 b^4 C \text{Sin}[c]+9 b^4 B \text{Sin}[d x]+36 a b^3 C \text{Sin}[d x]\right)}{63 d}+\frac{1}{315 d}$$
$$4 \text{Sec}[c] \text{Sec}[c+d x]^2 \left(63 A b^4 \text{Sin}[c]+252 a b^3 B \text{Sin}[c]+378 a^2 b^2 C \text{Sin}[c]+49 b^4 C \text{Sin}[c]+420 a A b^3 \text{Sin}[d x]+\right.$$
$$\left.630 a^2 b^2 B \text{Sin}[d x]+75 b^4 B \text{Sin}[d x]+420 a^3 b C \text{Sin}[d x]+300 a b^3 C \text{Sin}[d x]\right)+\frac{1}{315 d} 4 \text{Sec}[c] \text{Sec}[c+d x]^3$$
$$\left(45 b^4 B \text{Sin}[c]+180 a b^3 C \text{Sin}[c]+63 A b^4 \text{Sin}[d x]+252 a b^3 B \text{Sin}[d x]+378 a^2 b^2 C \text{Sin}[d x]+49 b^4 C \text{Sin}[d x]\right)+\frac{1}{105 d}$$
$$4 \text{Sec}[c] \text{Sec}[c+d x] \left(140 a A b^3 \text{Sin}[c]+210 a^2 b^2 B \text{Sin}[c]+25 b^4 B \text{Sin}[c]+140 a^3 b C \text{Sin}[c]+100 a b^3 C \text{Sin}[c]+630 a^2 A b^2 \text{Sin}[d x]+\right.$$
$$\left.\left.63 A b^4 \text{Sin}[d x]+420 a^3 b B \text{Sin}[d x]+252 a b^3 B \text{Sin}[d x]+105 a^4 C \text{Sin}[d x]+378 a^2 b^2 C \text{Sin}[d x]+49 b^4 C \text{Sin}[d x]\right)\right)-$$
$$\left(16 a^3 A b \text{Cos}[c+d x]^6 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] (a+b \text{Sec}[c+d x])^4\right.$$
$$\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) /$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(16\,a\,A\,b^3\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(4\,a^4\,B\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(8\,a^2\,b^2\,B\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(20\,b^4\,B\,\mathrm{Cos}[c+d\,x]^6\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,(a+b\,\mathrm{Sec}[c+d\,x])^4\right.$$

$$\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(16\,a^3\,b\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(80\,a\,b^3\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(2\,a^4\,A\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(12\,a^2\,A\,b^2\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/\left(d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(6\,A\,b^4\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\right/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)+$$

$$\left(8 a^3 b B \text{Cos}[c+d x]^6 \text{Csc}[c] (a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}} \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2 \text{Cos}[c]^2 \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/ \left(d (b+a \text{Cos}[c+d x])^4 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\right)+$$

$$\left(24 a b^3 B \text{Cos}[c+d x]^6 \text{Csc}[c] (a+b \text{Sec}[c+d x])^4 \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)\right.$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}} \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2 \text{Cos}[c]^2 \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c] \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}}\right)\right)\Big/$$

$$\left(5 d (b+a \text{Cos}[c+d x])^4 (A+2 C+2 B \text{Cos}[c+d x]+A \text{Cos}[2 c+2 d x])\right)+$$

$$\Bigg(2\,a^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\left(a+b\,\text{Sec}[c+d\,x]\right)^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/\left(d\,\left(b+a\,\text{Cos}[c+d\,x]\right)^4\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$

$$\Bigg(36\,a^2\,b^2\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,\left(a+b\,\text{Sec}[c+d\,x]\right)^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(5\,d\,\left(b+a\,\text{Cos}[c+d\,x]\right)^4\,\left(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$

$$\Big(14\,b^4\,C\,\text{Cos}[c+d\,x]^6\,\text{Csc}[c]\,(a+b\,\text{Sec}[c+d\,x])^4\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)\Big/$$

$$\left(15\,d\,(b+a\,\text{Cos}[c+d\,x])^4\,(A+2\,C+2\,B\,\text{Cos}[c+d\,x]+A\,\text{Cos}[2\,c+2\,d\,x])\right)$$

- **Problem 1320: Attempted integration timed out after 120 seconds.**

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{a+b\,\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 97 leaves, 6 steps):

$$\frac{2\,A\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{2\,(A\,b-a\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a^2\,d}+\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{EllipticPi}\left[\frac{2\,a}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a^2\,(a+b)\,d}$$

Result (type 1, 1 leaves):

???

- **Problem 1334: Unable to integrate problem.**

$$\int\text{Cos}[c+d\,x]^{9/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 457 leaves, 12 steps):

$$-\frac{2\left(a^2-b^2\right)\left(16 A b^3-75 a^3 B-24 a b^2 B+6 a^2 b (6 A+7 C)\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{315 a^4 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{1}{315 a^4 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$2\left(16 A b^4-57 a^3 b B-24 a b^3 B+6 a^2 b^2 (4 A+7 C)-21 a^4 (7 A+9 C)\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}+$$

$$\frac{2\left(8 A b^3+75 a^3 B-12 a b^2 B+a^2 b (13 A+21 C)\right) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{315 a^3 d}-$$

$$\frac{2\left(6 A b^2-9 a b B-7 a^2 (7 A+9 C)\right) \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{315 a^2 d}+$$

$$\frac{2 (A b+9 a B) \operatorname{Cos}[c+d x]^{5/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{63 a d}+\frac{2 A \operatorname{Cos}[c+d x]^{7/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{9 d}$$

Result (type 8, 47 leaves):

$$\int \operatorname{Cos}[c+d x]^{9/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Problem 1335: Unable to integrate problem.

$$\int \operatorname{Cos}[c+d x]^{7/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 360 leaves, 11 steps):

$$\frac{2\left(a^2-b^2\right)\left(25 a^2 A+8 A b^2-14 a b B+35 a^2 C\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right]}{105 a^3 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+\frac{1}{105 a^3 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$2\left(8 A b^3+63 a^3 B-14 a b^2 B+a^2 b (19 A+35 C)\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}-$$

$$\frac{2\left(4 A b^2-7 a b B-5 a^2 (5 A+7 C)\right) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{105 a^2 d}+$$

$$\frac{2 (A b+7 a B) \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{35 a d}+\frac{2 A \operatorname{Cos}[c+d x]^{5/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{7 d}$$

Result (type 8, 47 leaves):

$$\int \operatorname{Cos}[c+d x]^{7/2} \sqrt{a+b \operatorname{Sec}[c+d x]} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right) dx$$

Problem 1336: Unable to integrate problem.

$$\int \text{Cos}[c+d x]^{5/2} \sqrt{a+b \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 273 leaves, 10 steps):

$$-\frac{2 \left(a^2-b^2\right) (2 A b-5 a B) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{15 a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}-\frac{2 \left(2 A b^2-5 a b B-3 a^2 (3 A+5 C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{15 a^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 (A b+5 a B) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{15 a d}+\frac{2 A \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{5 d}$$

Result (type 8, 47 leaves):

$$\int \text{Cos}[c+d x]^{5/2} \sqrt{a+b \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Problem 1337: Attempted integration timed out after 120 seconds.

$$\int \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 277 leaves, 13 steps):

$$-\frac{2 \left(A b^2-a^2 (A+3 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{3 a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 b C \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 (A b+3 a B) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{3 a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{2 A \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d}$$

Result (type 1, 1 leaves):

???

Problem 1338: Unable to integrate problem.

$$\int \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 258 leaves, 13 steps):

$$\frac{(2aB+bC)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{(2bB+aC)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(2A-C)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{C\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

- **Problem 1339: Unable to integrate problem.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 346 leaves, 14 steps):

$$\frac{(8aA+4bB+3aC)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{4d\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\left(8Ab^2+4abB-a^2C+4b^2C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{4bd\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{(4bB+aC)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4bd\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{C\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{2d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{(4bB+aC)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4bd\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

- **Problem 1340: Unable to integrate problem.**

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 447 leaves, 15 steps):

$$\frac{\left(24\,A\,b^2+18\,a\,b\,B-a^2\,C+16\,b^2\,C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{24\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(2\,a^2\,b\,B-8\,b^3\,B-a^3\,C-4\,a\,b^2\,(2\,A+C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{8\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(24\,A\,b^2+6\,a\,b\,B-3\,a^2\,C+16\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{24\,b^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{C\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$

$$\frac{(6\,b\,B+a\,C)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{12\,b\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{\left(24\,A\,b^2+6\,a\,b\,B-3\,a^2\,C+16\,b^2\,C\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{24\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

- **Problem 1341: Attempted integration timed out after 120 seconds.**

$$\int\text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 455 leaves, 12 steps):

$$\frac{2\,\left(a^2-b^2\right)\left(8\,A\,b^3+75\,a^3\,B-18\,a\,b^2\,B+a^2\,(39\,A\,b+63\,b\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{315\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{1}{315\,a^3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

$$2\,\left(8\,A\,b^4+246\,a^3\,b\,B-18\,a\,b^3\,B+21\,a^4\,(7\,A+9\,C)+3\,a^2\,b^2\,(11\,A+21\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}-$$

$$\frac{2\,\left(4\,A\,b^3-75\,a^3\,B-9\,a\,b^2\,B-2\,a^2\,b\,(44\,A+63\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,a^2\,d}+$$

$$\frac{2\,\left(3\,A\,b^2+72\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,a\,d}+$$

$$\frac{2\,(A\,b+3\,a\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,A\,\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

- **Problem 1342: Attempted integration timed out after 120 seconds.**

$$\int \text{Cos}[c+d x]^{7/2} (a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 359 leaves, 11 steps):

$$\frac{2 \left(a^2-b^2\right) \left(25 a^2 A-6 A b^2+21 a b B+35 a^2 C\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{105 a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}-\frac{1}{105 a^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

$$2 \left(6 A b^3-63 a^3 B-21 a b^2 B-2 a^2 b (41 A+70 C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}+$$

$$\frac{2 \left(3 A b^2+42 a b B+5 a^2 (5 A+7 C)\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{105 a d}+$$

$$\frac{2 (3 A b+7 a B) \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{35 d}+\frac{2 A \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{7 d}$$

Result (type 1, 1 leaves):

???

- **Problem 1343: Attempted integration timed out after 120 seconds.**

$$\int \text{Cos}[c+d x]^{5/2} (a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 356 leaves, 14 steps):

$$-\frac{2 \left(3 A b^3-5 a^3 B+5 a b^2 B-3 a^2 b (A+5 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{15 a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+\frac{2 b^2 C \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\frac{2 \left(3 A b^2+20 a b B+3 a^2 (3 A+5 C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{15 a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+$$

$$\frac{2 (3 A b+5 a B) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{15 d}+\frac{2 A \text{Cos}[c+d x]^{3/2} (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 1, 1 leaves):

???

- **Problem 1344: Attempted integration timed out after 120 seconds.**

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 340 leaves, 14 steps):

$$\frac{\left(6\,a\,b\,B-b^2\,(2\,A-3\,C)+2\,a^2\,(A+3\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{b\,(2\,b\,B+3\,a\,C)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{(8\,A\,b+6\,a\,B-3\,b\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$

$$\frac{b\,(2\,A-3\,C)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 1, 1 leaves):

???

- **Problem 1345: Attempted integration timed out after 120 seconds.**

$$\int \sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 353 leaves, 14 steps):

$$\frac{\left(8 a^2 B+4 b^2 B+a b (8 A+7 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{4 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\frac{\left(8 A b^2+12 a b B+3 a^2 C+4 b^2 C\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{4 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\frac{(8 a A-4 b B-5 a C) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{4 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+$$

$$\frac{(4 b B+3 a C) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{4 d \sqrt{\text{Cos}[c+d x]}}+\frac{C (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{2 d \sqrt{\text{Cos}[c+d x]}}$$

Result (type 1, 1 leaves) :

???

- **Problem 1346: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b \text{Sec}[c+d x])^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{\sqrt{\text{Cos}[c+d x]}} \, dx$$

Optimal (type 4, 446 leaves, 15 steps) :

$$\frac{\left(42 a b B+8 b^2 (3 A+2 C)+a^2 (48 A+17 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{24 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\frac{\left(6 a^2 b B+8 b^3 B-a^3 C+12 a b^2 (2 A+C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{8 b d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}-$$

$$\frac{\left(24 A b^2+30 a b B+3 a^2 C+16 b^2 C\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{24 b d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}+\frac{(2 b B+a C) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{4 d \text{Cos}[c+d x]^{3/2}}+$$

$$\frac{\left(24 A b^2+30 a b B+3 a^2 C+16 b^2 C\right) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{24 b d \sqrt{\text{Cos}[c+d x]}}+\frac{C (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 1, 1 leaves) :

???

Problem 1347: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 551 leaves, 16 steps):

$$\frac{\left(136\,a^2\,b\,B+128\,b^3\,B-3\,a^3\,C+12\,a\,b^2\,(28\,A+19\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{192\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$

$$\left(\left(8\,a^3\,b\,B-96\,a\,b^3\,B-3\,a^4\,C-24\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\right)\Big/$$

$$\left(64\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-\frac{1}{192\,b^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

$$\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}+$$

$$\frac{(8\,b\,B+3\,a\,C)\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{24\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{\left(48\,A\,b^2+56\,a\,b\,B+3\,a^2\,C+36\,b^2\,C\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{96\,b\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$

$$\frac{\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{192\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{C\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 1, 1 leaves):

???

Problem 1348: Attempted integration timed out after 120 seconds.

$$\int \text{Cos}[c+d\,x]^{11/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 565 leaves, 13 steps):

$$\left(2\left(a^2-b^2\right)\left(40\,A\,b^4+1254\,a^3\,b\,B-110\,a\,b^3\,B+75\,a^4\,(9\,A+11\,C)+15\,a^2\,b^2\,(19\,A+33\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\right)\Big/$$

$$\left(3465\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)+\frac{1}{3465\,a^3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

$$2\left(40\,A\,b^5+1617\,a^5\,B+3069\,a^3\,b^2\,B-110\,a\,b^4\,B+15\,a^2\,b^3\,(17\,A+33\,C)+15\,a^4\,b\,(247\,A+319\,C)\right)$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}-\frac{1}{3465\,a^2\,d}$$

$$2\left(20\,A\,b^4-1793\,a^3\,b\,B-55\,a\,b^3\,B-75\,a^4\,(9\,A+11\,C)-5\,a^2\,b^2\,(205\,A+297\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]+$$

$$\frac{2\left(15\,A\,b^3+539\,a^3\,B+825\,a\,b^2\,B+5\,a^2\,b\,(229\,A+297\,C)\right)\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3465\,a\,d}+$$

$$\frac{2\left(5\,A\,b^2+44\,a\,b\,B+3\,a^2\,(9\,A+11\,C)\right)\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{231\,d}+$$

$$\frac{2\,(5\,A\,b+11\,a\,B)\,\text{Cos}[c+d\,x]^{7/2}\,(a+b\,\text{Sec}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{99\,d}+\frac{2\,A\,\text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{11\,d}$$

Result (type 1, 1 leaves) :

???

- **Problem 1349: Attempted integration timed out after 120 seconds.**

$$\int \text{Cos}[c+d\,x]^{9/2}\,(a+b\,\text{Sec}[c+d\,x])^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)dx$$

Optimal (type 4, 452 leaves, 12 steps) :

$$-\frac{2\left(a^2-b^2\right)\left(10 A b^3-75 a^3 B-45 a b^2 B-6 a^2 b (19 A+28 C)\right)\sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{315 a^2 d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}}-\frac{1}{315 a^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

$$2\left(10 A b^4-435 a^3 b B-45 a b^3 B-21 a^4 (7 A+9 C)-3 a^2 b^2 (93 A+161 C)\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \text{Sec}[c+d x]}+$$

$$\frac{2\left(5 A b^3+75 a^3 B+135 a b^2 B+a^2 b (163 A+231 C)\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{315 a d}+$$

$$\frac{2\left(15 A b^2+90 a b B+7 a^2 (7 A+9 C)\right)\text{Cos}[c+d x]^{3/2}\sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{315 d}+$$

$$\frac{2 (5 A b+9 a B)\text{Cos}[c+d x]^{5/2}(a+b \text{Sec}[c+d x])^{3/2}\text{Sin}[c+d x]}{63 d}+\frac{2 A \text{Cos}[c+d x]^{7/2}(a+b \text{Sec}[c+d x])^{5/2}\text{Sin}[c+d x]}{9 d}$$

Result (type 1, 1 leaves):

???

Problem 1350: Attempted integration timed out after 120 seconds.

$$\int \text{Cos}[c+d x]^{7/2}(a+b \text{Sec}[c+d x])^{5/2}\left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)dx$$

Optimal (type 4, 441 leaves, 15 steps):

$$-\left(2\left(15 A b^4-56 a^3 b B+56 a b^3 B+10 a^2 b^2 (A-7 C)-5 a^4 (5 A+7 C)\right)\sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\right)\Big/$$

$$\left(105 a d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}\right)+\frac{2 b^3 C \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}}+\frac{1}{105 a d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

$$2\left(15 A b^3+63 a^3 B+161 a b^2 B+5 a^2 b (29 A+49 C)\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \text{Sec}[c+d x]}+$$

$$\frac{2\left(15 A b^2+56 a b B+5 a^2 (5 A+7 C)\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{105 d}+$$

$$\frac{2 (5 A b+7 a B)\text{Cos}[c+d x]^{3/2}(a+b \text{Sec}[c+d x])^{3/2}\text{Sin}[c+d x]}{35 d}+\frac{2 A \text{Cos}[c+d x]^{5/2}(a+b \text{Sec}[c+d x])^{5/2}\text{Sin}[c+d x]}{7 d}$$

Result (type 1, 1 leaves):

???

Problem 1351: Attempted integration timed out after 120 seconds.

$$\int \text{Cos}[c+d x]^{5/2} (a+b\,\text{Sec}[c+d x])^{5/2} \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 419 leaves, 15 steps):

$$\frac{\left(10 a^3 B+20 a b^2 B-b^3 (16 A-15 C)+4 a^2 b (4 A+15 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{15 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b\,\text{Sec}[c+d x]}}+$$

$$\frac{b^2 (2 b B+5 a C) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b\,\text{Sec}[c+d x]}}+\frac{1}{15 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}$$

$$\left(70 a b B+b^2 (46 A-15 C)+6 a^2 (3 A+5 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right] \sqrt{a+b\,\text{Sec}[c+d x]}-$$

$$\frac{b (16 A b+10 a B-15 b C) \sqrt{a+b\,\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]}}+$$

$$\frac{2 (A b+a B) \sqrt{\text{Cos}[c+d x]}\ (a+b\,\text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{3 d}+\frac{2 A\,\text{Cos}[c+d x]^{3/2} (a+b\,\text{Sec}[c+d x])^{5/2} \text{Sin}[c+d x]}{5 d}$$

Result (type 1, 1 leaves):

???

Problem 1352: Attempted integration timed out after 120 seconds.

$$\int \text{Cos}[c+d x]^{3/2} (a+b\,\text{Sec}[c+d x])^{5/2} \left(A+B\,\text{Sec}[c+d x]+C\,\text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 427 leaves, 15 steps):

$$\frac{\left(48 a^2 b B+12 b^3 B+8 a^3 (A+3 C)+a b^2 (16 A+33 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{12 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\frac{b \left(8 A b^2+20 a b B+15 a^2 C+4 b^2 C\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{4 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\frac{\left(24 a^2 B-12 b^2 B+a b (56 A-27 C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}}{12 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}}-$$

$$\frac{b (8 a A-12 b B-21 a C) \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]}{12 d \sqrt{\text{Cos}[c+d x]}}-$$

$$\frac{b (4 A-3 C) (a+b \text{Sec}[c+d x])^{3/2} \text{Sin}[c+d x]}{6 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 A \sqrt{\text{Cos}[c+d x]} (a+b \text{Sec}[c+d x])^{5/2} \text{Sin}[c+d x]}{3 d}$$

Result (type 1, 1 leaves) :

???

- **Problem 1353: Attempted integration timed out after 120 seconds.**

$$\int \sqrt{\text{Cos}[c+d x]} (a+b \text{Sec}[c+d x])^{5/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right) dx$$

Optimal (type 4, 453 leaves, 15 steps) :

$$\frac{\left(48 a^3 B+66 a b^2 B+8 b^3 (3 A+2 C)+a^2 b (96 A+59 C)\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{24 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}+$$

$$\frac{\left(30 a^2 b B+8 b^3 B+5 a^3 C+20 a b^2 (2 A+C)\right) \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]}{8 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Sec}[c+d x]}}-\frac{1}{24 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$\left(54 a b B-a^2 (48 A-33 C)+8 b^2 (3 A+2 C)\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \operatorname{Sec}[c+d x]}+$$

$$\frac{\left(24 A b^2+42 a b B+15 a^2 C+16 b^2 C\right) \sqrt{a+b \operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{24 d \sqrt{\operatorname{Cos}[c+d x]}}+$$

$$\frac{(6 b B+5 a C) (a+b \operatorname{Sec}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{12 d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{C (a+b \operatorname{Sec}[c+d x])^{5/2} \operatorname{Sin}[c+d x]}{3 d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 1, 1 leaves):

???

- **Problem 1354: Attempted integration timed out after 120 seconds.**

$$\int \frac{(a+b \operatorname{Sec}[c+d x])^{5/2} \left(A+B \operatorname{Sec}[c+d x]+C \operatorname{Sec}[c+d x]^2\right)}{\sqrt{\operatorname{Cos}[c+d x]}} \, dx$$

Optimal (type 4, 550 leaves, 16 steps):

$$\left(\left(472\,a^2\,b\,B+128\,b^3\,B+4\,a\,b^2\,(132\,A+89\,C)+a^3\,(384\,A+133\,C)\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\right)\Big/$$

$$\left(192\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)+$$

$$\left(\left(40\,a^3\,b\,B+160\,a\,b^3\,B-5\,a^4\,C+120\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\right)\Big/$$

$$\left(64\,b\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\right)-\frac{1}{192\,b\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}}$$

$$\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(108\,A+71\,C)\right)\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;+$$

$$\frac{\left(16\,A\,b^2+24\,a\,b\,B+5\,a^2\,C+12\,b^2\,C\right)\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{32\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+$$

$$\frac{\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(108\,A+71\,C)\right)\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{192\,b\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+$$

$$\frac{(8\,b\,B+5\,a\,C)\,(a+b\,\mathrm{Sec}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{24\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{C\,(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{4\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 1, 1 leaves):

???

- **Problem 1355: Attempted integration timed out after 120 seconds.**

$$\int\frac{(a+b\,\mathrm{Sec}[c+d\,x])^{5/2}\,\left(A+B\,\mathrm{Sec}[c+d\,x]+C\,\mathrm{Sec}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 674 leaves, 17 steps):

$$\left(\left(1330 a^3 b B + 3560 a b^3 B - 15 a^4 C + 256 b^4 (5 A + 4 C) + 4 a^2 b^2 (1180 A + 809 C)\right) \sqrt{\frac{b + a \operatorname{Cos}[c + d x]}{a + b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 a}{a + b}\right]\right) \Big/$$

$$\left(1920 b d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Sec}[c + d x]}\right) -$$

$$\left(\left(10 a^4 b B - 240 a^2 b^3 B - 96 b^5 B - 3 a^5 C - 40 a^3 b^2 (2 A + C) - 80 a b^4 (4 A + 3 C)\right) \sqrt{\frac{b + a \operatorname{Cos}[c + d x]}{a + b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 a}{a + b}\right]\right) \Big/$$

$$\left(128 b^2 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Sec}[c + d x]}\right) - \frac{1}{1920 b^2 d \sqrt{\frac{b+a \operatorname{Cos}[c+d x]}{a+b}}}$$

$$\left(150 a^3 b B + 2840 a b^3 B - 45 a^4 C + 256 b^4 (5 A + 4 C) + 12 a^2 b^2 (220 A + 141 C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 a}{a + b}\right] \sqrt{a + b \operatorname{Sec}[c + d x]} +$$

$$\frac{\left(80 A b^2 + 110 a b B + 15 a^2 C + 64 b^2 C\right) \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{240 d \operatorname{Cos}[c + d x]^{5/2}} +$$

$$\frac{\left(590 a^2 b B + 360 b^3 B + 15 a^3 C + 4 a b^2 (260 A + 193 C)\right) \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{960 b d \operatorname{Cos}[c + d x]^{3/2}} + \frac{1}{1920 b^2 d \sqrt{\operatorname{Cos}[c + d x]}}$$

$$\left(150 a^3 b B + 2840 a b^3 B - 45 a^4 C + 256 b^4 (5 A + 4 C) + 12 a^2 b^2 (220 A + 141 C)\right) \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x] +$$

$$\frac{(2 b B + a C) (a + b \operatorname{Sec}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{8 d \operatorname{Cos}[c + d x]^{5/2}} + \frac{C (a + b \operatorname{Sec}[c + d x])^{5/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{5/2}}$$

Result (type 1, 1 leaves) :

???

- **Problem 1356: Unable to integrate problem.**

$$\int \frac{\operatorname{Cos}[c + d x]^{7/2} \left(A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2\right)}{\sqrt{a + b \operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 380 leaves, 11 steps) :

$$\left(2\left(48\,A\,b^4-49\,a^3\,b\,B-56\,a\,b^3\,B+5\,a^4\,(5\,A+7\,C)+2\,a^2\,b^2\,(16\,A+35\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\right)\Big/$$

$$\left(105\,a^4\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)-\frac{1}{105\,a^4\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

$$2\left(48\,A\,b^3-63\,a^3\,B-56\,a\,b^2\,B+a^2\,(44\,A\,b+70\,b\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\;+$$

$$\frac{2\left(24\,A\,b^2-28\,a\,b\,B+5\,a^2\,(5\,A+7\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{105\,a^3\,d}-$$

$$\frac{2\,(6\,A\,b-7\,a\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{35\,a^2\,d}+\frac{2\,A\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{7\,a\,d}$$

Result (type 8, 47 leaves):

$$\int\frac{\text{Cos}[c+d\,x]^{7/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 1357: Unable to integrate problem.

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 291 leaves, 10 steps):

$$-\frac{2\left(8\,A\,b^3-5\,a^3\,B-10\,a\,b^2\,B+a^2\,b\,(7\,A+15\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{15\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$

$$\frac{2\left(8\,A\,b^2-10\,a\,b\,B+3\,a^2\,(3\,A+5\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{15\,a^3\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}-$$

$$\frac{2\,(4\,A\,b-5\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,a^2\,d}+\frac{2\,A\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,a\,d}$$

Result (type 8, 47 leaves):

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 1358: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 216 leaves, 9 steps):

$$\frac{2\,\left(2\,A\,b^2-3\,a\,b\,B+a^2\,(A+3\,C)\right)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{3\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{2\,(2\,A\,b-3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{3\,a^2\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}$$

Result (type 1, 1 leaves):

???

Problem 1359: Unable to integrate problem.

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 219 leaves, 12 steps):

$$-\frac{2\,(A\,b-a\,B)\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,C\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{2\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}$$

Result (type 8, 47 leaves):

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 1360: Unable to integrate problem.

$$\int \frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 260 leaves, 13 steps):

$$\frac{(2A+C)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{d\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{(2bB-aC)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{b\,d\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{C\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{b\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{C\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\,d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 1361: Unable to integrate problem.

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 350 leaves, 14 steps):

$$\frac{(4bB-aC)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{4\,b\,d\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}+\frac{\left(8Ab^2-4abB+3a^2C+4b^2C\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]}{4\,b^2\,d\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Sec}[c+d\,x]}}-\frac{(4bB-3aC)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{4\,b^2\,d\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{C\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{2\,b\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{(4bB-3aC)\sqrt{a+b\,\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{4\,b^2\,d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int\frac{A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Problem 1362: Unable to integrate problem.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\left(a\,A+(A\,b+a\,B)\,\text{Sec}[c+d\,x]+b\,B\,\text{Sec}[c+d\,x]^2\right)}{\sqrt{a+b\,\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 208 leaves, 13 steps):

$$\frac{2\,a\,B\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticF\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{Cos[c+d\,x]}\;\sqrt{a+b\,Sec[c+d\,x]}}+$$

$$\frac{2\,b\,B\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticPi\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{d\,\sqrt{Cos[c+d\,x]}\;\sqrt{a+b\,Sec[c+d\,x]}}+\frac{2\,A\,\sqrt{Cos[c+d\,x]}\;EllipticE\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,Sec[c+d\,x]}}{d\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}}$$

Result (type 8, 56 leaves) :

$$\int\frac{\sqrt{Cos[c+d\,x]}\;\left(a\,A+(A\,b+a\,B)\;Sec[c+d\,x]+b\,B\,Sec[c+d\,x]^2\right)}{\sqrt{a+b\,Sec[c+d\,x]}}\,dx$$

- **Problem 1363: Attempted integration timed out after 120 seconds.**

$$\int\frac{Cos[c+d\,x]^{5/2}\,\left(A+B\,Sec[c+d\,x]+C\,Sec[c+d\,x]^2\right)}{(a+b\,Sec[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 461 leaves, 11 steps) :

$$-\frac{2\,\left(48\,A\,b^3-5\,a^3\,B-40\,a\,b^2\,B+6\,a^2\,b\,(2\,A+5\,C)\right)\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\;EllipticF\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{15\,a^4\,d\,\sqrt{Cos[c+d\,x]}\;\sqrt{a+b\,Sec[c+d\,x]}}-$$

$$\left(2\,\left(48\,A\,b^4+25\,a^3\,b\,B-40\,a\,b^3\,B-6\,a^2\,b^2\,(4\,A-5\,C)-3\,a^4\,(3\,A+5\,C)\right)\,\sqrt{Cos[c+d\,x]}\;EllipticE\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,Sec[c+d\,x]}\right)\Big/$$

$$\left(15\,a^4\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,Cos[c+d\,x]}{a+b}}\right)+\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,Cos[c+d\,x]^{3/2}\,Sin[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,Sec[c+d\,x]}}+$$

$$\frac{2\,\left(24\,A\,b^3+5\,a^3\,B-20\,a\,b^2\,B-a^2\,(9\,A\,b-15\,b\,C)\right)\,\sqrt{Cos[c+d\,x]}\;\sqrt{a+b\,Sec[c+d\,x]}\;Sin[c+d\,x]}{15\,a^3\,\left(a^2-b^2\right)\,d}-$$

$$\frac{2\,\left(6\,A\,b^2-5\,a\,b\,B-a^2\,(A-5\,C)\right)\,Cos[c+d\,x]^{3/2}\,\sqrt{a+b\,Sec[c+d\,x]}\;Sin[c+d\,x]}{5\,a^2\,\left(a^2-b^2\right)\,d}$$

Result (type 1, 1 leaves) :

???

■ **Problem 1364: Attempted integration timed out after 120 seconds.**

$$\int \frac{\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 350 leaves, 10 steps) :

$$\frac{2\left(8\,A\,b^2-6\,a\,b\,B+a^2\,(A+3\,C)\right)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{3\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}+$$
$$\left(2\left(8\,A\,b^3+3\,a^3\,B-6\,a\,b^2\,B-a^2\,(5\,A\,b-3\,b\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}\right)\Big/$$
$$\left(3\,a^3\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\right)+\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$
$$\frac{2\left(4\,A\,b^2-3\,a\,b\,B-a^2\,(A-3\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)\,d}$$

Result (type 1, 1 leaves) :

???

■ **Problem 1365: Unable to integrate problem.**

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 249 leaves, 9 steps) :

$$-\frac{2\,(2\,A\,b-a\,B)\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]}{a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}-$$
$$\frac{2\left(2\,A\,b^2-a\,b\,B-a^2\,(A-C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,a}{a+b}\right]\sqrt{a+b\,\text{Sec}[c+d\,x]}}{a^2\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Sec}[c+d\,x]}}$$

Result (type 8, 47 leaves) :

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Sec}[c+d\,x]+C\,\text{Sec}[c+d\,x]^2\right)}{(a+b\,\text{Sec}[c+d\,x])^{3/2}}\,dx$$

Problem 1366: Unable to integrate problem.

$$\int \frac{A + B\,\mathrm{Sec}[c + d\,x] + C\,\mathrm{Sec}[c + d\,x]^2}{\sqrt{\mathrm{Cos}[c + d\,x]}\,\left(a + b\,\mathrm{Sec}[c + d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 311 leaves, 13 steps):

$$\frac{2\,A\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{a\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}} + \frac{2\,C\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}} +$$

$$\frac{2\,\left(A\,b^2 - a\,(b\,B - a\,C)\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{a\,b\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}} - \frac{2\,\left(A\,b^2 - a\,(b\,B - a\,C)\right)\,\mathrm{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}$$

Result (type 8, 47 leaves):

$$\int \frac{A + B\,\mathrm{Sec}[c + d\,x] + C\,\mathrm{Sec}[c + d\,x]^2}{\sqrt{\mathrm{Cos}[c + d\,x]}\,\left(a + b\,\mathrm{Sec}[c + d\,x]\right)^{3/2}}\,dx$$

Problem 1367: Attempted integration timed out after 120 seconds.

$$\int \frac{A + B\,\mathrm{Sec}[c + d\,x] + C\,\mathrm{Sec}[c + d\,x]^2}{\mathrm{Cos}[c + d\,x]^{3/2}\,\left(a + b\,\mathrm{Sec}[c + d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 393 leaves, 14 steps):

$$\frac{C\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}} + \frac{(2\,b\,B - 3\,a\,C)\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]}{b^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}} -$$

$$\frac{\left(2\,A\,b^2 - 2\,a\,b\,B + 3\,a^2\,C - b^2\,C\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,a}{a+b}\right]\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{b+a\,\mathrm{Cos}[c+d\,x]}{a+b}}} -$$

$$\frac{2\,\left(A\,b^2 - a\,(b\,B - a\,C)\right)\,\mathrm{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}} + \frac{\left(2\,A\,b^2 - 2\,a\,b\,B + 3\,a^2\,C - b^2\,C\right)\,\sqrt{a+b\,\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 1, 1 leaves):

???

Problem 1368: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Cos}[c+d x]^{5/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 663 leaves, 12 steps):

$$\left(2 \left(128 A b^5+5 a^5 B+80 a^3 b^2 B-80 a b^4 B-4 a^2 b^3 (29 A-10 C)-a^4 b (17 A+45 C)\right) \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right]\right) \Big/ \left(15 a^5 \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]}\right)+$$
$$\left(2 \left(128 A b^6-40 a^5 b B+140 a^3 b^3 B-80 a b^5 B+5 a^4 b^2 (11 A-15 C)-4 a^2 b^4 (53 A-10 C)+3 a^6 (3 A+5 C)\right) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 a}{a+b}\right] \sqrt{a+b \text{Sec}[c+d x]}\right) \Big/ \left(15 a^5 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\right)+$$
$$\frac{2 \left(A b^2-a (b B-a C)\right) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \text{Sec}[c+d x])^{3/2}}-\frac{2 \left(8 A b^4+9 a^3 b B-5 a b^3 B-2 a^2 b^2 (6 A-C)-6 a^4 C\right) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}-$$
$$\frac{1}{15 a^4 \left(a^2-b^2\right)^2 d} 2 \left(64 A b^5-5 a^5 B+65 a^3 b^2 B-40 a b^4 B+2 a^4 b (7 A-20 C)-2 a^2 b^3 (49 A-10 C)\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]+$$
$$\frac{1}{15 a^3 \left(a^2-b^2\right)^2 d} 2 \left(48 A b^4+50 a^3 b B-30 a b^3 B+a^4 (3 A-35 C)-a^2 b^2 (71 A-15 C)\right) \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Sec}[c+d x]} \text{Sin}[c+d x]$$

Result (type 1, 1 leaves):

???

Problem 1369: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 521 leaves, 11 steps):

$$-\frac{2\left(16 A b^4+9 a^3 b B-8 a b^3 B-2 a^2 b^2 (8 A-C)-a^4 (A+3 C)\right)\sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{3 a^4 \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}}-$$

$$\left(2\left(16 A b^5-3 a^5 B+15 a^3 b^2 B-8 a b^4 B-2 a^2 b^3 (14 A-C)+a^4 (8 A b-6 b C)\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \text{Sec}[c+d x]}\right)\Big/$$

$$\left(3 a^4 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\right)+\frac{2\left(A b^2-a (b B-a C)\right)\sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d\ (a+b \text{Sec}[c+d x])^{3/2}}+$$

$$\frac{2\left(10 a^2 A b^2-6 A b^4-7 a^3 b B+3 a b^3 B+4 a^4 C\right)\sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Sec}[c+d x]}}+\frac{1}{3 a^3 \left(a^2-b^2\right)^2 d}$$

$$2\left(8 A b^4+8 a^3 b B-4 a b^3 B+a^4 (A-5 C)-a^2 b^2 (13 A-C)\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 1, 1 leaves) :

???

Problem 1370: Unable to integrate problem.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\ \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}}\, dx$$

Optimal (type 4, 401 leaves, 10 steps) :

$$\frac{2\left(8 A b^3+3 a^3 B-2 a b^2 B-a^2 b (9 A+C)\right)\sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]}{3 a^3 \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}}+$$

$$\left(2\left(8 A b^4+6 a^3 b B-2 a b^3 B+3 a^4 (A-C)-a^2 b^2 (15 A+C)\right)\sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x),\frac{2 a}{a+b}\right]\sqrt{a+b \text{Sec}[c+d x]}\right)\Big/$$

$$\left(3 a^3 \left(a^2-b^2\right)^2 d \sqrt{\frac{b+a \text{Cos}[c+d x]}{a+b}}\right)+\frac{2\left(A b^2-a (b B-a C)\right)\text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]}\ (a+b \text{Sec}[c+d x])^{3/2}}-$$

$$\frac{2\left(4 A b^4+5 a^3 b B-a b^3 B-2 a^4 C-2 a^2 b^2 (4 A+C)\right)\text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right)^2 d \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b \text{Sec}[c+d x]}}$$

Result (type 8, 47 leaves) :

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\ \left(A+B \text{Sec}[c+d x]+C \text{Sec}[c+d x]^2\right)}{(a+b \text{Sec}[c+d x])^{5/2}}\, dx$$

Problem 1371: Unable to integrate problem.

$$\int \frac{A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2}{\sqrt{\operatorname{Cos}[c + d x]}\, (a + b \operatorname{Sec}[c + d x])^{5/2}}\, dx$$

Optimal (type 4, 378 leaves, 10 steps):

$$-\frac{2\left(2 A b^2 + a b B - a^2 (3 A + C)\right)\sqrt{\frac{b + a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c + d x), \frac{2 a}{a+b}\right]}{3 a^2 \left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}} - \left(2\left(2 A b^3 + 3 a^3 B + a b^2 B - 2 a^2 b (3 A + 2 C)\right)\sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c + d x), \frac{2 a}{a + b}\right]\sqrt{a + b \operatorname{Sec}[c + d x]}\right) \Big/ \left(3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{\frac{b + a \operatorname{Cos}[c + d x]}{a + b}}\right) - \frac{2\left(A b^2 - a (b B - a C)\right)\operatorname{Sin}[c + d x]}{3 b \left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]}\ (a + b \operatorname{Sec}[c + d x])^{3/2}} + \frac{2\left(A b^4 + 2 a^3 b B + 2 a b^3 B + a^4 C - 5 a^2 b^2 (A + C)\right)\operatorname{Sin}[c + d x]}{3 a b \left(a^2 - b^2\right)^2 d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}}$$

Result (type 8, 47 leaves):

$$\int \frac{A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2}{\sqrt{\operatorname{Cos}[c + d x]}\, (a + b \operatorname{Sec}[c + d x])^{5/2}}\, dx$$

Problem 1372: Attempted integration timed out after 120 seconds.

$$\int \frac{A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2}{\operatorname{Cos}[c + d x]^{3/2}\, (a + b \operatorname{Sec}[c + d x])^{5/2}}\, dx$$

Optimal (type 4, 447 leaves, 14 steps):

$$-\frac{2\left(A b^2 - a (b B - a C)\right)\sqrt{\frac{b + a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c + d x), \frac{2 a}{a+b}\right]}{3 a b \left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}} + \frac{2 C \sqrt{\frac{b + a \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2}(c + d x), \frac{2 a}{a+b}\right]}{b^2 d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}} - \left(2\left(A b^4 - 4 a b^3 B - 3 a^4 C + a^2 b^2 (3 A + 7 C)\right)\sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c + d x), \frac{2 a}{a + b}\right]\sqrt{a + b \operatorname{Sec}[c + d x]}\right) \Big/ \left(3 a b^2 \left(a^2 - b^2\right)^2 d \sqrt{\frac{b + a \operatorname{Cos}[c + d x]}{a + b}}\right) - \frac{2\left(A b^2 - a (b B - a C)\right)\operatorname{Sin}[c + d x]}{3 b \left(a^2 - b^2\right) d \operatorname{Cos}[c + d x]^{3/2} (a + b \operatorname{Sec}[c + d x])^{3/2}} + \frac{2\left(A b^4 - 4 a b^3 B - 3 a^4 C + a^2 b^2 (3 A + 7 C)\right)\operatorname{Sin}[c + d x]}{3 b^2 \left(a^2 - b^2\right)^2 d \sqrt{\operatorname{Cos}[c + d x]}\ \sqrt{a + b \operatorname{Sec}[c + d x]}}$$

Result (type 1, 1 leaves) :

???

- **Problem 1373: Attempted integration timed out after 120 seconds.**

$$\int \frac{A + B \operatorname{Sec}[c + d x] + C \operatorname{Sec}[c + d x]^2}{\operatorname{Cos}[c + d x]^{5/2} (a + b \operatorname{Sec}[c + d x])^{5/2}} \, dx$$

Optimal (type 4, 563 leaves, 15 steps) :

$$\frac{\left(2 A b^2 - 2 a b B + 5 a^2 C - 3 b^2 C\right) \sqrt{\frac{b + a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 a}{a+b}\right]}{3 b^2 \left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Sec}[c + d x]}} + \frac{(2 b B - 5 a C) \sqrt{\frac{b + a \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 a}{a+b}\right]}{b^3 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Sec}[c + d x]}} +$$

$$\left(\left(8 A b^4 + 6 a^3 b B - 14 a b^3 B - 15 a^4 C + 26 a^2 b^2 C - 3 b^4 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 a}{a + b}\right] \sqrt{a + b \operatorname{Sec}[c + d x]}\right) \Big/$$

$$\left(3 b^3 \left(a^2 - b^2\right)^2 d \sqrt{\frac{b + a \operatorname{Cos}[c + d x]}{a + b}}\right) - \frac{2 \left(A b^2 - a (b B - a C)\right) \operatorname{Sin}[c + d x]}{3 b \left(a^2 - b^2\right) d \operatorname{Cos}[c + d x]^{5/2} (a + b \operatorname{Sec}[c + d x])^{3/2}} +$$

$$\frac{2 \left(3 A b^4 + 2 a^3 b B - 6 a b^3 B - 5 a^4 C + a^2 b^2 (A + 9 C)\right) \operatorname{Sin}[c + d x]}{3 b^2 \left(a^2 - b^2\right)^2 d \operatorname{Cos}[c + d x]^{3/2} \sqrt{a + b \operatorname{Sec}[c + d x]}} -$$

$$\frac{\left(8 A b^4 + 6 a^3 b B - 14 a b^3 B - 15 a^4 C + 26 a^2 b^2 C - 3 b^4 C\right) \sqrt{a + b \operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{3 b^3 \left(a^2 - b^2\right)^2 d \sqrt{\operatorname{Cos}[c + d x]}}$$

Result (type 1, 1 leaves) :

???

Test results for the 470 problems in "4.5.7 (d trig)^m (a+b (c sec)^n)^p.m"

- **Problem 5: Result more than twice size of optimal antiderivative.**

$$\int \operatorname{Csc}[e + f x] \left(a + b \operatorname{Sec}[e + f x]^2\right) dx$$

Optimal (type 3, 27 leaves, 3 steps) :

$$-\frac{(a + b) \operatorname{ArcTanh}[\operatorname{Cos}[e + f x]]}{f} + \frac{b \operatorname{Sec}[e + f x]}{f}$$

Result (type 3, 84 leaves) :

$$-\frac{a\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}-\frac{b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]\right]}{f}+\frac{a\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+\frac{b\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{f}+\frac{b\,\mathrm{Sec}[e+f x]}{f}$$

- **Problem 6: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[e+f x]^3\left(a+b\,\mathrm{Sec}[e+f x]^2\right)dx$$

Optimal (type 3, 53 leaves, 4 steps):

$$-\frac{(a+3 b)\,\mathrm{ArcTanh}[\mathrm{Cos}[e+f x]]}{2 f}-\frac{(a+b)\,\mathrm{Cot}[e+f x]\,\mathrm{Csc}[e+f x]}{2 f}+\frac{b\,\mathrm{Sec}[e+f x]}{f}$$

Result (type 3, 236 leaves):

$$-\frac{a\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{8 f}-\frac{b\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2}{8 f}-\frac{a\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]\right]}{2 f}-\frac{3 b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]\right]}{2 f}+\frac{a\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{2 f}+\frac{3 b\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{2 f}+\frac{a\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{8 f}+\frac{b\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2}{8 f}+\frac{b\,\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]}{f\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]-\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right)}-\frac{b\,\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]}{f\left(\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]+\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right)}$$

- **Problem 7: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[e+f x]^5\left(a+b\,\mathrm{Sec}[e+f x]^2\right)dx$$

Optimal (type 3, 81 leaves, 5 steps):

$$-\frac{3(a+5 b)\,\mathrm{ArcTanh}[\mathrm{Cos}[e+f x]]}{8 f}-\frac{(3 a+7 b)\,\mathrm{Cot}[e+f x]\,\mathrm{Csc}[e+f x]}{8 f}-\frac{(a+b)\,\mathrm{Cot}[e+f x]\,\mathrm{Csc}[e+f x]^3}{4 f}+\frac{b\,\mathrm{Sec}[e+f x]}{f}$$

Result (type 3, 198 leaves):

$$\frac{1}{64 f}\left(-2(3 a+7 b)\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^2-(a+b)\,\mathrm{Csc}\left[\frac{1}{2}(e+f x)\right]^4+1\Big/\left(-1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right.$$
$$\left(2\left(-3(a+13 b)+4\,\mathrm{Cos}[e+f x]\left(8 b+3(a+5 b)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(e+f x)\right]\right]-3(a+5 b)\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)\right)\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2-\right.$$
$$\left.\left.(a+b)\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^4+(4(a+2 b)+(3 a+7 b)\,\mathrm{Cos}[e+f x])\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^4\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)$$

- **Problem 18: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[e+f x]\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2dx$$

Optimal (type 3, 52 leaves, 4 steps):

$$-\frac{(a+b)^2 \text{ArcTanh}[\text{Cos}[e+f x]]}{f}+\frac{b (2 a+b) \text{Sec}[e+f x]}{f}+\frac{b^2 \text{Sec}[e+f x]^3}{3 f}$$

Result (type 3, 108 leaves) :

$$-\left(4 \left(b+a \text{Cos}[e+f x]^2\right)^2 \left(-b^2-3 b (2 a+b) \text{Cos}[e+f x]^2+3 (a+b)^2 \text{Cos}[e+f x]^3 \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]\right]-\text{Log}\left[\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]\right)\right) \text{Sec}[e+f x]^3\right) \Big/ \left(3 f (a+2 b+a \text{Cos}[2 (e+f x)])^2\right)$$

Problem 19: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[e+f x]^3 \left(a+b \text{Sec}[e+f x]^2\right)^2 \, dx$$

Optimal (type 3, 104 leaves, 5 steps) :

$$-\frac{(a+b) (a+5 b) \text{ArcTanh}[\text{Cos}[e+f x]]}{2 f}-\frac{\left(3 a^2+6 a b+5 b^2\right) \text{Cot}[e+f x] \text{Csc}[e+f x]}{6 f}+\frac{b (6 a+5 b) \text{Sec}[e+f x]}{3 f}+\frac{b^2 \text{Csc}[e+f x]^2 \text{Sec}[e+f x]^3}{3 f}$$

Result (type 3, 1021 leaves) :

$$\frac{\left(-a^2-2ab-b^2\right)\text{Cos}[e+fx]^4\,\text{Csc}\left[\frac{e}{2}+\frac{fx}{2}\right]^2\left(a+b\,\text{Sec}[e+fx]^2\right)^2}{2f\,(a+2b+a\,\text{Cos}[2e+2fx])^2}-\frac{2\left(a^2+6ab+5b^2\right)\text{Cos}[e+fx]^4\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]\right]\left(a+b\,\text{Sec}[e+fx]^2\right)^2}{f\,(a+2b+a\,\text{Cos}[2e+2fx])^2}+$$

$$\frac{2\left(a^2+6ab+5b^2\right)\text{Cos}[e+fx]^4\,\text{Log}\left[\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right]\left(a+b\,\text{Sec}[e+fx]^2\right)^2}{f\,(a+2b+a\,\text{Cos}[2e+2fx])^2}+$$

$$\frac{2b\,(12a+13b)\,\text{Cos}[e+fx]^4\,\text{Sec}[e]\left(a+b\,\text{Sec}[e+fx]^2\right)^2}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2}+\frac{\left(a^2+2ab+b^2\right)\text{Cos}[e+fx]^4\,\text{Sec}\left[\frac{e}{2}+\frac{fx}{2}\right]^2\left(a+b\,\text{Sec}[e+fx]^2\right)^2}{2f\,(a+2b+a\,\text{Cos}[2e+2fx])^2}+$$

$$\frac{2b^2\,\text{Cos}[e+fx]^4\left(a+b\,\text{Sec}[e+fx]^2\right)^2\text{Sin}\left[\frac{fx}{2}\right]}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[e+fx]^4\left(a+b\,\text{Sec}[e+fx]^2\right)^2\left(b^2\,\text{Cos}\left[\frac{e}{2}\right]+b^2\,\text{Sin}\left[\frac{e}{2}\right]\right)}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)^2}+$$

$$\frac{2\,\text{Cos}[e+fx]^4\left(a+b\,\text{Sec}[e+fx]^2\right)^2\left(12ab\,\text{Sin}\left[\frac{fx}{2}\right]+13b^2\,\text{Sin}\left[\frac{fx}{2}\right]\right)}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2\left(\text{Cos}\left[\frac{e}{2}\right]-\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)}-$$

$$\frac{2b^2\,\text{Cos}[e+fx]^4\left(a+b\,\text{Sec}[e+fx]^2\right)^2\text{Sin}\left[\frac{fx}{2}\right]}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)^3}+$$

$$\frac{\text{Cos}[e+fx]^4\left(a+b\,\text{Sec}[e+fx]^2\right)^2\left(b^2\,\text{Cos}\left[\frac{e}{2}\right]-b^2\,\text{Sin}\left[\frac{e}{2}\right]\right)}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)^2}-$$

$$\frac{2\,\text{Cos}[e+fx]^4\left(a+b\,\text{Sec}[e+fx]^2\right)^2\left(12ab\,\text{Sin}\left[\frac{fx}{2}\right]+13b^2\,\text{Sin}\left[\frac{fx}{2}\right]\right)}{3f\,(a+2b+a\,\text{Cos}[2e+2fx])^2\left(\text{Cos}\left[\frac{e}{2}\right]+\text{Sin}\left[\frac{e}{2}\right]\right)\left(\text{Cos}\left[\frac{e}{2}+\frac{fx}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{fx}{2}\right]\right)}$$

- **Problem 21: Result more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+fx]^2\right)^2\text{Sin}[e+fx]^6\,dx$$

Optimal (type 3, 148 leaves, 7 steps):

$$\frac{5}{16}\left(a^2-12ab+8b^2\right)x-\frac{\left(3a^2-36ab+8b^2\right)\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{16f}+$$

$$\frac{a\,(a-12b)\,\text{Cos}[e+fx]^3\,\text{Sin}[e+fx]}{24f}-\frac{\left(a^2-12ab+12b^2\right)\text{Tan}[e+fx]}{6f}+\frac{a^2\,\text{Sin}[e+fx]^6\,\text{Tan}[e+fx]}{6f}+\frac{b^2\,\text{Tan}[e+fx]^3}{3f}$$

Result (type 3, 499 leaves):

$$\frac{1}{768\, f\, (a+2\, b+a\, \text{Cos}[2\, (e+f\, x)])^2} \left(b+a\, \text{Cos}[e+f\, x]^2\right)^2 \text{Sec}[e]\, \text{Sec}[e+f\, x]^3 \left(360 \left(a^2-12\, a\, b+8\, b^2\right) f\, x\, \text{Cos}[f\, x]+360 \left(a^2-12\, a\, b+8\, b^2\right) f\, x\, \text{Cos}[2\, e+f\, x]+120\, a^2\, f\, x\, \text{Cos}[2\, e+3\, f\, x]-1440\, a\, b\, f\, x\, \text{Cos}[2\, e+3\, f\, x]+960\, b^2\, f\, x\, \text{Cos}[2\, e+3\, f\, x]+120\, a^2\, f\, x\, \text{Cos}[4\, e+3\, f\, x]-1440\, a\, b\, f\, x\, \text{Cos}[4\, e+3\, f\, x]+960\, b^2\, f\, x\, \text{Cos}[4\, e+3\, f\, x]-81\, a^2\, \text{Sin}[f\, x]+3444\, a\, b\, \text{Sin}[f\, x]-3168\, b^2\, \text{Sin}[f\, x]-81\, a^2\, \text{Sin}[2\, e+f\, x]-1164\, a\, b\, \text{Sin}[2\, e+f\, x]+2208\, b^2\, \text{Sin}[2\, e+f\, x]-109\, a^2\, \text{Sin}[2\, e+3\, f\, x]+2076\, a\, b\, \text{Sin}[2\, e+3\, f\, x]-1936\, b^2\, \text{Sin}[2\, e+3\, f\, x]-109\, a^2\, \text{Sin}[4\, e+3\, f\, x]+540\, a\, b\, \text{Sin}[4\, e+3\, f\, x]-144\, b^2\, \text{Sin}[4\, e+3\, f\, x]-21\, a^2\, \text{Sin}[4\, e+5\, f\, x]+156\, a\, b\, \text{Sin}[4\, e+5\, f\, x]-48\, b^2\, \text{Sin}[4\, e+5\, f\, x]-21\, a^2\, \text{Sin}[6\, e+5\, f\, x]+156\, a\, b\, \text{Sin}[6\, e+5\, f\, x]-48\, b^2\, \text{Sin}[6\, e+5\, f\, x]+6\, a^2\, \text{Sin}[6\, e+7\, f\, x]-12\, a\, b\, \text{Sin}[6\, e+7\, f\, x]+6\, a^2\, \text{Sin}[8\, e+7\, f\, x]-12\, a\, b\, \text{Sin}[8\, e+7\, f\, x]-a^2\, \text{Sin}[8\, e+9\, f\, x]-a^2\, \text{Sin}[10\, e+9\, f\, x]\right)$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int \left(a+b\, \text{Sec}[e+f\, x]^2\right)^2 dx$$

Optimal (type 3, 40 leaves, 4 steps):

$$a^2\, x+\frac{b\, (2\, a+b)\, \text{Tan}[e+f\, x]}{f}+\frac{b^2\, \text{Tan}[e+f\, x]^3}{3\, f}$$

Result (type 3, 106 leaves):

$$\left(4 \left(b+a\, \text{Cos}[e+f\, x]^2\right)^2 \text{Sec}[e+f\, x]^3 \left(3\, a^2\, f\, x\, \text{Cos}[e+f\, x]^3+b^2\, \text{Sec}[e]\, \text{Sin}[f\, x]+2\, b\, (3\, a+b)\, \text{Cos}[e+f\, x]^2\, \text{Sec}[e]\, \text{Sin}[f\, x]+b^2\, \text{Cos}[e+f\, x]\, \text{Tan}[e]\right)\right) \Big/ \left(3\, f\, (a+2\, b+a\, \text{Cos}[2\, (e+f\, x)])^2\right)$$

Problem 25: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[e+f\, x]^2 \left(a+b\, \text{Sec}[e+f\, x]^2\right)^2 dx$$

Optimal (type 3, 50 leaves, 3 steps):

$$-\frac{(a+b)^2\, \text{Cot}[e+f\, x]}{f}+\frac{2\, b\, (a+b)\, \text{Tan}[e+f\, x]}{f}+\frac{b^2\, \text{Tan}[e+f\, x]^3}{3\, f}$$

Result (type 3, 109 leaves):

$$\left(4 \left(b+a\, \text{Cos}[e+f\, x]^2\right)^2 \text{Sec}[e+f\, x]^3 \left(b^2\, \text{Sec}[e]\, \text{Sin}[f\, x]+\text{Cos}[e+f\, x]^2 \left(3\, (a+b)^2\, \text{Cot}[e+f\, x]\, \text{Csc}[e]+b\, (6\, a+5\, b)\, \text{Sec}[e]\right) \text{Sin}[f\, x]+b^2\, \text{Cos}[e+f\, x]\, \text{Tan}[e]\right)\right) \Big/ \left(3\, f\, (a+2\, b+a\, \text{Cos}[2\, (e+f\, x)])^2\right)$$

Problem 27: Result more than twice size of optimal antiderivative.

$$\int \text{Csc}[e+f\, x]^6 \left(a+b\, \text{Sec}[e+f\, x]^2\right)^2 dx$$

Optimal (type 3, 103 leaves, 3 steps):

$$-\frac{\left(a^2+6\, a\, b+6\, b^2\right) \text{Cot}[e+f\, x]}{f}-\frac{2\, (a+b)\, (a+2\, b)\, \text{Cot}[e+f\, x]^3}{3\, f}-\frac{(a+b)^2\, \text{Cot}[e+f\, x]^5}{5\, f}+\frac{2\, b\, (a+2\, b)\, \text{Tan}[e+f\, x]}{f}+\frac{b^2\, \text{Tan}[e+f\, x]^3}{3\, f}$$

Result (type 3, 353 leaves) :

$$-\frac{1}{1920 f} \text{Csc}[e] \text{Csc}[e+f x]^5 \text{Sec}[e] \text{Sec}[e+f x]^3 \left(20 a (5 a+12 b) \text{Sin}[2 e]-32 \left(2 a^2+9 a b+12 b^2\right) \text{Sin}[2 f x]-24 a^2 \text{Sin}[2 (e+f x)]-108 a b \text{Sin}[2 (e+f x)]-54 b^2 \text{Sin}[2 (e+f x)]+8 a^2 \text{Sin}[4 (e+f x)]+36 a b \text{Sin}[4 (e+f x)]+18 b^2 \text{Sin}[4 (e+f x)]+8 a^2 \text{Sin}[6 (e+f x)]+36 a b \text{Sin}[6 (e+f x)]+18 b^2 \text{Sin}[6 (e+f x)]-4 a^2 \text{Sin}[8 (e+f x)]-18 a b \text{Sin}[8 (e+f x)]-9 b^2 \text{Sin}[8 (e+f x)]+8 a^2 \text{Sin}[2 (e+2 f x)]+96 a b \text{Sin}[2 (e+2 f x)]+128 b^2 \text{Sin}[2 (e+2 f x)]+40 a^2 \text{Sin}[4 e+2 f x]+8 a^2 \text{Sin}[4 e+6 f x]+96 a b \text{Sin}[4 e+6 f x]+128 b^2 \text{Sin}[4 e+6 f x]-4 a^2 \text{Sin}[6 e+8 f x]-48 a b \text{Sin}[6 e+8 f x]-64 b^2 \text{Sin}[6 e+8 f x]\right)$$

- **Problem 28: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^5}{a+b \text{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 98 leaves, 4 steps) :

$$\frac{\sqrt{b} (a+b)^2 \text{ArcTan}\left[\frac{\sqrt{a} \text{Cos}[e+f x]}{\sqrt{b}}\right]}{a^{7/2} f}-\frac{(a+b)^2 \text{Cos}[e+f x]}{a^3 f}+\frac{(2 a+b) \text{Cos}[e+f x]^3}{3 a^2 f}-\frac{\text{Cos}[e+f x]^5}{5 a f}$$

Result (type 3, 425 leaves) :

$$\frac{1}{1920 a^{7/2} \sqrt{b} f \left(a+b \text{Sec}[e+f x]^2\right)} (a+2 b+a \text{Cos}[2 (e+f x)]) \left(15 \left(5 a^3+64 a^2 b+128 a b^2+64 b^3\right) \text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}-i \sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}\right) \text{Sin}[e] \text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e] \left(\sqrt{a}-\sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2} \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]+15 \left(5 a^3+64 a^2 b+128 a b^2+64 b^3\right) \text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}+i \sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}\right) \text{Sin}[e] \text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e] \left(\sqrt{a}+\sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2} \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]-75 a^3 \text{ArcTan}\left[\frac{\sqrt{a}-\sqrt{a+b} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{b}}\right]-75 a^3 \text{ArcTan}\left[\frac{\sqrt{a}+\sqrt{a+b} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{b}}\right]-8 \sqrt{a} \sqrt{b} \text{Cos}[e+f x] \left(89 a^2+220 a b+120 b^2-4 a (7 a+5 b) \text{Cos}[2 (e+f x)]+3 a^2 \text{Cos}[4 (e+f x)]\right)\right) \text{Sec}[e+f x]^2$$

- **Problem 29: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^3}{a+b \text{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 71 leaves, 4 steps) :

$$\frac{\sqrt{b}\ (a+b)\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Cos}[e+f x]}{\sqrt{b}}\right]}{a^{5/2}\ f}-\frac{(a+b)\ \text{Cos}[e+f x]}{a^2\ f}+\frac{\text{Cos}[e+f x]^3}{3\ a\ f}$$

Result (type 3, 376 leaves):

$$\frac{1}{48\ a^{5/2}\ \sqrt{b}\ f\ \left(a+b\ \text{Sec}[e+f x]^2\right)}$$
$$(a+2\ b+a\ \text{Cos}[2\ (e+f x)])\ \Bigg(3\ \left(a^2+8\ a\ b+8\ b^2\right)\ \text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}-\mathrm{i}\ \sqrt{a+b}\ \sqrt{(\text{Cos}[e]-\mathrm{i}\ \text{Sin}[e])^2}\right)\ \text{Sin}[e]\ \text{Tan}\left[\frac{f x}{2}\right]+\right.\right.$$
$$\left.\left.\text{Cos}[e]\ \left(\sqrt{a}-\sqrt{a+b}\ \sqrt{(\text{Cos}[e]-\mathrm{i}\ \text{Sin}[e])^2}\ \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]+3\ \left(a^2+8\ a\ b+8\ b^2\right)$$
$$\text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}+\mathrm{i}\ \sqrt{a+b}\ \sqrt{(\text{Cos}[e]-\mathrm{i}\ \text{Sin}[e])^2}\right)\ \text{Sin}[e]\ \text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e]\ \left(\sqrt{a}+\sqrt{a+b}\ \sqrt{(\text{Cos}[e]-\mathrm{i}\ \text{Sin}[e])^2}\ \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]-$$
$$3\ a^2\ \text{ArcTan}\left[\frac{\sqrt{a}-\sqrt{a+b}\ \text{Tan}\left[\frac{1}{2}\ (e+f x)\right]}{\sqrt{b}}\right]-3\ a^2\ \text{ArcTan}\left[\frac{\sqrt{a}+\sqrt{a+b}\ \text{Tan}\left[\frac{1}{2}\ (e+f x)\right]}{\sqrt{b}}\right]+$$
$$4\ \sqrt{a}\ \sqrt{b}\ \text{Cos}[e+f x]\ (-5\ a-6\ b+a\ \text{Cos}[2\ (e+f x)])\Bigg)\ \text{Sec}[e+f x]^2$$

- **Problem 30: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]}{a+b\ \text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 47 leaves, 3 steps):

$$\frac{\sqrt{b}\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Cos}[e+f x]}{\sqrt{b}}\right]}{a^{3/2}\ f}-\frac{\text{Cos}[e+f x]}{a\ f}$$

Result (type 3, 329 leaves):

$$\frac{1}{8\, a^{3/2}\sqrt{b}\, f\left(b+a\,\text{Cos}[e+f\,x]^2\right)}\left((a+4\,b)\,\text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}-\mathrm{i}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]+\right.$$
$$(a+4\,b)\,\text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}+\mathrm{i}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]-$$
$$\left.a\,\text{ArcTan}\left[\frac{\sqrt{a}-\sqrt{a+b}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{b}}\right]-a\,\text{ArcTan}\left[\frac{\sqrt{a}+\sqrt{a+b}\,\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]}{\sqrt{b}}\right]-4\sqrt{a}\,\sqrt{b}\,\text{Cos}[e+f\,x]\right)(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])$$

- **Problem 31: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+f\,x]}{a+b\,\text{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 55 leaves, 4 steps):

$$\frac{\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f\,x]}{\sqrt{b}}\right]}{\sqrt{a}\,(a+b)\,f}-\frac{\text{ArcTanh}[\text{Cos}[e+f\,x]]}{(a+b)\,f}$$

Result (type 3, 239 leaves):

$$\frac{1}{(a+b)\,f}\left(\frac{\sqrt{b}\,\text{ArcTan}\left[\frac{\left(-\sqrt{a}-\mathrm{i}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{b}}\right]}{\sqrt{a}}+\right.$$
$$\left.\frac{\sqrt{b}\,\text{ArcTan}\left[\frac{\left(-\sqrt{a}+\mathrm{i}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)}{\sqrt{b}}\right]}{\sqrt{a}}-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]\right]+\text{Log}\left[\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]\right]\right)$$

- **Problem 32: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+f\,x]^3}{a+b\,\text{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 86 leaves, 5 steps):

$$\frac{\sqrt{a}\,\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f\,x]}{\sqrt{b}}\right]}{(a+b)^2\,f}-\frac{(a-b)\,\text{ArcTanh}[\text{Cos}[e+f\,x]]}{2\,(a+b)^2\,f}-\frac{\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]}{2\,(a+b)\,f}$$

Result (type 3, 371 leaves) :

$$-\frac{1}{16\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\Bigg(-8\,\sqrt{a}\,\sqrt{b}\,\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a}-i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\Big)\,\text{Sin}[e]\,\text{Tan}\Big[\frac{f\,x}{2}\Big]+\text{Cos}[e]\,\Big(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\Big[\frac{f\,x}{2}\Big]\Big)\Big)\Big]-8\,\sqrt{a}\,\sqrt{b}\,\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a}+i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\Big)\,\text{Sin}[e]\,\text{Tan}\Big[\frac{f\,x}{2}\Big]+\text{Cos}[e]\,\Big(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\Big[\frac{f\,x}{2}\Big]\Big)\Big)\Big]+a\,\text{Csc}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2+b\,\text{Csc}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2+4\,a\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-4\,b\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-4\,a\,\text{Log}\Big[\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]+4\,b\,\text{Log}\Big[\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]-a\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2-b\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Bigg)\,\text{Sec}[e+f\,x]^2$$

- **Problem 33: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+f\,x]^5}{a+b\,\text{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 129 leaves, 6 steps) :

$$\frac{a^{3/2}\,\sqrt{b}\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Cos}[e+f\,x]}{\sqrt{b}}\Big]}{(a+b)^3\,f}-\frac{\left(3\,a^2-6\,a\,b-b^2\right)\,\text{ArcTanh}[\text{Cos}[e+f\,x]]}{8\,(a+b)^3\,f}-\frac{(3\,a-b)\,\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]}{8\,(a+b)^2\,f}-\frac{\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^3}{4\,(a+b)\,f}$$

Result (type 3, 903 leaves) :

$$\Big(a^{3/2}\sqrt{b}\,\text{ArcTan}\Big[1\Big/\left(2\sqrt{b}\right)\text{Sec}\Big[\frac{f x}{2}\Big]\Big(2\sqrt{a}\,\text{Cos}\Big[e+\frac{f x}{2}\Big]-i\sqrt{a+b}\,\text{Cos}\Big[e-\frac{f x}{2}\Big]\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}+i\sqrt{a+b}\,\text{Cos}\Big[e+\frac{f x}{2}\Big]\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}+\sqrt{a+b}\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}\,\text{Sin}\Big[e-\frac{f x}{2}\Big]-\sqrt{a+b}\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}\,\text{Sin}\Big[e+\frac{f x}{2}\Big]\Big)\Big]\,(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Sec}[e+f x]^2\Big)\Big/\left(2 (a+b)^3 f\left(a+b\,\text{Sec}[e+f x]^2\right)\right)+$$

$$\Big(a^{3/2}\sqrt{b}\,\text{ArcTan}\Big[1\Big/\left(2\sqrt{b}\right)\text{Sec}\Big[\frac{f x}{2}\Big]\Big(2\sqrt{a}\,\text{Cos}\Big[e+\frac{f x}{2}\Big]+i\sqrt{a+b}\,\text{Cos}\Big[e-\frac{f x}{2}\Big]\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}-i\sqrt{a+b}\,\text{Cos}\Big[e+\frac{f x}{2}\Big]\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}-\sqrt{a+b}\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}\,\text{Sin}\Big[e-\frac{f x}{2}\Big]+\sqrt{a+b}\sqrt{\text{Cos}[2 e]-i\,\text{Sin}[2 e]}\,\text{Sin}\Big[e+\frac{f x}{2}\Big]\Big)\Big]\,(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Sec}[e+f x]^2\Big)\Big/\left(2 (a+b)^3 f\left(a+b\,\text{Sec}[e+f x]^2\right)\right)+$$

$$\frac{(-3 a+b)\,(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Sec}[e+f x]^2}{64 (a+b)^2 f\left(a+b\,\text{Sec}[e+f x]^2\right)}-$$

$$\frac{(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Csc}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Sec}[e+f x]^2}{128 (a+b) f\left(a+b\,\text{Sec}[e+f x]^2\right)}+$$

$$\frac{\left(-3 a^2+6 a b+b^2\right)(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\text{Sec}[e+f x]^2}{16 (a+b)^3 f\left(a+b\,\text{Sec}[e+f x]^2\right)}+$$

$$\frac{\left(3 a^2-6 a b-b^2\right)(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Log}\left[\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]\text{Sec}[e+f x]^2}{16 (a+b)^3 f\left(a+b\,\text{Sec}[e+f x]^2\right)}+$$

$$\frac{(3 a-b)\,(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^2\text{Sec}[e+f x]^2}{64 (a+b)^2 f\left(a+b\,\text{Sec}[e+f x]^2\right)}+$$

$$\frac{(a+2 b+a\,\text{Cos}[2 e+2 f x])\,\text{Sec}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\text{Sec}[e+f x]^2}{128 (a+b) f\left(a+b\,\text{Sec}[e+f x]^2\right)}$$

- **Problem 34: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sin}[e+f x]^6}{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 166 leaves, 7 steps) :

$$\frac{\left(5 a^3+30 a^2 b+40 a b^2+16 b^3\right) x}{16 a^4}-\frac{\sqrt{b}\ (a+b)^{5/2} \text{ArcTan}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a^4 f}-\frac{\left(11 a^2+18 a b+8 b^2\right) \text{Cos}[e+f x] \text{Sin}[e+f x]}{16 a^3 f}+\frac{(3 a+2 b) \text{Cos}[e+f x]^3 \text{Sin}[e+f x]}{8 a^2 f}+\frac{\text{Cos}[e+f x]^3 \text{Sin}[e+f x]^3}{6 a f}$$

Result (type 3, 357 leaves) :

$$\frac{1}{768 a^4 \sqrt{b} \sqrt{a+b}\ f \left(a+b \text{Sec}[e+f x]^2\right) \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}}$$
$$(a+2 b+a \text{Cos}[2 (e+f x)]) \text{Sec}[e+f x]^2 \left(3 \sqrt{b} \left(9 a^4+136 a^3 b+384 a^2 b^2+384 a b^3+128 b^4\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-i \text{Sin}[2 e]) (-(a+2 b) \text{Sin}[f x]+a \text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-i \text{Sin}[2 e])+$$
$$\sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4} \left(3 a^3 (9 a+8 b) \text{ArcTan}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b}}\right]+2 \sqrt{b} \sqrt{a+b} \left(-12 a^3 e+60 a^3 f x+360 a^2 b f x+\right.\right.$$
$$\left.\left.\left.480 a b^2 f x+192 b^3 f x-3 a \left(15 a^2+32 a b+16 b^2\right) \text{Sin}[2 (e+f x)]+3 a^2 (3 a+2 b) \text{Sin}[4 (e+f x)]-a^3 \text{Sin}[6 (e+f x)]\right)\right)\right)$$

- **Problem 35: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^4}{a+b \text{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 117 leaves, 6 steps) :

$$\frac{\left(3 a^2+12 a b+8 b^2\right) x}{8 a^3}-\frac{\sqrt{b}\ (a+b)^{3/2} \text{ArcTan}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a^3 f}-\frac{(5 a+4 b) \text{Cos}[e+f x] \text{Sin}[e+f x]}{8 a^2 f}+\frac{\text{Cos}[e+f x]^3 \text{Sin}[e+f x]}{4 a f}$$

Result (type 3, 303 leaves) :

$$\frac{1}{64 a^3 \sqrt{b} \sqrt{a+b} f \left(a+b \operatorname{Sec}[e+f x]^2\right) \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}} (a+2 b+a \operatorname{Cos}[2 (e+f x)]) \operatorname{Sec}[e+f x]^2 \left(\sqrt{b} \left(3 a^3+34 a^2 b+64 a b^2+32 b^3\right) \operatorname{ArcTan}\left[\frac{\operatorname{Sec}[f x] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]) (-(a+2 b) \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}}\right] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e])+\sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4} \left(a^2 (3 a+2 b) \operatorname{ArcTan}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b}}\right]+\sqrt{b} \sqrt{a+b} \left(-2 a^2 e+12 a^2 f x+48 a b f x+32 b^2 f x-8 a (a+b) \operatorname{Sin}[2 (e+f x)]+a^2 \operatorname{Sin}[4 (e+f x)]\right)\right)\right)$$

- **Problem 36: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sin}[e+f x]^2}{a+b \operatorname{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 76 leaves, 5 steps):

$$\frac{(a+2 b) x}{2 a^2}-\frac{\sqrt{b} \sqrt{a+b} \operatorname{ArcTan}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a^2 f}-\frac{\operatorname{Cos}[e+f x] \operatorname{Sin}[e+f x]}{2 a f}$$

Result (type 3, 245 leaves):

$$\frac{1}{16 \left(a+b \operatorname{Sec}[e+f x]^2\right)} (a+2 b+a \operatorname{Cos}[2 (e+f x)]) \operatorname{Sec}[e+f x]^2 \left(\frac{\operatorname{ArcTan}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b}}\right]}{\sqrt{b} \sqrt{a+b} f}-1/a^2 \left(-4 (a+2 b) x-\frac{\left(a^2+8 a b+8 b^2\right) \operatorname{ArcTan}\left[\frac{\operatorname{Sec}[f x] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]) (-(a+2 b) \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}}\right] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e])}{\sqrt{a+b} f \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}}+\frac{2 a \operatorname{Cos}[2 f x] \operatorname{Sin}[2 e]}{f}+\frac{2 a \operatorname{Cos}[2 e] \operatorname{Sin}[2 f x]}{f}\right)\right)$$

- **Problem 37: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{1}{a+b \operatorname{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 45 leaves, 3 steps):

$$\frac{x}{a}+\frac{\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a+b}\,\text{Cot}[e+f x]}{\sqrt{b}}\right]}{a\sqrt{a+b}\,f}$$

Result (type 3, 182 leaves):

$$\left((a+2 b+a \text{Cos}[2 (e+f x)]) \text{Sec}[e+f x]^2 \left(\sqrt{a+b}\, f x \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}+ b \text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-i \text{Sin}[2 e]) (-(a+2 b) \text{Sin}[f x]+a \text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-i \text{Sin}[2 e])\right)\right) \Big/ \left(2 a \sqrt{a+b}\, f \left(a+b \text{Sec}[e+f x]^2\right) \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}\right)$$

- **Problem 38: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Csc}[e+f x]^2}{a+b \text{Sec}[e+f x]^2}\, dx$$

Optimal (type 3, 54 leaves, 3 steps):

$$-\frac{\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{3/2} f}-\frac{\text{Cot}[e+f x]}{(a+b) f}$$

Result (type 3, 189 leaves):

$$\left((a+2 b+a \text{Cos}[2 (e+f x)]) \text{Sec}[e+f x]^2 \left(b \text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-i \text{Sin}[2 e]) (-(a+2 b) \text{Sin}[f x]+a \text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-i \text{Sin}[2 e])+ \sqrt{a+b}\, \text{Csc}[e] \text{Csc}[e+f x] \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}\, \text{Sin}[f x]\right)\right) \Big/ \left(2 (a+b)^{3/2} f \left(a+b \text{Sec}[e+f x]^2\right) \sqrt{b (\text{Cos}[e]-i \text{Sin}[e])^4}\right)$$

- **Problem 39: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Csc}[e+f x]^4}{a+b \text{Sec}[e+f x]^2}\, dx$$

Optimal (type 3, 76 leaves, 4 steps):

$$-\frac{a\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2} f}-\frac{a\,\text{Cot}[e+f x]}{(a+b)^2 f}-\frac{\text{Cot}[e+f x]^3}{3 (a+b) f}$$

Result (type 3, 226 leaves):

$$\left((a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}[e+f x]^2\left(3 a b\,\text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]) (-(a+2 b) \text{Sin}[f x]+a\,\text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e])+\frac{1}{4} \sqrt{a+b}\,\text{Csc}[e]\,\text{Csc}[e+f x]^3 \sqrt{b (\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}\,(6 a\,\text{Sin}[f x]-3 b\,\text{Sin}[2 e+f x]+(-2 a+b)\,\text{Sin}[2 e+3 f x])\right)\right)\Big/\left(6 (a+b)^{5/2} f \left(a+b\,\text{Sec}[e+f x]^2\right) \sqrt{b (\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}\right)$$

- **Problem 40: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Csc}[e+f x]^6}{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 105 leaves, 4 steps):

$$-\frac{a^2\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{7/2} f}-\frac{a^2\,\text{Cot}[e+f x]}{(a+b)^3 f}-\frac{(2 a+b)\,\text{Cot}[e+f x]^3}{3 (a+b)^2 f}-\frac{\text{Cot}[e+f x]^5}{5 (a+b) f}$$

Result (type 3, 318 leaves):

$$\frac{1}{480 (a+b)^{7/2} f \left(a+b\,\text{Sec}[e+f x]^2\right) \sqrt{b (\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}}(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}[e+f x]^2\left(240 a^2 b\,\text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]) (-(a+2 b) \text{Sin}[f x]+a\,\text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e])+\sqrt{a+b}\,\text{Csc}[e]\,\text{Csc}[e+f x]^5 \sqrt{b (\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}\left(10 \left(8 a^2+b^2\right) \text{Sin}[f x]-30 b (3 a+b)\,\text{Sin}[2 e+f x]-40 a^2\,\text{Sin}[2 e+3 f x]+30 a b\,\text{Sin}[2 e+3 f x]+10 b^2\,\text{Sin}[2 e+3 f x]+15 a b\,\text{Sin}[4 e+3 f x]+8 a^2\,\text{Sin}[4 e+5 f x]-9 a b\,\text{Sin}[4 e+5 f x]-2 b^2\,\text{Sin}[4 e+5 f x]\right)\right)$$

- **Problem 41: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 161 leaves, 6 steps):

$$\frac{\sqrt{b}\,(a+b)\,(3a+7b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f x]}{\sqrt{b}}\right]}{2a^{9/2}f}-\frac{(a+b)\,(3a+7b)\,\text{Cos}[e+f x]}{2a^4 f}+\frac{(a+b)\,(3a+7b)\,\text{Cos}[e+f x]^3}{6a^3 b f}-\frac{\text{Cos}[e+f x]^5}{5a^2 f}-\frac{(a+b)^2\,\text{Cos}[e+f x]^5}{2a^2 b f\left(b+a\,\text{Cos}[e+f x]^2\right)}$$

Result (type 3, 454 leaves):

$$\frac{1}{3840\,a^{9/2} f}\left(\frac{1}{b^{3/2}}15\left(3a^4+384a^2b^2+1280ab^3+896b^4\right)\right.$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]+$$
$$\frac{1}{b^{3/2}}15\left(3a^4+384a^2b^2+1280ab^3+896b^4\right)$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]-$$
$$\frac{45a^4\,\text{ArcTan}\left[\frac{\sqrt{a}-\sqrt{a+b}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{b}}\right]}{b^{3/2}}-\frac{45a^4\,\text{ArcTan}\left[\frac{\sqrt{a}+\sqrt{a+b}\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]}{\sqrt{b}}\right]}{b^{3/2}}-$$
$$\left(16\sqrt{a}\,\text{Cos}[e+f x]\left(150a^3+1436a^2b+2960ab^2+1680b^3+a\left(125a^2+688ab+560b^2\right)\text{Cos}[2(e+f x)]-\right.\right.$$
$$\left.\left.\left.2a^2(11a+14b)\,\text{Cos}[4(e+f x)]+3a^3\,\text{Cos}[6(e+f x)]\right)\right)\Big/\left(a+2b+a\,\text{Cos}[2(e+f x)]\right)\right)$$

- **Problem 42: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 114 leaves, 5 steps):

$$\frac{\sqrt{b}\,(3a+5b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+fx]}{\sqrt{b}}\right]}{2a^{7/2}f}-\frac{(a+2b)\,\text{Cos}[e+fx]}{a^3 f}+\frac{\text{Cos}[e+fx]^3}{3a^2 f}-\frac{b\,(a+b)\,\text{Cos}[e+fx]}{2a^3 f\left(b+a\,\text{Cos}[e+fx]^2\right)}$$

Result (type 3, 403 leaves) :

$$\frac{1}{384a^{7/2}f}\left(\frac{1}{b^{3/2}}3\left(3a^3+192ab^2+320b^3\right)\right.$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{fx}{2}\right]+\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{fx}{2}\right]\right)\right)\right]+$$
$$\frac{1}{b^{3/2}}3\left(3a^3+192ab^2+320b^3\right)$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{fx}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{fx}{2}\right]\right)\right)\right]-$$
$$\frac{9a^3\,\text{ArcTan}\left[\frac{\sqrt{a}-\sqrt{a+b}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{b}}\right]}{b^{3/2}}-\frac{9a^3\,\text{ArcTan}\left[\frac{\sqrt{a}+\sqrt{a+b}\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]}{\sqrt{b}}\right]}{b^{3/2}}-$$
$$\left.\frac{32\sqrt{a}\,\text{Cos}[e+fx]\left(9a^2+56ab+60b^2+4a\,(2a+5b)\,\text{Cos}[2\,(e+fx)]-a^2\,\text{Cos}[4\,(e+fx)]\right)}{a+2b+a\,\text{Cos}[2\,(e+fx)]}\right)$$

Problem 43: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Sin}[e+fx]}{\left(a+b\,\text{Sec}[e+fx]^2\right)^2}\,dx$$

Optimal (type 3, 84 leaves, 4 steps) :

$$\frac{3\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+fx]}{\sqrt{b}}\right]}{2a^{5/2}f}-\frac{3\,\text{Cos}[e+fx]}{2a^2 f}+\frac{\text{Cos}[e+fx]^3}{2af\left(b+a\,\text{Cos}[e+fx]^2\right)}$$

Result (type 3, 393 leaves) :

$$\frac{1}{64\, a^{5/2}\, f\, \left(a + b\, \text{Sec}[e + f\, x]^2\right)^2}$$

$$(a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^2 \left(\frac{1}{b^{3/2}} \left(a^2 + 24\, b^2\right) \text{ArcTan}\left[1 \Big/ \left(\sqrt{b}\right) \left(\left(-\sqrt{a} - i\, \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\right) \text{Sin}[e]\, \text{Tan}\left[\frac{f\, x}{2}\right] + \right.\right.\right.$$

$$\left.\left.\text{Cos}[e] \left(\sqrt{a} - \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\, \text{Tan}\left[\frac{f\, x}{2}\right]\right)\right)\right] + \frac{1}{b^{3/2}} \left(a^2 + 24\, b^2\right)$$

$$\text{ArcTan}\left[1 \Big/ \left(\sqrt{b}\right) \left(\left(-\sqrt{a} + i\, \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\right) \text{Sin}[e]\, \text{Tan}\left[\frac{f\, x}{2}\right] + \text{Cos}[e] \left(\sqrt{a} + \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\, \text{Tan}\left[\frac{f\, x}{2}\right]\right)\right)\right] -$$

$$\left.\frac{a^2\, \text{ArcTan}\left[\frac{\sqrt{a} - \sqrt{a+b}\, \text{Tan}\left[\frac{1}{2} (e+f\, x)\right]}{\sqrt{b}}\right]}{b^{3/2}} - \frac{a^2\, \text{ArcTan}\left[\frac{\sqrt{a} + \sqrt{a+b}\, \text{Tan}\left[\frac{1}{2} (e+f\, x)\right]}{\sqrt{b}}\right]}{b^{3/2}} - \frac{16\, \sqrt{a}\, \text{Cos}[e + f\, x]\, (a + 3\, b + a\, \text{Cos}[2\, (e + f\, x)])}{a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)]}\right) \text{Sec}[e + f\, x]^4$$

- **Problem 44: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Csc}[e + f\, x]}{\left(a + b\, \text{Sec}[e + f\, x]^2\right)^2}\, dx$$

Optimal (type 3, 99 leaves, 5 steps):

$$\frac{\sqrt{b}\, (3\, a + b)\, \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Cos}[e+f\, x]}{\sqrt{b}}\right]}{2\, a^{3/2}\, (a + b)^2\, f} - \frac{\text{ArcTanh}[\text{Cos}[e + f\, x]]}{(a + b)^2\, f} - \frac{b\, \text{Cos}[e + f\, x]}{2\, a\, (a + b)\, f\, \left(b + a\, \text{Cos}[e + f\, x]^2\right)}$$

Result (type 3, 384 leaves):

$$\frac{1}{8\, (a + b)^2\, f\, \left(a + b\, \text{Sec}[e + f\, x]^2\right)^2} (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])\, \text{Sec}[e + f\, x]^3$$

$$\left(-\frac{2\, b\, (a + b)}{a} + \frac{1}{a^{3/2}} \sqrt{b}\, (3\, a + b)\, \text{ArcTan}\left[1 \Big/ \left(\sqrt{b}\right) \left(\left(-\sqrt{a} - i\, \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\right) \text{Sin}[e]\, \text{Tan}\left[\frac{f\, x}{2}\right] + \right.\right.\right.$$

$$\left.\left.\text{Cos}[e] \left(\sqrt{a} - \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\, \text{Tan}\left[\frac{f\, x}{2}\right]\right)\right)\right] (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])\, \text{Sec}[e + f\, x] + \frac{1}{a^{3/2}} \sqrt{b}\, (3\, a + b)$$

$$\text{ArcTan}\left[1 \Big/ \left(\sqrt{b}\right) \left(\left(-\sqrt{a} + i\, \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\right) \text{Sin}[e]\, \text{Tan}\left[\frac{f\, x}{2}\right] + \text{Cos}[e] \left(\sqrt{a} + \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\, \text{Tan}\left[\frac{f\, x}{2}\right]\right)\right)\right]$$

$$(a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])\, \text{Sec}[e + f\, x] - 2\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])\, \text{Log}\left[\text{Cos}\left[\frac{1}{2}\, (e + f\, x)\right]\right] \text{Sec}[e + f\, x] +$$

$$\left.2\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])\, \text{Log}\left[\text{Sin}\left[\frac{1}{2}\, (e + f\, x)\right]\right] \text{Sec}[e + f\, x]\right)$$

Problem 45: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Csc}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 147 leaves, 6 steps):

$$\frac{(3 a-b)\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f x]}{\sqrt{b}}\right]}{2\sqrt{a}\,(a+b)^3 f}-\frac{(a-3 b)\,\text{ArcTanh}[\text{Cos}[e+f x]]}{2 (a+b)^3 f}+\frac{(a-b)\,\text{Cos}[e+f x]}{2 (a+b)^2 f\left(b+a\,\text{Cos}[e+f x]^2\right)}-\frac{\text{Cot}[e+f x]\,\text{Csc}[e+f x]}{2 (a+b) f\left(b+a\,\text{Cos}[e+f x]^2\right)}$$

Result (type 3, 468 leaves):

$$\frac{1}{32 (a+b)^3 f\left(a+b\,\text{Sec}[e+f x]^2\right)^2}(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}[e+f x]^3$$
$$\left(-8 b (a+b)-\frac{1}{\sqrt{a}}4\sqrt{b}\,(-3 a+b)\,\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f x}{2}\right]+\right.\right.\right.$$
$$\left.\left.\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right](a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}[e+f x]-\frac{1}{\sqrt{a}}4\sqrt{b}\,(-3 a+b)$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]$$
$$(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}[e+f x]-(a+b)\,(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]-$$
$$4 (a-3 b)\,(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]\right]\text{Sec}[e+f x]+$$
$$\left.4 (a-3 b)\,(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\text{Sec}[e+f x]+(a+b)\,(a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)$$

Problem 46: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Csc}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 197 leaves, 7 steps):

$$\frac{3\sqrt{a}\,(a-b)\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f x]}{\sqrt{b}}\right]}{2 (a+b)^4 f}-\frac{3\left(a^2-6 a b+b^2\right)\text{ArcTanh}[\text{Cos}[e+f x]]}{8 (a+b)^4 f}+$$
$$\frac{3 a (a-3 b)\,\text{Cos}[e+f x]}{8 (a+b)^3 f\left(b+a\,\text{Cos}[e+f x]^2\right)}-\frac{(a-5 b)\,\text{Cot}[e+f x]\,\text{Csc}[e+f x]}{8 (a+b)^2 f\left(b+a\,\text{Cos}[e+f x]^2\right)}-\frac{\text{Cot}[e+f x]\,\text{Csc}[e+f x]^3}{4 (a+b) f\left(b+a\,\text{Cos}[e+f x]^2\right)}$$

Result (type 3, 450 leaves):

$$\frac{1}{256\,(a+b)^4\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\left(96\,\sqrt{a}\,(a-b)\,\sqrt{b}\,\text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}-i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\,\left(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])+96\,\sqrt{a}\,(a-b)\,\sqrt{b}\,\text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}+i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\,\left(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])-2\,(a+b)\,\left(11\,a^2+43\,a\,b-4\,b^2+4\,\left(2\,a^2-5\,a\,b+5\,b^2\right)\text{Cos}[2\,(e+f\,x)]-3\,a\,(a-3\,b)\,\text{Cos}[4\,(e+f\,x)]\right)\,\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^3-24\,\left(a^2-6\,a\,b+b^2\right)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+24\,\left(a^2-6\,a\,b+b^2\right)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\right)\,\text{Sec}[e+f\,x]^4$$

- **Problem 47: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f\,x]^6}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\,dx$$

Optimal (type 3, 267 leaves, 8 steps):

$$\frac{\left(5\,a^3+60\,a^2\,b+120\,a\,b^2+64\,b^3\right)\,x}{16\,a^5}-\frac{\sqrt{b}\,(a+b)^{3/2}\,(3\,a+8\,b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{2\,a^5\,f}-\frac{\left(33\,a^2+82\,a\,b+48\,b^2\right)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{48\,a^3\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}+\frac{(9\,a+8\,b)\,\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]}{24\,a^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}+\frac{\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]^3}{6\,a\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}-\frac{b\,\left(19\,a^2+52\,a\,b+32\,b^2\right)\,\text{Tan}[e+f\,x]}{16\,a^4\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 2987 leaves):

$$-\left((a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Sec}[e+f\,x]^4\,\left(16\,x+\left(\left(-a^3+6\,a^2\,b+24\,a\,b^2+16\,b^3\right)\,\text{ArcTan}\left[\frac{\text{Sec}[f\,x]\,(\text{Cos}[2\,e]-i\,\text{Sin}[2\,e])\,(-(a+2\,b)\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])}{2\,\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right]\,(\text{Cos}[2\,e]-i\,\text{Sin}[2\,e])\right)\Big/\left(b\,(a+b)^{3/2}\,f\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)+\frac{\left(a^2+8\,a\,b+8\,b^2\right)\,((a+2\,b)\,\text{Sin}[2\,e]-a\,\text{Sin}[2\,f\,x])}{b\,(a+b)\,f\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}\right)\Big/\right.$$

$$\left(512\, a^2 \left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2\right)+\Bigg(3\,(a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^2\, \mathrm{Sec}[e+f\, x]^4$$

$$\Bigg(-64\,(a+2\, b)\, x+\Bigg(\left(a^4-16\, a^3\, b-144\, a^2\, b^2-256\, a\, b^3-128\, b^4\right) \mathrm{ArcTan}\Big[\frac{\mathrm{Sec}[f\, x]\,(\mathrm{Cos}[2\, e]-\mathrm{i}\, \mathrm{Sin}[2\, e])\,(-(a+2\, b)\, \mathrm{Sin}[f\, x]+a\, \mathrm{Sin}[2\, e+f\, x])}{2\, \sqrt{a+b}\, \sqrt{b\,(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^4}}\Big]$$

$$(\mathrm{Cos}[2\, e]-\mathrm{i}\, \mathrm{Sin}[2\, e])\Bigg)\Big/\left(b\,(a+b)^{3/2}\, f\, \sqrt{b\,(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^4}\right)+\frac{16\, a\, \mathrm{Cos}[2\, f\, x]\, \mathrm{Sin}[2\, e]}{f}+\frac{16\, a\, \mathrm{Cos}[2\, e]\, \mathrm{Sin}[2\, f\, x]}{f}-$$

$$\frac{\left(a^3+18\, a^2\, b+48\, a\, b^2+32\, b^3\right)\,((a+2\, b)\, \mathrm{Sin}[2\, e]-a\, \mathrm{Sin}[2\, f\, x])}{b\,(a+b)\, f\,(a+2\, b+a\, \mathrm{Cos}[2\,(e+f\, x)])\,(\mathrm{Cos}[e]-\mathrm{Sin}[e])\,(\mathrm{Cos}[e]+\mathrm{Sin}[e])}\Bigg)\Bigg)\Big/\left(4096\, a^3\left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2\right)+$$

$$\frac{3\,(a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^2\, \mathrm{Sec}[e+f\, x]^4\left(\frac{(a+2\, b)\, \mathrm{ArcTan}\left[\frac{\sqrt{b}\, \mathrm{Tan}[e+f\, x]}{\sqrt{a+b}}\right]}{(a+b)^{3/2}}-\frac{a\, \sqrt{b}\, \mathrm{Sin}[2\,(e+f\, x)]}{(a+b)\,(a+2\, b+a\, \mathrm{Cos}[2\,(e+f\, x)])}\right)}{2048\, b^{3/2}\, f\left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2}-$$

$$\frac{(a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^2\, \mathrm{Sec}[e+f\, x]^4\left(-\frac{a\, \mathrm{ArcTan}\left[\frac{\sqrt{b}\, \mathrm{Tan}[e+f\, x]}{\sqrt{a+b}}\right]}{(a+b)^{3/2}}+\frac{\sqrt{b}\,(a+2\, b)\, \mathrm{Sin}[2\,(e+f\, x)]}{(a+b)\,(a+2\, b+a\, \mathrm{Cos}[2\,(e+f\, x)])}\right)}{2048\, b^{3/2}\, f\left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2}+$$

$$\frac{1}{256\left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2}$$

$$(a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^2\, \mathrm{Sec}[e+f\, x]^4$$

$$\Bigg(\frac{1}{a+b}\left(-a^5+30\, a^4\, b+480\, a^3\, b^2+1600\, a^2\, b^3+1920\, a\, b^4+768\, b^5\right)$$

$$\Bigg(\Bigg(\mathrm{ArcTan}\Big[\mathrm{Sec}[f\, x]\left(\frac{\mathrm{Cos}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-\mathrm{i}\, b\, \mathrm{Sin}[4\, e]}}-\frac{\mathrm{i}\, \mathrm{Sin}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-\mathrm{i}\, b\, \mathrm{Sin}[4\, e]}}\right)$$

$$(-a\, \mathrm{Sin}[f\, x]-2\, b\, \mathrm{Sin}[f\, x]+a\, \mathrm{Sin}[2\, e+f\, x])\Big]\, \mathrm{Cos}[2\, e]\Bigg)\Big/\left(8\, a^4\, b\, \sqrt{a+b}\, f\, \sqrt{b\, \mathrm{Cos}[4\, e]-\mathrm{i}\, b\, \mathrm{Sin}[4\, e]}\right)-$$

$$\Bigg(\mathrm{i}\, \mathrm{ArcTan}\Big[\mathrm{Sec}[f\, x]\left(\frac{\mathrm{Cos}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-\mathrm{i}\, b\, \mathrm{Sin}[4\, e]}}-\frac{\mathrm{i}\, \mathrm{Sin}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-\mathrm{i}\, b\, \mathrm{Sin}[4\, e]}}\right)$$

$$(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\Big] \operatorname{Sin}[2 e]\Big)\Big/\left(8 a^4 b \sqrt{a+b}\, f \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}\right)\Bigg)+$$

$$\frac{1}{8 a^4 b (a+b) f (a+2 b+a \operatorname{Cos}[2 e+2 f x])} \operatorname{Sec}[2 e] \big(160 a^4 b f x \operatorname{Cos}[2 e]+1248 a^3 b^2 f x \operatorname{Cos}[2 e]+3392 a^2 b^3 f x \operatorname{Cos}[2 e]+$$
$$3840 a b^4 f x \operatorname{Cos}[2 e]+1536 b^5 f x \operatorname{Cos}[2 e]+80 a^4 b f x \operatorname{Cos}[2 f x]+464 a^3 b^2 f x \operatorname{Cos}[2 f x]+768 a^2 b^3 f x \operatorname{Cos}[2 f x]+$$
$$384 a b^4 f x \operatorname{Cos}[2 f x]+80 a^4 b f x \operatorname{Cos}[4 e+2 f x]+464 a^3 b^2 f x \operatorname{Cos}[4 e+2 f x]+768 a^2 b^3 f x \operatorname{Cos}[4 e+2 f x]+$$
$$384 a b^4 f x \operatorname{Cos}[4 e+2 f x]+a^5 \operatorname{Sin}[2 e]+34 a^4 b \operatorname{Sin}[2 e]+224 a^3 b^2 \operatorname{Sin}[2 e]+576 a^2 b^3 \operatorname{Sin}[2 e]+640 a b^4 \operatorname{Sin}[2 e]+$$
$$256 b^5 \operatorname{Sin}[2 e]-a^5 \operatorname{Sin}[2 f x]-62 a^4 b \operatorname{Sin}[2 f x]-318 a^3 b^2 \operatorname{Sin}[2 f x]-512 a^2 b^3 \operatorname{Sin}[2 f x]-256 a b^4 \operatorname{Sin}[2 f x]-$$
$$30 a^4 b \operatorname{Sin}[4 e+2 f x]-158 a^3 b^2 \operatorname{Sin}[4 e+2 f x]-256 a^2 b^3 \operatorname{Sin}[4 e+2 f x]-128 a b^4 \operatorname{Sin}[4 e+2 f x]-12 a^4 b \operatorname{Sin}[2 e+4 f x]-$$
$$36 a^3 b^2 \operatorname{Sin}[2 e+4 f x]-24 a^2 b^3 \operatorname{Sin}[2 e+4 f x]-12 a^4 b \operatorname{Sin}[6 e+4 f x]-36 a^3 b^2 \operatorname{Sin}[6 e+4 f x]-24 a^2 b^3 \operatorname{Sin}[6 e+4 f x]+$$
$$2 a^4 b \operatorname{Sin}[4 e+6 f x]+2 a^3 b^2 \operatorname{Sin}[4 e+6 f x]+2 a^4 b \operatorname{Sin}[8 e+6 f x]+2 a^3 b^2 \operatorname{Sin}[8 e+6 f x]\big)\Bigg)+\frac{1}{512 \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}$$

$$(a+2 b+a \operatorname{Cos}[2 e+2 f x])^2 \operatorname{Sec}[e+f x]^4 \Bigg(-\frac{1}{a+b}\left(a^6-48 a^5 b-1200 a^4 b^2-6400 a^3 b^3-13440 a^2 b^4-12288 a b^5-4096 b^6\right)$$

$$\Bigg(\Bigg(\operatorname{ArcTan}\Big[\operatorname{Sec}[f x]\left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}}-\frac{\mathrm{i} \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}}\right)$$
$$(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\Big] \operatorname{Cos}[2 e]\Bigg)\Big/\left(8 a^5 b \sqrt{a+b}\, f \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}\right)-$$

$$\Bigg(\mathrm{i} \operatorname{ArcTan}\Big[\operatorname{Sec}[f x]\left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}}-\frac{\mathrm{i} \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}}\right)$$
$$(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\Big] \operatorname{Sin}[2 e]\Bigg)\Big/\left(8 a^5 b \sqrt{a+b}\, f \sqrt{b \operatorname{Cos}[4 e]-\mathrm{i}\, b \operatorname{Sin}[4 e]}\right)\Bigg)-$$

$$\frac{1}{24 a^5 b (a+b) f (a+2 b+a \operatorname{Cos}[2 e+2 f x])} \operatorname{Sec}[2 e] \big(-960 a^5 b f x \operatorname{Cos}[2 e]-10944 a^4 b^2 f x \operatorname{Cos}[2 e]-44544 a^3 b^3 f x \operatorname{Cos}[2 e]-$$
$$83712 a^2 b^4 f x \operatorname{Cos}[2 e]-73728 a b^5 f x \operatorname{Cos}[2 e]-24576 b^6 f x \operatorname{Cos}[2 e]-480 a^5 b f x \operatorname{Cos}[2 f x]-4512 a^4 b^2 f x \operatorname{Cos}[2 f x]-$$
$$13248 a^3 b^3 f x \operatorname{Cos}[2 f x]-15360 a^2 b^4 f x \operatorname{Cos}[2 f x]-6144 a b^5 f x \operatorname{Cos}[2 f x]-480 a^5 b f x \operatorname{Cos}[4 e+2 f x]-$$
$$4512 a^4 b^2 f x \operatorname{Cos}[4 e+2 f x]-13248 a^3 b^3 f x \operatorname{Cos}[4 e+2 f x]-15360 a^2 b^4 f x \operatorname{Cos}[4 e+2 f x]-6144 a b^5 f x \operatorname{Cos}[4 e+2 f x]-$$
$$3 a^6 \operatorname{Sin}[2 e]-156 a^5 b \operatorname{Sin}[2 e]-1500 a^4 b^2 \operatorname{Sin}[2 e]-5760 a^3 b^3 \operatorname{Sin}[2 e]-10560 a^2 b^4 \operatorname{Sin}[2 e]-9216 a b^5 \operatorname{Sin}[2 e]-$$
$$3072 b^6 \operatorname{Sin}[2 e]+3 a^6 \operatorname{Sin}[2 f x]+366 a^5 b \operatorname{Sin}[2 f x]+3000 a^4 b^2 \operatorname{Sin}[2 f x]+8400 a^3 b^3 \operatorname{Sin}[2 f x]+9600 a^2 b^4 \operatorname{Sin}[2 f x]+$$
$$3840 a b^5 \operatorname{Sin}[2 f x]+216 a^5 b \operatorname{Sin}[4 e+2 f x]+1800 a^4 b^2 \operatorname{Sin}[4 e+2 f x]+5040 a^3 b^3 \operatorname{Sin}[4 e+2 f x]+5760 a^2 b^4 \operatorname{Sin}[4 e+2 f x]+$$
$$2304 a b^5 \operatorname{Sin}[4 e+2 f x]+76 a^5 b \operatorname{Sin}[2 e+4 f x]+460 a^4 b^2 \operatorname{Sin}[2 e+4 f x]+768 a^3 b^3 \operatorname{Sin}[2 e+4 f x]+$$
$$384 a^2 b^4 \operatorname{Sin}[2 e+4 f x]+76 a^5 b \operatorname{Sin}[6 e+4 f x]+460 a^4 b^2 \operatorname{Sin}[6 e+4 f x]+768 a^3 b^3 \operatorname{Sin}[6 e+4 f x]+384 a^2 b^4 \operatorname{Sin}[6 e+4 f x]-$$
$$16 a^5 b \operatorname{Sin}[4 e+6 f x]-48 a^4 b^2 \operatorname{Sin}[4 e+6 f x]-32 a^3 b^3 \operatorname{Sin}[4 e+6 f x]-16 a^5 b \operatorname{Sin}[8 e+6 f x]-48 a^4 b^2 \operatorname{Sin}[8 e+6 f x]-$$
$$32 a^3 b^3 \operatorname{Sin}[8 e+6 f x]+4 a^5 b \operatorname{Sin}[6 e+8 f x]+4 a^4 b^2 \operatorname{Sin}[6 e+8 f x]+4 a^5 b \operatorname{Sin}[10 e+8 f x]+4 a^4 b^2 \operatorname{Sin}[10 e+8 f x]\big)\Bigg)$$

- **Problem 48: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f\,x]^4}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\,dx$$

Optimal (type 3, 191 leaves, 7 steps) :

$$\frac{3\left(a^2+8\,a\,b+8\,b^2\right)x}{8\,a^4}-\frac{3\,\sqrt{b}\,\sqrt{a+b}\,(a+2\,b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{2\,a^4\,f}-\frac{(5\,a+6\,b)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{8\,a^2\,f\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}+\frac{\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]}{4\,a\,f\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}-\frac{3\,b\,(3\,a+4\,b)\,\text{Tan}[e+f\,x]}{8\,a^3\,f\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 1354 leaves) :

$$-\left((a+2b+a\operatorname{Cos}[2e+2fx])^2\operatorname{Sec}[e+fx]^4\left(16x+\right.\right.$$

$$\left(\left(-a^3+6a^2b+24ab^2+16b^3\right)\operatorname{ArcTan}\left[\frac{\operatorname{Sec}[fx]\,(\operatorname{Cos}[2e]-\mathrm{i}\operatorname{Sin}[2e])\,(-(a+2b)\operatorname{Sin}[fx]+a\operatorname{Sin}[2e+fx])}{2\sqrt{a+b}\,\sqrt{b\,(\operatorname{Cos}[e]-\mathrm{i}\operatorname{Sin}[e])^4}}\right](\operatorname{Cos}[2e]-\mathrm{i}\operatorname{Sin}[2e])\right)\Big/$$

$$\left.\left.\left(b\,(a+b)^{3/2}f\sqrt{b\,(\operatorname{Cos}[e]-\mathrm{i}\operatorname{Sin}[e])^4}\right)+\frac{\left(a^2+8ab+8b^2\right)((a+2b)\operatorname{Sin}[2e]-a\operatorname{Sin}[2fx])}{b\,(a+b)\,f\,(a+2b+a\operatorname{Cos}[2(e+fx)])\,(\operatorname{Cos}[e]-\operatorname{Sin}[e])\,(\operatorname{Cos}[e]+\operatorname{Sin}[e])}\right)\right)\Big/$$

$$\left(256a^2\left(a+b\operatorname{Sec}[e+fx]^2\right)^2\right)+\frac{3\,(a+2b+a\operatorname{Cos}[2e+2fx])^2\operatorname{Sec}[e+fx]^4\left(\frac{(a+2b)\operatorname{ArcTan}\left[\frac{\sqrt{b}\operatorname{Tan}[e+fx]}{\sqrt{a+b}}\right]}{(a+b)^{3/2}}-\frac{a\sqrt{b}\operatorname{Sin}[2(e+fx)]}{(a+b)\,(a+2b+a\operatorname{Cos}[2(e+fx)])}\right)}{1024\,b^{3/2}f\left(a+b\operatorname{Sec}[e+fx]^2\right)^2}+$$

$$\frac{1}{128\left(a+b\operatorname{Sec}[e+fx]^2\right)^2}(a+2b+a\operatorname{Cos}[2e+2fx])^2\operatorname{Sec}[e+fx]^4\left(\frac{1}{a+b}\left(-a^5+30a^4b+480a^3b^2+1600a^2b^3+1920ab^4+768b^5\right)\right.$$

$$\left(\left(\operatorname{ArcTan}\left[\operatorname{Sec}[fx]\left(\frac{\operatorname{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\operatorname{Cos}[4e]-\mathrm{i}\,b\operatorname{Sin}[4e]}}-\frac{\mathrm{i}\operatorname{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\operatorname{Cos}[4e]-\mathrm{i}\,b\operatorname{Sin}[4e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\operatorname{Sin}[fx]-2b\operatorname{Sin}[fx]+a\operatorname{Sin}[2e+fx])\right]\operatorname{Cos}[2e]\right)\Big/\left(8a^4b\sqrt{a+b}\;f\sqrt{b\operatorname{Cos}[4e]-\mathrm{i}\,b\operatorname{Sin}[4e]}\right)-$$

$$\left(\mathrm{i}\operatorname{ArcTan}\left[\operatorname{Sec}[fx]\left(\frac{\operatorname{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\operatorname{Cos}[4e]-\mathrm{i}\,b\operatorname{Sin}[4e]}}-\frac{\mathrm{i}\operatorname{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\operatorname{Cos}[4e]-\mathrm{i}\,b\operatorname{Sin}[4e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\operatorname{Sin}[fx]-2b\operatorname{Sin}[fx]+a\operatorname{Sin}[2e+fx])\right]\operatorname{Sin}[2e]\right)\Big/\left(8a^4b\sqrt{a+b}\;f\sqrt{b\operatorname{Cos}[4e]-\mathrm{i}\,b\operatorname{Sin}[4e]}\right)\right)+$$

$$\frac{1}{8a^4b\,(a+b)\,f\,(a+2b+a\operatorname{Cos}[2e+2fx])}\operatorname{Sec}[2e]\left(160a^4bfx\operatorname{Cos}[2e]+1248a^3b^2fx\operatorname{Cos}[2e]+3392a^2b^3fx\operatorname{Cos}[2e]+\right.$$
$$3840ab^4fx\operatorname{Cos}[2e]+1536b^5fx\operatorname{Cos}[2e]+80a^4bfx\operatorname{Cos}[2fx]+464a^3b^2fx\operatorname{Cos}[2fx]+768a^2b^3fx\operatorname{Cos}[2fx]+$$
$$384ab^4fx\operatorname{Cos}[2fx]+80a^4bfx\operatorname{Cos}[4e+2fx]+464a^3b^2fx\operatorname{Cos}[4e+2fx]+768a^2b^3fx\operatorname{Cos}[4e+2fx]+$$
$$384ab^4fx\operatorname{Cos}[4e+2fx]+a^5\operatorname{Sin}[2e]+34a^4b\operatorname{Sin}[2e]+224a^3b^2\operatorname{Sin}[2e]+576a^2b^3\operatorname{Sin}[2e]+640ab^4\operatorname{Sin}[2e]+$$
$$256b^5\operatorname{Sin}[2e]-a^5\operatorname{Sin}[2fx]-62a^4b\operatorname{Sin}[2fx]-318a^3b^2\operatorname{Sin}[2fx]-512a^2b^3\operatorname{Sin}[2fx]-256ab^4\operatorname{Sin}[2fx]-$$
$$30a^4b\operatorname{Sin}[4e+2fx]-158a^3b^2\operatorname{Sin}[4e+2fx]-256a^2b^3\operatorname{Sin}[4e+2fx]-128ab^4\operatorname{Sin}[4e+2fx]-$$
$$12a^4b\operatorname{Sin}[2e+4fx]-36a^3b^2\operatorname{Sin}[2e+4fx]-24a^2b^3\operatorname{Sin}[2e+4fx]-12a^4b\operatorname{Sin}[6e+4fx]-36a^3b^2\operatorname{Sin}[6e+4fx]-$$
$$\left.\left.24a^2b^3\operatorname{Sin}[6e+4fx]+2a^4b\operatorname{Sin}[4e+6fx]+2a^3b^2\operatorname{Sin}[4e+6fx]+2a^4b\operatorname{Sin}[8e+6fx]+2a^3b^2\operatorname{Sin}[8e+6fx]\right)\right)$$

- **Problem 49: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 130 leaves, 6 steps):

$$\frac{(a+4 b)\,x}{2 a^3}-\frac{\sqrt{b}\,(3 a+4 b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2 a^3\sqrt{a+b}\,f}-\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{2 a f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}-\frac{b\,\text{Tan}[e+f x]}{a^2 f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 825 leaves):

$$-\left((a+2b+a\cos[2e+2fx])^2\sec[e+fx]^4\left(16x+\left((-a^3+6a^2b+24ab^2+16b^3)\,\text{ArcTan}\left[\frac{\sec[fx]\,(\cos[2e]-i\sin[2e])\,(-(a+2b)\sin[fx]+a\sin[2e+fx])}{2\sqrt{a+b}\,\sqrt{b\,(\cos[e]-i\sin[e])^4}}\right](\cos[2e]-i\sin[2e])\right)\Big/\left(b\,(a+b)^{3/2}f\sqrt{b\,(\cos[e]-i\sin[e])^4}\right)+\frac{(a^2+8ab+8b^2)\,((a+2b)\sin[2e]-a\sin[2fx])}{b\,(a+b)\,f\,(a+2b+a\cos[2(e+fx)])\,(\cos[e]-\sin[e])\,(\cos[e]+\sin[e])}\right)\right)\Big/$$

$$\left(128a^2\left(a+b\sec[e+fx]^2\right)^2\right)-\left((a+2b+a\cos[2e+2fx])^2\sec[e+fx]^4\right.$$

$$\left(-64(a+2b)x+\left((a^4-16a^3b-144a^2b^2-256ab^3-128b^4)\,\text{ArcTan}\left[\frac{\sec[fx]\,(\cos[2e]-i\sin[2e])\,(-(a+2b)\sin[fx]+a\sin[2e+fx])}{2\sqrt{a+b}\,\sqrt{b\,(\cos[e]-i\sin[e])^4}}\right]\right.\right.$$

$$\left.(\cos[2e]-i\sin[2e])\right)\Big/\left(b\,(a+b)^{3/2}f\sqrt{b\,(\cos[e]-i\sin[e])^4}\right)+\frac{16a\cos[2fx]\sin[2e]}{f}+\frac{16a\cos[2e]\sin[2fx]}{f}-$$

$$\left.\left.\frac{(a^3+18a^2b+48ab^2+32b^3)\,((a+2b)\sin[2e]-a\sin[2fx])}{b\,(a+b)\,f\,(a+2b+a\cos[2(e+fx)])\,(\cos[e]-\sin[e])\,(\cos[e]+\sin[e])}\right)\right)\Big/\left(256a^3\left(a+b\sec[e+fx]^2\right)^2\right)+$$

$$\frac{(a+2b+a\cos[2e+2fx])^2\sec[e+fx]^4\left(\frac{(a+2b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\tan[e+fx]}{\sqrt{a+b}}\right]}{(a+b)^{3/2}}-\frac{a\sqrt{b}\,\sin[2(e+fx)]}{(a+b)\,(a+2b+a\cos[2(e+fx)])}\right)}{128\,b^{3/2}f\left(a+b\sec[e+fx]^2\right)^2}+$$

$$\frac{(a+2b+a\cos[2e+2fx])^2\sec[e+fx]^4\left(-\frac{a\,\text{ArcTan}\left[\frac{\sqrt{b}\,\tan[e+fx]}{\sqrt{a+b}}\right]}{(a+b)^{3/2}}+\frac{\sqrt{b}\,(a+2b)\sin[2(e+fx)]}{(a+b)\,(a+2b+a\cos[2(e+fx)])}\right)}{256\,b^{3/2}f\left(a+b\sec[e+fx]^2\right)^2}$$

- **Problem 50: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\left(a+b\sec[e+fx]^2\right)^2}\,dx$$

Optimal (type 3, 92 leaves, 5 steps):

$$\frac{x}{a^2}-\frac{\sqrt{b}\,(3a+2b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2a^2(a+b)^{3/2} f}-\frac{b\,\text{Tan}[e+f x]}{2a(a+b) f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 240 leaves):

$$\frac{1}{8a^2\left(a+b\,\text{Sec}[e+f x]^2\right)^2}(a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]^4\left(2x(a+2b+a\,\text{Cos}[2(e+f x)])+\left(b(3a+2b)\,\text{ArcTan}\left[\frac{\text{Sec}[f x](\text{Cos}[2e]-i\,\text{Sin}[2e])(-(a+2b)\,\text{Sin}[f x]+a\,\text{Sin}[2e+f x])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](a+2b+a\,\text{Cos}[2(e+f x)])(\text{Cos}[2e]-i\,\text{Sin}[2e])\right)\Big/\left((a+b)^{3/2} f\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)+\frac{b((a+2b)\,\text{Sin}[2e]-a\,\text{Sin}[2f x])}{(a+b) f(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])}\right)$$

- **Problem 51: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 91 leaves, 4 steps):

$$-\frac{3\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2(a+b)^{5/2} f}-\frac{3\,\text{Cot}[e+f x]}{2(a+b)^2 f}+\frac{\text{Cot}[e+f x]}{2(a+b) f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 242 leaves):

$$\left((a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]^4\left(\left(3b\,\text{ArcTan}\left[\frac{\text{Sec}[f x](\text{Cos}[2e]-i\,\text{Sin}[2e])(-(a+2b)\,\text{Sin}[f x]+a\,\text{Sin}[2e+f x])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](a+2b+a\,\text{Cos}[2(e+f x)])(\text{Cos}[2e]-i\,\text{Sin}[2e])\right)\Big/\left(\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)+2(a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Csc}[e]\,\text{Csc}[e+f x]\,\text{Sin}[f x]+\frac{b((a+2b)\,\text{Sin}[2e]-a\,\text{Sin}[2f x])}{a(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])}\right)\right)\Big/\left(8(a+b)^2 f\left(a+b\,\text{Sec}[e+f x]^2\right)^2\right)$$

Problem 52: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Csc}[e+f x]^4}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 123 leaves, 5 steps):

$$-\frac{(3a-2b)\sqrt{b}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2(a+b)^{7/2} f}-\frac{(a-b)\,\mathrm{Cot}[e+f x]}{(a+b)^3 f}-\frac{\mathrm{Cot}[e+f x]^3}{3(a+b)^2 f}-\frac{a b\,\mathrm{Tan}[e+f x]}{2(a+b)^3 f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)}$$

Result (type 3, 637 leaves):

$$-\frac{(a+2b+a\,\mathrm{Cos}[2e+2f x])^2\,\mathrm{Cot}[e]\,\mathrm{Csc}[e+f x]^2\,\mathrm{Sec}[e+f x]^4}{12(a+b)^2 f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2}+\Bigg((3a-2b)(a+2b+a\,\mathrm{Cos}[2e+2f x])^2$$
$$\mathrm{Sec}[e+f x]^4\Bigg(\Bigg(b\,\mathrm{ArcTan}\Big[\mathrm{Sec}[f x]\left(\frac{\mathrm{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}-\frac{i\,\mathrm{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}\right)$$
$$(-a\,\mathrm{Sin}[f x]-2b\,\mathrm{Sin}[f x]+a\,\mathrm{Sin}[2e+f x])\Big]\,\mathrm{Cos}[2e]\Bigg)\Big/\left(8\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}\right)-$$
$$\Bigg(i\,b\,\mathrm{ArcTan}\Big[\mathrm{Sec}[f x]\left(\frac{\mathrm{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}-\frac{i\,\mathrm{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}\right)$$
$$(-a\,\mathrm{Sin}[f x]-2b\,\mathrm{Sin}[f x]+a\,\mathrm{Sin}[2e+f x])\Big]\,\mathrm{Sin}[2e]\Bigg)\Big/\left(8\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}\right)\Bigg)\Bigg)\Big/$$
$$\left((a+b)^3\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2\right)+\frac{(a+2b+a\,\mathrm{Cos}[2e+2f x])^2\,\mathrm{Csc}[e]\,\mathrm{Csc}[e+f x]^3\,\mathrm{Sec}[e+f x]^4\,\mathrm{Sin}[f x]}{12(a+b)^2 f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2}+$$
$$\frac{(a+2b+a\,\mathrm{Cos}[2e+2f x])^2\,\mathrm{Csc}[e]\,\mathrm{Csc}[e+f x]\,\mathrm{Sec}[e+f x]^4\,(a\,\mathrm{Sin}[f x]-2b\,\mathrm{Sin}[f x])}{6(a+b)^3 f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2}+$$
$$\frac{(a+2b+a\,\mathrm{Cos}[2e+2f x])\,\mathrm{Sec}[e+f x]^4\left(a b\,\mathrm{Sin}[2e]+2b^2\,\mathrm{Sin}[2e]-a b\,\mathrm{Sin}[2f x]\right)}{8(a+b)^3 f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2(\mathrm{Cos}[e]-\mathrm{Sin}[e])(\mathrm{Cos}[e]+\mathrm{Sin}[e])}$$

Problem 53: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Csc}[e+f x]^6}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 188 leaves, 6 steps):

$$-\frac{a\,(3a-4b)\,\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2\,(a+b)^{9/2}\,f}-\frac{\left(5a^2-10ab-b^2\right)\text{Cot}[e+f x]}{5\,(a+b)^4\,f}-\frac{(10a+3b)\,\text{Cot}[e+f x]^3}{15\,(a+b)^3\,f}-\frac{\text{Cot}[e+f x]^5}{5\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)}-\frac{b\,\left(5a^2+2b^2\right)\text{Tan}[e+f x]}{10\,(a+b)^4\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 777 leaves):

$$\frac{1}{7680\,(a+b)^4\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^2}(a+2b+a\,\text{Cos}[2\,(e+f x)])\,\text{Sec}[e+f x]^4\left(\left(960\,a\,(3a-4b)\,b\,\text{ArcTan}\left[\frac{\text{Sec}[f x]\,(\text{Cos}[2e]-i\,\text{Sin}[2e])\,(-(a+2b)\,\text{Sin}[f x]+a\,\text{Sin}[2e+f x])}{2\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right]\right.\right.$$
$$\left.(a+2b+a\,\text{Cos}[2\,(e+f x)])\,(\text{Cos}[2e]-i\,\text{Sin}[2e])\right)\Big/\left(\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)-\text{Csc}[e]\,\text{Csc}[e+f x]^5\,\text{Sec}[2e]$$
$$\left(10a\left(16a^2+34ab+123b^2\right)\text{Sin}[f x]-a\left(16a^2-223ab+1336b^2\right)\text{Sin}[3 f x]+240a^3\,\text{Sin}[2e-f x]+640a^2 b\,\text{Sin}[2e-f x]-\right.$$
$$1460ab^2\,\text{Sin}[2e-f x]+240b^3\,\text{Sin}[2e-f x]-240a^3\,\text{Sin}[2e+f x]-715a^2 b\,\text{Sin}[2e+f x]+860ab^2\,\text{Sin}[2e+f x]-$$
$$240b^3\,\text{Sin}[2e+f x]+160a^3\,\text{Sin}[4e+f x]+415a^2 b\,\text{Sin}[4e+f x]+1830ab^2\,\text{Sin}[4e+f x]+165a^2 b\,\text{Sin}[2e+3 f x]-$$
$$30ab^2\,\text{Sin}[2e+3 f x]+120b^3\,\text{Sin}[2e+3 f x]-16a^3\,\text{Sin}[4e+3 f x]+208a^2 b\,\text{Sin}[4e+3 f x]-1036ab^2\,\text{Sin}[4e+3 f x]+$$
$$180a^2 b\,\text{Sin}[6e+3 f x]-330ab^2\,\text{Sin}[6e+3 f x]+120b^3\,\text{Sin}[6e+3 f x]+48a^3\,\text{Sin}[2e+5 f x]-268a^2 b\,\text{Sin}[2e+5 f x]+$$
$$290ab^2\,\text{Sin}[2e+5 f x]-24b^3\,\text{Sin}[2e+5 f x]+48a^3\,\text{Sin}[6e+5 f x]-223a^2 b\,\text{Sin}[6e+5 f x]+230ab^2\,\text{Sin}[6e+5 f x]-$$
$$24b^3\,\text{Sin}[6e+5 f x]-45a^2 b\,\text{Sin}[8e+5 f x]+60ab^2\,\text{Sin}[8e+5 f x]-16a^3\,\text{Sin}[4e+7 f x]+83a^2 b\,\text{Sin}[4e+7 f x]-$$
$$\left.\left.6ab^2\,\text{Sin}[4e+7 f x]-15a^2 b\,\text{Sin}[6e+7 f x]-16a^3\,\text{Sin}[8e+7 f x]+68a^2 b\,\text{Sin}[8e+7 f x]-6ab^2\,\text{Sin}[8e+7 f x]\right)\right)$$

Problem 54: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sin}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 214 leaves, 6 steps):

$$\frac{\sqrt{b}\,\left(15a^2+70ab+63b^2\right)\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f x]}{\sqrt{b}}\right]}{8\,a^{11/2}\,f}-\frac{\left(3a^2+14ab+13b^2\right)\text{Cos}[e+f x]}{2\,a^5\,f}+\frac{(a+3b)\,(3a+5b)\,\text{Cos}[e+f x]^3}{12\,a^4\,b\,f}-\frac{\text{Cos}[e+f x]^5}{5\,a^3\,f}-\frac{(a+b)^2\,\text{Cos}[e+f x]^7}{4\,a^2\,b\,f\,\left(b+a\,\text{Cos}[e+f x]^2\right)^2}-\frac{b\,(a+b)\,(3a+11b)\,\text{Cos}[e+f x]}{8\,a^5\,f\,\left(b+a\,\text{Cos}[e+f x]^2\right)}$$

Result (type 3, 1641 leaves):

$$\frac{1}{491520\, a^{11/2}\, b^{5/2}\, f\, \left(a + b\, \text{Sec}[e + f x]^2\right)^3}$$

$$(a + 2 b + a \text{Cos}[2 (e + f x)]) \text{Sec}[e + f x]^6 \Bigg(-900 a^{11/2} b^{3/2} \text{Cos}[e + f x] - 109000 a^{9/2} b^{5/2} \text{Cos}[e + f x] - 936000 a^{7/2} b^{7/2} \text{Cos}[e + f x] -$$

$$2803072 a^{5/2} b^{9/2} \text{Cos}[e + f x] - 3763200 a^{3/2} b^{11/2} \text{Cos}[e + f x] - 1935360 \sqrt{a}\, b^{13/2} \text{Cos}[e + f x] -$$
$$900 a^{11/2} b^{3/2} \text{Cos}[e + f x] \text{Cos}[2 (e + f x)] + 900 a^{9/2} b^{3/2} \text{Cos}[e + f x] (a + 2 b + a \text{Cos}[2 (e + f x)]) +$$
$$24000 a^{7/2} b^{5/2} \text{Cos}[e + f x] (a + 2 b + a \text{Cos}[2 (e + f x)]) + 43200 a^{5/2} b^{7/2} \text{Cos}[e + f x] (a + 2 b + a \text{Cos}[2 (e + f x)]) +$$
$$225 a^5 \text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} - i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} - \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 115200 a^2 b^3$$
$$\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} - i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} - \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 537600 a b^4 \text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} - i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] +$$
$$\text{Cos}[e] \Big(\sqrt{a} - \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big] (a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 483840 b^5$$
$$\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} - i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} - \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 +$$
$$225 a^5 \text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} + i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} + \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 115200 a^2 b^3$$
$$\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} + i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} + \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 537600 a b^4$$
$$\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} + i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} + \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 483840 b^5$$
$$\text{ArcTan}\Big[\frac{1}{\sqrt{b}}\Big(\Big(-\sqrt{a} + i \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2}\Big) \text{Sin}[e] \text{Tan}\Big[\frac{f x}{2}\Big] + \text{Cos}[e] \Big(\sqrt{a} + \sqrt{a + b} \sqrt{(\text{Cos}[e] - i \text{Sin}[e])^2} \text{Tan}\Big[\frac{f x}{2}\Big]\Big)\Big)\Big]$$
$$(a + 2 b + a \text{Cos}[2 (e + f x)])^2 - 225 a^5 \text{ArcTan}\Big[\frac{\sqrt{a} - \sqrt{a + b} \text{Tan}\big[\frac{1}{2} (e + f x)\big]}{\sqrt{b}}\Big] (a + 2 b + a \text{Cos}[2 (e + f x)])^2 -$$
$$225 a^5 \text{ArcTan}\Big[\frac{\sqrt{a} + \sqrt{a + b} \text{Tan}\big[\frac{1}{2} (e + f x)\big]}{\sqrt{b}}\Big] (a + 2 b + a \text{Cos}[2 (e + f x)])^2 + 19200 a^{5/2} b^{5/2} \text{Cos}[e] \text{Cos}[f x] (a + 2 b + a \text{Cos}[2 (e + f x)])^2 -$$

$$20352\, a^{9/2} b^{5/2} \text{Cos}[e+f x] \text{Cos}[4 (e+f x)] - 115712\, a^{7/2} b^{7/2} \text{Cos}[e+f x] \text{Cos}[4 (e+f x)] -$$
$$129024\, a^{5/2} b^{9/2} \text{Cos}[e+f x] \text{Cos}[4 (e+f x)] + 2048\, a^{9/2} b^{5/2} \text{Cos}[e+f x] \text{Cos}[6 (e+f x)] + 4608\, a^{7/2} b^{7/2} \text{Cos}[e+f x] \text{Cos}[6 (e+f x)] -$$
$$384\, a^{9/2} b^{5/2} \text{Cos}[e+f x] \text{Cos}[8 (e+f x)] - 19200\, a^{5/2} b^{5/2} (a+2 b+a \text{Cos}[2 (e+f x)])^2 \text{Sin}[e] \text{Sin}[f x] -$$
$$32496\, a^{9/2} b^{5/2} \text{Csc}[e+f x] \text{Sin}[4 (e+f x)] - 252080\, a^{7/2} b^{7/2} \text{Csc}[e+f x] \text{Sin}[4 (e+f x)] -$$
$$\left. 577024\, a^{5/2} b^{9/2} \text{Csc}[e+f x] \text{Sin}[4 (e+f x)] - 403200\, a^{3/2} b^{11/2} \text{Csc}[e+f x] \text{Sin}[4 (e+f x)] \right)$$

Problem 55: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sin}[e+f x]^3}{\left(a+b \text{Sec}[e+f x]^2\right)^3} \, dx$$

Optimal (type 3, 154 leaves, 6 steps):

$$\frac{5 \sqrt{b} (3 a+7 b) \text{ArcTan}\left[\frac{\sqrt{a} \text{Cos}[e+f x]}{\sqrt{b}}\right]}{8 a^{9/2} f} - \frac{(a+3 b) \text{Cos}[e+f x]}{a^4 f} + \frac{\text{Cos}[e+f x]^3}{3 a^3 f} + \frac{b^2 (a+b) \text{Cos}[e+f x]}{4 a^4 f \left(b+a \text{Cos}[e+f x]^2\right)^2} - \frac{b (9 a+13 b) \text{Cos}[e+f x]}{8 a^4 f \left(b+a \text{Cos}[e+f x]^2\right)}$$

Result (type 3, 1392 leaves):

$$\left(3 \left(-\frac{3 \text{ArcTan}\left[\frac{\sqrt{a}-\sqrt{a+b} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{b}}\right]}{\sqrt{a}} - \frac{3 \text{ArcTan}\left[\frac{\sqrt{a}+\sqrt{a+b} \text{Tan}\left[\frac{1}{2} (e+f x)\right]}{\sqrt{b}}\right]}{\sqrt{a}} - \frac{2 \sqrt{b} \text{Cos}[e+f x] (3 a+10 b+3 a \text{Cos}[2 (e+f x)])}{(a+2 b+a \text{Cos}[2 (e+f x)])^2}\right)\right.$$
$$\left.(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6\right) \Big/ \left(8192 b^{5/2} f \left(a+b \text{Sec}[e+f x]^2\right)^3\right) + \frac{1}{2048 a^{3/2} b^{5/2} f \left(a+b \text{Sec}[e+f x]^2\right)^3} \left((3 a-4 b) \text{ArcTan}\left[\frac{1}{\sqrt{b}}\right.\right.$$
$$\left.\left(\left(-\sqrt{a}-i \sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}\right) \text{Sin}[e] \text{Tan}\left[\frac{f x}{2}\right] + \text{Cos}[e] \left(\sqrt{a}-\sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2} \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right] + (3 a-4 b)$$
$$\text{ArcTan}\left[\frac{1}{\sqrt{b}} \left(\left(-\sqrt{a}+i \sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}\right) \text{Sin}[e] \text{Tan}\left[\frac{f x}{2}\right] + \text{Cos}[e] \left(\sqrt{a}+\sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2} \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right] +$$
$$\left.\frac{2 \sqrt{a} \sqrt{b} \text{Cos}[e+f x] \left(3 a^2+6 a b+8 b^2+a (3 a-4 b) \text{Cos}[2 (e+f x)]\right)}{(a+2 b+a \text{Cos}[2 (e+f x)])^2}\right) (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6 -$$
$$\frac{1}{49152 a^{9/2} b^{5/2} f \left(a+b \text{Sec}[e+f x]^2\right)^3} \left(-3 \left(3 a^4-40 a^3 b+720 a^2 b^2+6720 a b^3+8960 b^4\right)\right.$$
$$\text{ArcTan}\left[\frac{1}{\sqrt{b}} \left(\left(-\sqrt{a}-i \sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2}\right) \text{Sin}[e] \text{Tan}\left[\frac{f x}{2}\right] + \text{Cos}[e] \left(\sqrt{a}-\sqrt{a+b} \sqrt{(\text{Cos}[e]-i \text{Sin}[e])^2} \text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right] -$$
$$3 \left(3 a^4-40 a^3 b+720 a^2 b^2+6720 a b^3+8960 b^4\right)$$

$$\text{ArcTan}\left[\frac{1}{\sqrt{b}}\left(\left(-\sqrt{a}+i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]-$$

$$\left(2\sqrt{a}\sqrt{b}\,\text{Cos}[e+f\,x]\left(9a^5-90a^4b-10144a^3b^2-48672a^2b^3-85120ab^4-53760b^5+a\left(9a^4-120a^3b-12432a^2b^2-47936ab^3-44800b^4\right)\text{Cos}[2(e+f\,x)]-128a^2b^2(15a+28b)\,\text{Cos}[4(e+f\,x)]+128a^3b^2\,\text{Cos}[6(e+f\,x)]\right)\right)\Big/(a+2b+a\,\text{Cos}[2(e+f\,x)])^2\Bigg)$$

$$(a+2b+a\,\text{Cos}[2e+2f\,x])^3\,\text{Sec}[e+f\,x]^6-\frac{1}{16384\,a^{7/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}3\,(a+2b+a\,\text{Cos}[2e+2f\,x])^3$$

$$\text{Sec}[e+f\,x]^6\left(\frac{1}{b^{5/2}}3\left(a^3-8a^2b+80ab^2+320b^3\right)\text{ArcTan}\Big[\right.$$

$$1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\Big]+$$

$$\frac{1}{b^{5/2}}3\left(a^3-8a^2b+80ab^2+320b^3\right)\text{ArcTan}\Big[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\right.$$

$$\left.\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\Big]-512\sqrt{a}\,\text{Cos}[e]\,\text{Cos}[f\,x]+$$

$$\left.\frac{8\sqrt{a}\left(a^3+24a^2b+80ab^2+64b^3\right)\text{Cos}[e+f\,x]}{b\,(a+2b+a\,\text{Cos}[2(e+f\,x)])^2}+\frac{2\sqrt{a}\left(3a^3-24a^2b-400ab^2-576b^3\right)\text{Cos}[e+f\,x]}{b^2\,(a+2b+a\,\text{Cos}[2(e+f\,x)])}+512\sqrt{a}\,\text{Sin}[e]\,\text{Sin}[f\,x]\right)$$

- **Problem 56: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sin}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 116 leaves, 5 steps):

$$\frac{15\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f\,x]}{\sqrt{b}}\right]}{8\,a^{7/2}\,f}-\frac{15\,\text{Cos}[e+f\,x]}{8\,a^3\,f}+\frac{\text{Cos}[e+f\,x]^5}{4\,a\,f\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}+\frac{5\,\text{Cos}[e+f\,x]^3}{8\,a^2\,f\left(b+a\,\text{Cos}[e+f\,x]^2\right)}$$

Result (type 3, 656 leaves):

$$\frac{1}{4096\, a^{7/2}\, b^{5/2}\, f\, \left(a + b\, \text{Sec}[e + f\, x]^2\right)^3} (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^3\, \text{Sec}[e + f\, x]^6 \left(15\, \left(a^3 + 64\, b^3\right) \text{ArcTan}\left[\frac{1}{\sqrt{b}}\right.\right.$$

$$\left(\left(-\sqrt{a} - i\, \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\right) \text{Sin}[e]\, \text{Tan}\left[\frac{f\, x}{2}\right] + \text{Cos}[e] \left(\sqrt{a} - \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\, \text{Tan}\left[\frac{f\, x}{2}\right]\right)\right)\Bigg] + 15\, \left(a^3 + 64\, b^3\right)$$

$$\text{ArcTan}\left[\frac{1}{\sqrt{b}} \left(\left(-\sqrt{a} + i\, \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\right) \text{Sin}[e]\, \text{Tan}\left[\frac{f\, x}{2}\right] + \text{Cos}[e] \left(\sqrt{a} + \sqrt{a + b}\, \sqrt{(\text{Cos}[e] - i\, \text{Sin}[e])^2}\, \text{Tan}\left[\frac{f\, x}{2}\right]\right)\right)\right] +$$

$$\frac{1}{(a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^2} \sqrt{a} \left(24\, a^4\, \sqrt{b}\, \text{Cos}[e + f\, x] - 24\, a^3\, b^{3/2}\, \text{Cos}[e + f\, x] - 144\, a^2\, b^{5/2}\, \text{Cos}[e + f\, x] + 512\, b^{9/2}\, \text{Cos}[e + f\, x] - 72\, a^3\, b^{3/2}\right.$$

$$\text{Cos}[e + f\, x]\, \text{Cos}[2\, (e + f\, x)] - 24\, a^3\, \sqrt{b}\, \text{Cos}[e + f\, x]\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)]) + 72\, a^2\, b^{3/2}\, \text{Cos}[e + f\, x]\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)]) -$$

$$1152\, b^{7/2}\, \text{Cos}[e + f\, x]\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)]) - 15\, a^{5/2}\, \text{ArcTan}\left[\frac{\sqrt{a} - \sqrt{a + b}\, \text{Tan}\left[\frac{1}{2}\, (e + f\, x)\right]}{\sqrt{b}}\right] (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^2 -$$

$$15\, a^{5/2}\, \text{ArcTan}\left[\frac{\sqrt{a} + \sqrt{a + b}\, \text{Tan}\left[\frac{1}{2}\, (e + f\, x)\right]}{\sqrt{b}}\right] (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^2 - 512\, b^{5/2}\, \text{Cos}[e]\, \text{Cos}[f\, x]\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^2 +$$

$$\left.\left. 512\, b^{5/2}\, (a + 2\, b + a\, \text{Cos}[2\, (e + f\, x)])^2\, \text{Sin}[e]\, \text{Sin}[f\, x] + 6\, a^4\, \sqrt{b}\, \text{Csc}[e + f\, x]\, \text{Sin}[4\, (e + f\, x)]\right)\right)$$

- **Problem 57: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Csc}[e + f\, x]}{\left(a + b\, \text{Sec}[e + f\, x]^2\right)^3}\, dx$$

Optimal (type 3, 154 leaves, 6 steps):

$$\frac{\sqrt{b}\, \left(15\, a^2 + 10\, a\, b + 3\, b^2\right) \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Cos}[e+f\, x]}{\sqrt{b}}\right]}{8\, a^{5/2}\, (a + b)^3\, f} - \frac{\text{ArcTanh}[\text{Cos}[e + f\, x]]}{(a + b)^3\, f} - \frac{b\, \text{Cos}[e + f\, x]^3}{4\, a\, (a + b)\, f\, \left(b + a\, \text{Cos}[e + f\, x]^2\right)^2} - \frac{b\, (7\, a + 3\, b)\, \text{Cos}[e + f\, x]}{8\, a^2\, (a + b)^2\, f\, \left(b + a\, \text{Cos}[e + f\, x]^2\right)}$$

Result (type 3, 447 leaves):

$$\frac{1}{64\,(a+b)^3 f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]^5\left(\frac{8\,b^2\,(a+b)^2}{a^2}-\frac{2\,b\,(a+b)\,(9\,a+5\,b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])}{a^2}+\frac{1}{a^{5/2}}\sqrt{b}\,\left(15\,a^2+10\,a\,b+3\,b^2\right)\right.$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\,\left(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Sec}[e+f\,x]+\frac{1}{a^{5/2}}\sqrt{b}\,\left(15\,a^2+10\,a\,b+3\,b^2\right)$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f\,x}{2}\right]+\text{Cos}[e]\,\left(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f\,x}{2}\right]\right)\right)\right]$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Sec}[e+f\,x]-8\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\,\text{Sec}[e+f\,x]+$$
$$\left.8\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\,\text{Sec}[e+f\,x]\right)$$

- **Problem 58: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+f\,x]^3}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 213 leaves, 7 steps):

$$\frac{\sqrt{b}\,\left(15\,a^2-10\,a\,b-b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Cos}[e+f\,x]}{\sqrt{b}}\right]}{8\,a^{3/2}\,(a+b)^4\,f}-\frac{(a-5\,b)\,\text{ArcTanh}[\text{Cos}[e+f\,x]]}{2\,(a+b)^4\,f}-$$
$$\frac{(2\,a-b)\,b\,\text{Cos}[e+f\,x]}{4\,a\,(a+b)^2\,f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}+\frac{\left(4\,a^2-9\,a\,b-b^2\right)\,\text{Cos}[e+f\,x]}{8\,a\,(a+b)^3\,f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)}-\frac{\text{Cos}[e+f\,x]\,\text{Cot}[e+f\,x]^2}{2\,(a+b)\,f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}$$

Result (type 3, 532 leaves):

$$\frac{1}{64\,(a+b)^4 f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]^5\left(\frac{8\,b^2\,(a+b)^2}{a}-\frac{2\,b\,(a+b)\,(9\,a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])}{a}-\frac{1}{a^{3/2}}\sqrt{b}\,\left(-15\,a^2+10\,a\,b+b^2\right)\right.$$
$$\text{ArcTan}\Big[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\Big[\frac{f\,x}{2}\Big]+\text{Cos}[e]\,\left(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\Big[\frac{f\,x}{2}\Big]\right)\right)\Big]$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Sec}[e+f\,x]-\frac{1}{a^{3/2}}\sqrt{b}\,\left(-15\,a^2+10\,a\,b+b^2\right)$$
$$\text{ArcTan}\Big[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\Big[\frac{f\,x}{2}\Big]+\text{Cos}[e]\,\left(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\Big[\frac{f\,x}{2}\Big]\right)\right)\Big]$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Sec}[e+f\,x]-(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Csc}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}[e+f\,x]-$$
$$4\,(a-5\,b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\,\text{Sec}[e+f\,x]+4\,(a-5\,b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2$$
$$\left.\text{Log}\Big[\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\,\text{Sec}[e+f\,x]+(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Sec}[e+f\,x]\right)$$

- **Problem 59: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+f\,x]^5}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 257 leaves, 8 steps):

$$\frac{3\,\sqrt{b}\,\left(5\,a^2-10\,a\,b+b^2\right)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Cos}[e+f\,x]}{\sqrt{b}}\Big]}{8\,\sqrt{a}\,(a+b)^5 f}-\frac{3\,\left(a^2-10\,a\,b+5\,b^2\right)\,\text{ArcTanh}[\text{Cos}[e+f\,x]]}{8\,(a+b)^5 f}+\frac{\left(a^2-9\,a\,b+2\,b^2\right)\,\text{Cos}[e+f\,x]}{8\,(a+b)^3 f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}+$$
$$\frac{3\,\left(a^2-6\,a\,b+b^2\right)\,\text{Cos}[e+f\,x]}{8\,(a+b)^4 f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)}-\frac{(a-7\,b)\,\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]}{8\,(a+b)^2 f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}-\frac{\text{Cot}[e+f\,x]^3\,\text{Csc}[e+f\,x]}{4\,(a+b)\,f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}$$

Result (type 3, 549 leaves):

$$\frac{1}{1024\,(a+b)^5 f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^3}$$
$$(a+2 b+a\,\text{Cos}[2\,(e+f x)])\left(\frac{1}{\sqrt{a}}48\sqrt{b}\,\left(5 a^2-10 a b+b^2\right)\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}-i\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f x}{2}\right]+\right.\right.\right.$$
$$\left.\left.\text{Cos}[e]\left(\sqrt{a}-\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]\,(a+2 b+a\,\text{Cos}[2\,(e+f x)])^2+\frac{1}{\sqrt{a}}48\sqrt{b}\,\left(5 a^2-10 a b+b^2\right)$$
$$\text{ArcTan}\left[1\Big/\left(\sqrt{b}\right)\left(\left(-\sqrt{a}+i\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\right)\text{Sin}[e]\,\text{Tan}\left[\frac{f x}{2}\right]+\text{Cos}[e]\left(\sqrt{a}+\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}\left[\frac{f x}{2}\right]\right)\right)\right]$$
$$(a+2 b+a\,\text{Cos}[2\,(e+f x)])^2-2\,(a+b)\,\left(30 a^3+112 a^2 b+182 a b^2-140 b^3+\left(35 a^3+78 a^2 b-93 a b^2+224 b^3\right)\text{Cos}[2\,(e+f x)]+\right.$$
$$\left.2\left(a^3-8 a^2 b+53 a b^2-10 b^3\right)\text{Cos}[4\,(e+f x)]-3 a^3\,\text{Cos}[6\,(e+f x)]+18 a^2 b\,\text{Cos}[6\,(e+f x)]-3 a b^2\,\text{Cos}[6\,(e+f x)]\right)$$
$$\text{Cot}[e+f x]\,\text{Csc}[e+f x]^3-48\left(a^2-10 a b+5 b^2\right)(a+2 b+a\,\text{Cos}[2\,(e+f x)])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]\right]+$$
$$\left.48\left(a^2-10 a b+5 b^2\right)(a+2 b+a\,\text{Cos}[2\,(e+f x)])^2\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]\right)\text{Sec}[e+f x]^6$$

- **Problem 60: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sin}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 314 leaves, 9 steps):

$$\frac{5\,(a+2 b)\,\left(a^2+16 a b+16 b^2\right)x}{16 a^6}-\frac{5\sqrt{b}\,\sqrt{a+b}\,(a+4 b)\,(3 a+4 b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^6 f}-$$
$$\frac{\left(33 a^2+110 a b+80 b^2\right)\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{48 a^3 f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}+\frac{(9 a+10 b)\,\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]}{24 a^2 f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}+$$
$$\frac{\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]^3}{6 a f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}-\frac{5 b\,\left(9 a^2+32 a b+24 b^2\right)\text{Tan}[e+f x]}{48 a^4 f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}-\frac{5 b\,\left(5 a^2+20 a b+16 b^2\right)\text{Tan}[e+f x]}{16 a^5 f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 2057 leaves):

$$\left(5\,(a+2 b+a\,\text{Cos}[2 e+2 f x])^3\,\text{Sec}[e+f x]^6\right.$$
$$\left.\left(\frac{\left(3 a^2+8 a b+8 b^2\right)\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}}-\frac{a\sqrt{b}\,\left(3 a^2+16 a b+16 b^2+3 a\,(a+2 b)\,\text{Cos}[2\,(e+f x)]\right)\text{Sin}[2\,(e+f x)]}{(a+b)^2\,(a+2 b+a\,\text{Cos}[2\,(e+f x)])^2}\right)\right)\Big/$$

$$\left(65536\, b^{5/2} f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3\right)+\frac{1}{2048 \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}$$

$$(a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Sec}[e+f x]^6 \left(\frac{32 \left(7 a^3+54 a^2 b+120 a b^2+80 b^3\right) x}{a^6}-\right.$$

$$\frac{1}{(a+b)^2}\left(-3 a^8+64 a^7 b-2240 a^6 b^2-53760 a^5 b^3-313600 a^4 b^4-802816 a^3 b^5-1032192 a^2 b^6-655360 a b^7-163840 b^8\right)$$

$$\left(\left(\operatorname{ArcTan}\left[\operatorname{Sec}[f x]\left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}-\frac{i \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\right] \operatorname{Cos}[2 e]\right) \Big/ \left(64 a^6 b^2 \sqrt{a+b} f \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}\right)-$$

$$\left(i \operatorname{ArcTan}\left[\operatorname{Sec}[f x]\left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}-\frac{i \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\right] \operatorname{Sin}[2 e]\right) \Big/ \left(64 a^6 b^2 \sqrt{a+b} f \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}\right)\right)-$$

$$\frac{1}{16 a^6 b (a+b) f (a+2 b+a \operatorname{Cos}[2 e+2 f x])^2} \operatorname{Sec}[2 e] \left(a^7 \operatorname{Sin}[2 e]+74 a^6 b \operatorname{Sin}[2 e]+984 a^5 b^2 \operatorname{Sin}[2 e]+5264 a^4 b^3 \operatorname{Sin}[2 e]+\right.$$
$$14080 a^3 b^4 \operatorname{Sin}[2 e]+19968 a^2 b^5 \operatorname{Sin}[2 e]+14336 a b^6 \operatorname{Sin}[2 e]+4096 b^7 \operatorname{Sin}[2 e]-a^7 \operatorname{Sin}[2 f x]-72 a^6 b \operatorname{Sin}[2 f x]-$$
$$\left.840 a^5 b^2 \operatorname{Sin}[2 f x]-3584 a^4 b^3 \operatorname{Sin}[2 f x]-6912 a^3 b^4 \operatorname{Sin}[2 f x]-6144 a^2 b^5 \operatorname{Sin}[2 f x]-2048 a b^6 \operatorname{Sin}[2 f x]\right)-$$

$$\frac{1}{64 a^6 b^2 (a+b)^2 f (a+2 b+a \operatorname{Cos}[2 e+2 f x])} \operatorname{Sec}[2 e] \left(3 a^8 \operatorname{Sin}[2 e]-64 a^7 b \operatorname{Sin}[2 e]-4480 a^6 b^2 \operatorname{Sin}[2 e]-\right.$$
$$45696 a^5 b^3 \operatorname{Sin}[2 e]-196928 a^4 b^4 \operatorname{Sin}[2 e]-438272 a^3 b^5 \operatorname{Sin}[2 e]-528384 a^2 b^6 \operatorname{Sin}[2 e]-327680 a b^7 \operatorname{Sin}[2 e]-$$
$$81920 b^8 \operatorname{Sin}[2 e]-3 a^8 \operatorname{Sin}[2 f x]+66 a^7 b \operatorname{Sin}[2 f x]+4056 a^6 b^2 \operatorname{Sin}[2 f x]+33936 a^5 b^3 \operatorname{Sin}[2 f x]+$$
$$\left.111360 a^4 b^4 \operatorname{Sin}[2 f x]+173568 a^3 b^5 \operatorname{Sin}[2 f x]+129024 a^2 b^6 \operatorname{Sin}[2 f x]+36864 a b^7 \operatorname{Sin}[2 f x]\right)-$$

$$\left(7 a^2+32 a b+32 b^2\right)\left(-\frac{6 i \operatorname{Cos}[2 e+2 f x]}{a^5 f}+\frac{6 \operatorname{Sin}[2 e+2 f x]}{a^5 f}\right)-\left(7 a^2+32 a b+32 b^2\right)\left(\frac{6 i \operatorname{Cos}[2 e+2 f x]}{a^5 f}+\frac{6 \operatorname{Sin}[2 e+2 f x]}{a^5 f}\right)-$$

$$(a+2 b)\left(-\frac{6 i \operatorname{Cos}[4 e+4 f x]}{a^4 f}-\frac{6 \operatorname{Sin}[4 e+4 f x]}{a^4 f}\right)-$$

$$\left.(a+2 b)\left(\frac{6 i \operatorname{Cos}[4 e+4 f x]}{a^4 f}-\frac{6 \operatorname{Sin}[4 e+4 f x]}{a^4 f}\right)-\frac{4 \operatorname{Sin}[6 e+6 f x]}{3 a^3 f}\right)-$$

$$\left(15 (a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Sec}[e+f x]^6 \left(-\frac{6 a^2 \operatorname{ArcTan}\left[\frac{\operatorname{Sec}[f x] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]) (-(a+2 b) \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}}\right] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e])}{\sqrt{a+b} \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}}+\right.\right.$$

$$\left(a \operatorname{Sec}[2 e] \left(\left(-9 a^4-16 a^3 b+48 a^2 b^2+128 a b^3+64 b^4\right) \operatorname{Sin}[2 f x]+\right.\right.$$

$$a\left(-3a^3+2a^2b+24ab^2+16b^3\right)\mathrm{Sin}[2(e+2fx)]+\left(3a^4-64a^2b^2-128ab^3-64b^4\right)\mathrm{Sin}[4e+2fx]\Big)+$$

$$\left(9a^5+18a^4b-64a^3b^2-256a^2b^3-320ab^4-128b^5\right)\mathrm{Tan}[2e]\Big)\Big/\left(a^2\left(a+2b+a\,\mathrm{Cos}[2(e+fx)]\right)^2\right)\Big)\Big)\Big/$$

$$\left(262144\,b^2(a+b)^2 f\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3\right)+\frac{1}{65536\,a^4\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}3\left(a+2b+a\,\mathrm{Cos}[2e+2fx]\right)^3$$

$$\mathrm{Sec}[e+fx]^6$$

$$\Bigg(-1536(a+2b)x-\Bigg(3\left(a^6-8a^5b+120a^4b^2+1280a^3b^3+3200a^2b^4+3072ab^5+1024b^6\right)$$

$$\mathrm{ArcTan}\left[\frac{\mathrm{Sec}[fx]\left(\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]\right)\left(-(a+2b)\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx]\right)}{2\sqrt{a+b}\sqrt{b\left(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e]\right)^4}}\right]\left(\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]\right)\Bigg)\Big/$$

$$\left(b^2(a+b)^{5/2}f\sqrt{b\left(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e]\right)^4}\right)+\frac{4\left(a^4+32a^3b+160a^2b^2+256ab^3+128b^4\right)\mathrm{Sec}[2e]\left((a+2b)\mathrm{Sin}[2e]-a\,\mathrm{Sin}[2fx]\right)}{b(a+b)f\left(a+2b+a\,\mathrm{Cos}[2(e+fx)]\right)^2}+$$

$$\frac{256\,a\,\mathrm{Sin}[2(e+fx)]}{f}+\Big(a\left(-3a^5+26a^4b+736a^3b^2+2624a^2b^3+3200ab^4+1280b^5\right)\mathrm{Sec}[2e]\,\mathrm{Sin}[2fx]+$$

$$\left(3a^6-24a^5b-920a^4b^2-4864a^3b^3-10112a^2b^4-9216ab^5-3072b^6\right)\mathrm{Tan}[2e]\Big)\Big/\left(b^2(a+b)^2f\left(a+2b+a\,\mathrm{Cos}[2(e+fx)]\right)\right)\Bigg)$$

- **Problem 61: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sin}[e+fx]^4}{\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 238 leaves, 8 steps):

$$\frac{3\left(a^2+12ab+16b^2\right)x}{8a^5}-\frac{3\sqrt{b}\left(5a^2+20ab+16b^2\right)\mathrm{ArcTan}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b}}\right]}{8a^5\sqrt{a+b}\,f}-\frac{(5a+8b)\mathrm{Cos}[e+fx]\,\mathrm{Sin}[e+fx]}{8a^2f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^2}+$$

$$\frac{\mathrm{Cos}[e+fx]^3\,\mathrm{Sin}[e+fx]}{4af\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^2}-\frac{b(7a+12b)\mathrm{Tan}[e+fx]}{8a^3f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^2}-\frac{3b(a+2b)\mathrm{Tan}[e+fx]}{2a^4f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)}$$

Result (type 3, 3109 leaves):

$$\Bigg(3\left(a+2b+a\,\mathrm{Cos}[2e+2fx]\right)^3\mathrm{Sec}[e+fx]^6$$

$$\left(\frac{\left(3 a^2+8 a b+8 b^2\right) \text{ArcTan}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}}-\frac{a \sqrt{b}\ \left(3 a^2+16 a b+16 b^2+3 a (a+2 b) \text{Cos}[2 (e+f x)]\right) \text{Sin}[2 (e+f x)]}{(a+b)^2 (a+2 b+a \text{Cos}[2 (e+f x)])^2}\right)\Bigg)\Bigg/$$

$$\left(16384 b^{5/2} f \left(a+b \text{Sec}[e+f x]^2\right)^3\right)+\Bigg((a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6$$

$$\left(-\frac{3 a (a+2 b) \text{ArcTan}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}}+\frac{\sqrt{b}\ \left(3 a^3+14 a^2 b+24 a b^2+16 b^3+a \left(3 a^2+4 a b+4 b^2\right) \text{Cos}[2 (e+f x)]\right) \text{Sin}[2 (e+f x)]}{(a+b)^2 (a+2 b+a \text{Cos}[2 (e+f x)])^2}\right)\Bigg)\Bigg/$$

$$\left(16384 b^{5/2} f \left(a+b \text{Sec}[e+f x]^2\right)^3\right)-\frac{1}{512 \left(a+b \text{Sec}[e+f x]^2\right)^3}$$

$$3 (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6 \Bigg(\frac{1}{(a+b)^2}\left(3 a^5-10 a^4 b+80 a^3 b^2+480 a^2 b^3+640 a b^4+256 b^5\right)$$

$$\Bigg(\Bigg(\text{ArcTan}\Big[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b}\ \sqrt{b \text{Cos}[4 e]-\mathbb{i}\, b \text{Sin}[4 e]}}-\frac{\mathbb{i} \text{Sin}[2 e]}{2 \sqrt{a+b}\ \sqrt{b \text{Cos}[4 e]-\mathbb{i}\, b \text{Sin}[4 e]}}\right)$$

$$(-a \text{Sin}[f x]-2 b \text{Sin}[f x]+a \text{Sin}[2 e+f x])\Big] \text{Cos}[2 e]\Bigg)\Bigg/\left(64 a^3 b^2 \sqrt{a+b}\ f \sqrt{b \text{Cos}[4 e]-\mathbb{i}\, b \text{Sin}[4 e]}\right)-$$

$$\Bigg(\mathbb{i} \text{ArcTan}\Big[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b}\ \sqrt{b \text{Cos}[4 e]-\mathbb{i}\, b \text{Sin}[4 e]}}-\frac{\mathbb{i} \text{Sin}[2 e]}{2 \sqrt{a+b}\ \sqrt{b \text{Cos}[4 e]-\mathbb{i}\, b \text{Sin}[4 e]}}\right)$$

$$(-a \text{Sin}[f x]-2 b \text{Sin}[f x]+a \text{Sin}[2 e+f x])\Big] \text{Sin}[2 e]\Bigg)\Bigg/\left(64 a^3 b^2 \sqrt{a+b}\ f \sqrt{b \text{Cos}[4 e]-\mathbb{i}\, b \text{Sin}[4 e]}\right)\Bigg)+$$

$$\frac{1}{128 a^3 b^2 (a+b)^2 f (a+2 b+a \text{Cos}[2 e+2 f x])^2} \text{Sec}[2 e] \Big(768 a^4 b^2 f x \text{Cos}[2 e]+3584 a^3 b^3 f x \text{Cos}[2 e]+6912 a^2 b^4 f x \text{Cos}[2 e]+$$
$$6144 a b^5 f x \text{Cos}[2 e]+2048 b^6 f x \text{Cos}[2 e]+512 a^4 b^2 f x \text{Cos}[2 f x]+2048 a^3 b^3 f x \text{Cos}[2 f x]+2560 a^2 b^4 f x \text{Cos}[2 f x]+$$
$$1024 a b^5 f x \text{Cos}[2 f x]+512 a^4 b^2 f x \text{Cos}[4 e+2 f x]+2048 a^3 b^3 f x \text{Cos}[4 e+2 f x]+2560 a^2 b^4 f x \text{Cos}[4 e+2 f x]+$$
$$1024 a b^5 f x \text{Cos}[4 e+2 f x]+128 a^4 b^2 f x \text{Cos}[2 e+4 f x]+256 a^3 b^3 f x \text{Cos}[2 e+4 f x]+128 a^2 b^4 f x \text{Cos}[2 e+4 f x]+$$
$$128 a^4 b^2 f x \text{Cos}[6 e+4 f x]+256 a^3 b^3 f x \text{Cos}[6 e+4 f x]+128 a^2 b^4 f x \text{Cos}[6 e+4 f x]-9 a^6 \text{Sin}[2 e]+12 a^5 b \text{Sin}[2 e]+$$
$$684 a^4 b^2 \text{Sin}[2 e]+2880 a^3 b^3 \text{Sin}[2 e]+5280 a^2 b^4 \text{Sin}[2 e]+4608 a b^5 \text{Sin}[2 e]+1536 b^6 \text{Sin}[2 e]+9 a^6 \text{Sin}[2 f x]-$$
$$14 a^5 b \text{Sin}[2 f x]-608 a^4 b^2 \text{Sin}[2 f x]-2112 a^3 b^3 \text{Sin}[2 f x]-2560 a^2 b^4 \text{Sin}[2 f x]-1024 a b^5 \text{Sin}[2 f x]-3 a^6 \text{Sin}[4 e+2 f x]+$$
$$10 a^5 b \text{Sin}[4 e+2 f x]+304 a^4 b^2 \text{Sin}[4 e+2 f x]+1056 a^3 b^3 \text{Sin}[4 e+2 f x]+1280 a^2 b^4 \text{Sin}[4 e+2 f x]+512 a b^5 \text{Sin}[4 e+2 f x]+$$
$$3 a^6 \text{Sin}[2 e+4 f x]-12 a^5 b \text{Sin}[2 e+4 f x]-204 a^4 b^2 \text{Sin}[2 e+4 f x]-384 a^3 b^3 \text{Sin}[2 e+4 f x]-192 a^2 b^4 \text{Sin}[2 e+4 f x]\Big)\Bigg)+$$

$$\frac{1}{512\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^3}(a+2b+a\,\mathrm{Cos}[2e+2fx])^3\,\mathrm{Sec}[e+fx]^6\left(\frac{12\left(7a^2+32ab+32b^2\right)x}{a^5}+\right.$$

$$\frac{1}{(a+b)^2}\left(a^7-14a^6b+336a^5b^2+5600a^4b^3+22400a^3b^4+37632a^2b^5+28672ab^6+8192b^7\right)$$

$$\left(\left(3\,\mathrm{ArcTan}\left[\mathrm{Sec}[fx]\left(\frac{\mathrm{Cos}[2e]}{2\sqrt{a+b}\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}-\frac{i\,\mathrm{Sin}[2e]}{2\sqrt{a+b}\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\mathrm{Sin}[fx]-2b\,\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])\right]\mathrm{Cos}[2e]\right)\Big/\left(64a^5b^2\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}\right)-$$

$$\left(3\,i\,\mathrm{ArcTan}\left[\mathrm{Sec}[fx]\left(\frac{\mathrm{Cos}[2e]}{2\sqrt{a+b}\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}-\frac{i\,\mathrm{Sin}[2e]}{2\sqrt{a+b}\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\,\mathrm{Sin}[fx]-2b\,\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])\right]\mathrm{Sin}[2e]\right)\Big/\left(64a^5b^2\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}\right)\right)+$$

$$\left(\mathrm{Sec}[2e]\left(-a^6\,\mathrm{Sin}[2e]-52a^5b\,\mathrm{Sin}[2e]-500a^4b^2\,\mathrm{Sin}[2e]-1920a^3b^3\,\mathrm{Sin}[2e]-3520a^2b^4\,\mathrm{Sin}[2e]-3072ab^5\,\mathrm{Sin}[2e]-1024b^6\right.\right.$$
$$\left.\left.\mathrm{Sin}[2e]+a^6\,\mathrm{Sin}[2fx]+50a^5b\,\mathrm{Sin}[2fx]+400a^4b^2\,\mathrm{Sin}[2fx]+1120a^3b^3\,\mathrm{Sin}[2fx]+1280a^2b^4\,\mathrm{Sin}[2fx]+512ab^5\,\mathrm{Sin}[2fx]\right)\right)\Big/$$

$$\left(16a^5b(a+b)f(a+2b+a\,\mathrm{Cos}[2e+2fx])^2\right)+\frac{1}{64a^5b^2(a+b)^2f(a+2b+a\,\mathrm{Cos}[2e+2fx])}$$

$$\mathrm{Sec}[2e]\left(-3a^7\,\mathrm{Sin}[2e]+42a^6b\,\mathrm{Sin}[2e]+2192a^5b^2\,\mathrm{Sin}[2e]+16480a^4b^3\,\mathrm{Sin}[2e]+51200a^3b^4\,\mathrm{Sin}[2e]+\right.$$
$$77824a^2b^5\,\mathrm{Sin}[2e]+57344ab^6\,\mathrm{Sin}[2e]+16384b^7\,\mathrm{Sin}[2e]+3a^7\,\mathrm{Sin}[2fx]-44a^6b\,\mathrm{Sin}[2fx]-$$
$$\left.1900a^5b^2\,\mathrm{Sin}[2fx]-10880a^4b^3\,\mathrm{Sin}[2fx]-23360a^3b^4\,\mathrm{Sin}[2fx]-21504a^2b^5\,\mathrm{Sin}[2fx]-7168ab^6\,\mathrm{Sin}[2fx]\right)+$$

$$(a+2b)\left(-\frac{12\,i\,\mathrm{Cos}[2e+2fx]}{a^4f}-\frac{12\,\mathrm{Sin}[2e+2fx]}{a^4f}\right)+(a+2b)\left(\frac{12\,i\,\mathrm{Cos}[2e+2fx]}{a^4f}-\frac{12\,\mathrm{Sin}[2e+2fx]}{a^4f}\right)+$$

$$\left.\frac{2\,\mathrm{Sin}[4e+4fx]}{a^3f}\right)-$$

$$\left((a+2b+a\,\mathrm{Cos}[2e+2fx])^3\,\mathrm{Sec}[e+fx]^6\left(-\frac{6a^2\,\mathrm{ArcTan}\left[\frac{\mathrm{Sec}[fx](\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e])(-(a+2b)\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])}{2\sqrt{a+b}\sqrt{b(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}}\right](\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e])}{\sqrt{a+b}\sqrt{b(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}}+\right.\right.$$

$$\left(a\,\mathrm{Sec}[2e]\left(\left(-9a^4-16a^3b+48a^2b^2+128ab^3+64b^4\right)\mathrm{Sin}[2fx]+\right.\right.$$
$$a\left(-3a^3+2a^2b+24ab^2+16b^3\right)\mathrm{Sin}[2(e+2fx)]+\left(3a^4-64a^2b^2-128ab^3-64b^4\right)\mathrm{Sin}[4e+2fx]\Big)+$$

$$\left.\left.\left.\left(9a^5+18a^4b-64a^3b^2-256a^2b^3-320ab^4-128b^5\right)\mathrm{Tan}[2e]\right)\Big/\left(a^2(a+2b+a\,\mathrm{Cos}[2(e+fx)])^2\right)\right)\right)\Big/$$

$$\left(8192\, b^2 (a+b)^2 f \left(a+b\, \text{Sec}[e+f x]^2\right)^3\right) + \frac{1}{16384\, a^4 \left(a+b\, \text{Sec}[e+f x]^2\right)^3} (a+2 b+a\, \text{Cos}[2 e+2 f x])^3$$

$$\text{Sec}[e+f x]^6$$

$$\left(-1536 (a+2 b) x - \left(3 \left(a^6-8 a^5 b+120 a^4 b^2+1280 a^3 b^3+3200 a^2 b^4+3072 a b^5+1024 b^6\right)\right.\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-i\, \text{Sin}[2 e]) (-(a+2 b) \text{Sin}[f x]+a\, \text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-i\, \text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-i\, \text{Sin}[2 e])\right) \Big/$$

$$\left(b^2 (a+b)^{5/2} f \sqrt{b (\text{Cos}[e]-i\, \text{Sin}[e])^4}\right) + \frac{4 \left(a^4+32 a^3 b+160 a^2 b^2+256 a b^3+128 b^4\right) \text{Sec}[2 e] ((a+2 b) \text{Sin}[2 e]-a\, \text{Sin}[2 f x])}{b (a+b) f (a+2 b+a\, \text{Cos}[2 (e+f x)])^2} +$$

$$\frac{256\, a\, \text{Sin}[2 (e+f x)]}{f} + \left(a \left(-3 a^5+26 a^4 b+736 a^3 b^2+2624 a^2 b^3+3200 a b^4+1280 b^5\right) \text{Sec}[2 e]\, \text{Sin}[2 f x] +\right.$$

$$\left.\left.\left(3 a^6-24 a^5 b-920 a^4 b^2-4864 a^3 b^3-10112 a^2 b^4-9216 a b^5-3072 b^6\right) \text{Tan}[2 e]\right) \Big/ \left(b^2 (a+b)^2 f (a+2 b+a\, \text{Cos}[2 (e+f x)])\right)\right)$$

- **Problem 62: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^2}{\left(a+b\, \text{Sec}[e+f x]^2\right)^3} \, dx$$

Optimal (type 3, 184 leaves, 7 steps):

$$\frac{(a+6 b) x}{2 a^4} - \frac{\sqrt{b} \left(15 a^2+40 a b+24 b^2\right) \text{ArcTan}\left[\frac{\sqrt{b}\, \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^4 (a+b)^{3/2} f} -$$

$$\frac{\text{Cos}[e+f x]\, \text{Sin}[e+f x]}{2 a f \left(a+b+b\, \text{Tan}[e+f x]^2\right)^2} - \frac{3 b\, \text{Tan}[e+f x]}{4 a^2 f \left(a+b+b\, \text{Tan}[e+f x]^2\right)^2} - \frac{b (11 a+12 b) \text{Tan}[e+f x]}{8 a^3 (a+b) f \left(a+b+b\, \text{Tan}[e+f x]^2\right)}$$

Result (type 3, 2187 leaves):

$$\left(5 (a+2 b+a\, \text{Cos}[2 e+2 f x])^3\, \text{Sec}[e+f x]^6\right.$$

$$\left.\left(\frac{\left(3 a^2+8 a b+8 b^2\right) \text{ArcTan}\left[\frac{\sqrt{b}\, \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}} - \frac{a \sqrt{b} \left(3 a^2+16 a b+16 b^2+3 a (a+2 b) \text{Cos}[2 (e+f x)]\right) \text{Sin}[2 (e+f x)]}{(a+b)^2 (a+2 b+a\, \text{Cos}[2 (e+f x)])^2}\right)\right) \Big/$$

$$\left(8192\, b^{5/2}\, f\, \left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^3\right)+\Bigg((a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^3\, \mathrm{Sec}[e+f\, x]^6$$

$$\left(-\frac{3\, a\, (a+2\, b)\, \mathrm{ArcTan}\left[\frac{\sqrt{b}\, \mathrm{Tan}[e+f\, x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}}+\frac{\sqrt{b}\, \left(3\, a^3+14\, a^2\, b+24\, a\, b^2+16\, b^3+a\, \left(3\, a^2+4\, a\, b+4\, b^2\right)\, \mathrm{Cos}[2\, (e+f\, x)]\right)\, \mathrm{Sin}[2\, (e+f\, x)]}{(a+b)^2\, (a+2\, b+a\, \mathrm{Cos}[2\, (e+f\, x)])^2}\right)\Bigg)\Big/$$

$$\left(2048\, b^{5/2}\, f\, \left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^3\right)+\frac{1}{32\, \left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^3}\, (a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^3\, \mathrm{Sec}[e+f\, x]^6$$

$$\Bigg(-\frac{1}{(a+b)^2}\left(3\, a^5-10\, a^4\, b+80\, a^3\, b^2+480\, a^2\, b^3+640\, a\, b^4+256\, b^5\right)$$

$$\Bigg(\Bigg(\mathrm{ArcTan}\Bigg[\mathrm{Sec}[f\, x]\, \left(\frac{\mathrm{Cos}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-i\, b\, \mathrm{Sin}[4\, e]}}-\frac{i\, \mathrm{Sin}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-i\, b\, \mathrm{Sin}[4\, e]}}\right)$$

$$(-a\, \mathrm{Sin}[f\, x]-2\, b\, \mathrm{Sin}[f\, x]+a\, \mathrm{Sin}[2\, e+f\, x])\Bigg]\, \mathrm{Cos}[2\, e]\Bigg)\Big/\left(64\, a^3\, b^2\, \sqrt{a+b}\, f\, \sqrt{b\, \mathrm{Cos}[4\, e]-i\, b\, \mathrm{Sin}[4\, e]}\right)-$$

$$\Bigg(i\, \mathrm{ArcTan}\Bigg[\mathrm{Sec}[f\, x]\, \left(\frac{\mathrm{Cos}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-i\, b\, \mathrm{Sin}[4\, e]}}-\frac{i\, \mathrm{Sin}[2\, e]}{2\, \sqrt{a+b}\, \sqrt{b\, \mathrm{Cos}[4\, e]-i\, b\, \mathrm{Sin}[4\, e]}}\right)$$

$$(-a\, \mathrm{Sin}[f\, x]-2\, b\, \mathrm{Sin}[f\, x]+a\, \mathrm{Sin}[2\, e+f\, x])\Bigg]\, \mathrm{Sin}[2\, e]\Bigg)\Big/\left(64\, a^3\, b^2\, \sqrt{a+b}\, f\, \sqrt{b\, \mathrm{Cos}[4\, e]-i\, b\, \mathrm{Sin}[4\, e]}\right)\Bigg)-$$

$$\frac{1}{128\, a^3\, b^2\, (a+b)^2\, f\, (a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^2}\, \mathrm{Sec}[2\, e]\, \Big(768\, a^4\, b^2\, f\, x\, \mathrm{Cos}[2\, e]+3584\, a^3\, b^3\, f\, x\, \mathrm{Cos}[2\, e]+6912\, a^2\, b^4\, f\, x\, \mathrm{Cos}[2\, e]+$$
$$6144\, a\, b^5\, f\, x\, \mathrm{Cos}[2\, e]+2048\, b^6\, f\, x\, \mathrm{Cos}[2\, e]+512\, a^4\, b^2\, f\, x\, \mathrm{Cos}[2\, f\, x]+2048\, a^3\, b^3\, f\, x\, \mathrm{Cos}[2\, f\, x]+2560\, a^2\, b^4\, f\, x\, \mathrm{Cos}[2\, f\, x]+$$
$$1024\, a\, b^5\, f\, x\, \mathrm{Cos}[2\, f\, x]+512\, a^4\, b^2\, f\, x\, \mathrm{Cos}[4\, e+2\, f\, x]+2048\, a^3\, b^3\, f\, x\, \mathrm{Cos}[4\, e+2\, f\, x]+2560\, a^2\, b^4\, f\, x\, \mathrm{Cos}[4\, e+2\, f\, x]+$$
$$1024\, a\, b^5\, f\, x\, \mathrm{Cos}[4\, e+2\, f\, x]+128\, a^4\, b^2\, f\, x\, \mathrm{Cos}[2\, e+4\, f\, x]+256\, a^3\, b^3\, f\, x\, \mathrm{Cos}[2\, e+4\, f\, x]+128\, a^2\, b^4\, f\, x\, \mathrm{Cos}[2\, e+4\, f\, x]+$$
$$128\, a^4\, b^2\, f\, x\, \mathrm{Cos}[6\, e+4\, f\, x]+256\, a^3\, b^3\, f\, x\, \mathrm{Cos}[6\, e+4\, f\, x]+128\, a^2\, b^4\, f\, x\, \mathrm{Cos}[6\, e+4\, f\, x]-9\, a^6\, \mathrm{Sin}[2\, e]+12\, a^5\, b\, \mathrm{Sin}[2\, e]+$$
$$684\, a^4\, b^2\, \mathrm{Sin}[2\, e]+2880\, a^3\, b^3\, \mathrm{Sin}[2\, e]+5280\, a^2\, b^4\, \mathrm{Sin}[2\, e]+4608\, a\, b^5\, \mathrm{Sin}[2\, e]+1536\, b^6\, \mathrm{Sin}[2\, e]+9\, a^6\, \mathrm{Sin}[2\, f\, x]-$$
$$14\, a^5\, b\, \mathrm{Sin}[2\, f\, x]-608\, a^4\, b^2\, \mathrm{Sin}[2\, f\, x]-2112\, a^3\, b^3\, \mathrm{Sin}[2\, f\, x]-2560\, a^2\, b^4\, \mathrm{Sin}[2\, f\, x]-1024\, a\, b^5\, \mathrm{Sin}[2\, f\, x]-3\, a^6\, \mathrm{Sin}[4\, e+2\, f\, x]+$$
$$10\, a^5\, b\, \mathrm{Sin}[4\, e+2\, f\, x]+304\, a^4\, b^2\, \mathrm{Sin}[4\, e+2\, f\, x]+1056\, a^3\, b^3\, \mathrm{Sin}[4\, e+2\, f\, x]+1280\, a^2\, b^4\, \mathrm{Sin}[4\, e+2\, f\, x]+512\, a\, b^5\, \mathrm{Sin}[4\, e+2\, f\, x]+$$
$$3\, a^6\, \mathrm{Sin}[2\, e+4\, f\, x]-12\, a^5\, b\, \mathrm{Sin}[2\, e+4\, f\, x]-204\, a^4\, b^2\, \mathrm{Sin}[2\, e+4\, f\, x]-384\, a^3\, b^3\, \mathrm{Sin}[2\, e+4\, f\, x]-192\, a^2\, b^4\, \mathrm{Sin}[2\, e+4\, f\, x]\Big)\Bigg)-$$

$$\Bigg((a+2\, b+a\, \mathrm{Cos}[2\, e+2\, f\, x])^3\, \mathrm{Sec}[e+f\, x]^6\, \Bigg(-\frac{6\, a^2\, \mathrm{ArcTan}\left[\frac{\mathrm{Sec}[f\, x]\, (\mathrm{Cos}[2\, e]-i\, \mathrm{Sin}[2\, e])\, (-(a+2\, b)\, \mathrm{Sin}[f\, x]+a\, \mathrm{Sin}[2\, e+f\, x])}{2\, \sqrt{a+b}\, \sqrt{b\, (\mathrm{Cos}[e]-i\, \mathrm{Sin}[e])^4}}\right]\, (\mathrm{Cos}[2\, e]-i\, \mathrm{Sin}[2\, e])}{\sqrt{a+b}\, \sqrt{b\, (\mathrm{Cos}[e]-i\, \mathrm{Sin}[e])^4}}+$$

$$\Big(a\, \mathrm{Sec}[2\, e]\, \Big(\left(-9\, a^4-16\, a^3\, b+48\, a^2\, b^2+128\, a\, b^3+64\, b^4\right)\, \mathrm{Sin}[2\, f\, x]+$$

$$a\left(-3a^3+2a^2b+24ab^2+16b^3\right)\mathrm{Sin}[2(e+2fx)]+\left(3a^4-64a^2b^2-128ab^3-64b^4\right)\mathrm{Sin}[4e+2fx]\Big)+$$

$$\left(9a^5+18a^4b-64a^3b^2-256a^2b^3-320ab^4-128b^5\right)\mathrm{Tan}[2e]\Big)\Big/\left(a^2\left(a+2b+a\,\mathrm{Cos}[2(e+fx)]\right)^2\right)\Bigg)\Bigg)\Bigg/$$

$$\left(4096b^2(a+b)^2f\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3\right)-\frac{1}{8192a^4\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}\left(a+2b+a\,\mathrm{Cos}[2e+2fx]\right)^3$$

$$\mathrm{Sec}[e+fx]^6$$

$$\Bigg(-1536(a+2b)x-\Bigg(3\left(a^6-8a^5b+120a^4b^2+1280a^3b^3+3200a^2b^4+3072ab^5+1024b^6\right)$$

$$\mathrm{ArcTan}\left[\frac{\mathrm{Sec}[fx](\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e])(-(a+2b)\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])}{2\sqrt{a+b}\sqrt{b(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}}\right](\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e])\Bigg)\Bigg/$$

$$\left(b^2(a+b)^{5/2}f\sqrt{b(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}\right)+\frac{4\left(a^4+32a^3b+160a^2b^2+256ab^3+128b^4\right)\mathrm{Sec}[2e]\left((a+2b)\mathrm{Sin}[2e]-a\,\mathrm{Sin}[2fx]\right)}{b(a+b)f\left(a+2b+a\,\mathrm{Cos}[2(e+fx)]\right)^2}+$$

$$\frac{256a\,\mathrm{Sin}[2(e+fx)]}{f}+\Big(a\left(-3a^5+26a^4b+736a^3b^2+2624a^2b^3+3200ab^4+1280b^5\right)\mathrm{Sec}[2e]\,\mathrm{Sin}[2fx]+$$

$$\left(3a^6-24a^5b-920a^4b^2-4864a^3b^3-10112a^2b^4-9216ab^5-3072b^6\right)\mathrm{Tan}[2e]\Big)\Big/\left(b^2(a+b)^2f\left(a+2b+a\,\mathrm{Cos}[2(e+fx)]\right)\right)\Bigg)$$

- **Problem 63: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 144 leaves, 6 steps):

$$\frac{x}{a^3}-\frac{\sqrt{b}\left(15a^2+20ab+8b^2\right)\mathrm{ArcTan}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b}}\right]}{8a^3(a+b)^{5/2}f}-\frac{b\,\mathrm{Tan}[e+fx]}{4a(a+b)f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^2}-\frac{b(7a+4b)\mathrm{Tan}[e+fx]}{8a^2(a+b)^2f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)}$$

Result (type 3, 627 leaves):

$$\frac{x\,(a+2b+a\,\text{Cos}[2e+2fx])^3\,\text{Sec}[e+fx]^6}{8a^3\,(a+b\,\text{Sec}[e+fx]^2)^3}+\Bigg(\left(15a^2+20ab+8b^2\right)(a+2b+a\,\text{Cos}[2e+2fx])^3$$

$$\text{Sec}[e+fx]^6\left(\left(b\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Cos}[2e]\right)\Big/\left(64a^3\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)-$$

$$\left(i\,b\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)(-a\,\text{Sin}[fx]-\right.\right.$$

$$\left.\left.\left.2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Sin}[2e]\right)\Big/\left(64a^3\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)\right)\Bigg)\Big/\left((a+b)^2\left(a+b\,\text{Sec}[e+fx]^2\right)^3\right)+$$

$$\left((a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^6\left(9a^2b\,\text{Sin}[2e]+28ab^2\,\text{Sin}[2e]+16b^3\,\text{Sin}[2e]-9a^2b\,\text{Sin}[2fx]-6ab^2\,\text{Sin}[2fx]\right)\right)\Big/$$

$$\left(64a^3(a+b)^2f\left(a+b\,\text{Sec}[e+fx]^2\right)^3(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])\right)+$$

$$\frac{(a+2b+a\,\text{Cos}[2e+2fx])\,\text{Sec}[e+fx]^6\left(-ab^2\,\text{Sin}[2e]-2b^3\,\text{Sin}[2e]+ab^2\,\text{Sin}[2fx]\right)}{16a^3(a+b)f\left(a+b\,\text{Sec}[e+fx]^2\right)^3(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])}$$

- **Problem 64: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+fx]^2}{\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 124 leaves, 5 steps):

$$-\frac{15\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b}}\right]}{8(a+b)^{7/2}f}-\frac{15\,\text{Cot}[e+fx]}{8(a+b)^3f}+\frac{\text{Cot}[e+fx]}{4(a+b)f\left(a+b+b\,\text{Tan}[e+fx]^2\right)^2}+\frac{5\,\text{Cot}[e+fx]}{8(a+b)^2f\left(a+b+b\,\text{Tan}[e+fx]^2\right)}$$

Result (type 3, 987 leaves):

$$\Bigg(\left(a+2b+a\,\text{Cos}[2e+2fx]\right)^3\,\text{Sec}[e+fx]^6\,\Bigg(\Bigg(15\,b\,\text{ArcTan}\Big[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)$$

$$\left(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx]\right)\Big]\,\text{Cos}[2e]\Bigg)\Bigg/\left(64\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)-$$

$$\Bigg(15\,i\,b\,\text{ArcTan}\Big[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)$$

$$\left(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx]\right)\Big]\,\text{Sin}[2e]\Bigg)\Bigg/\left(64\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)\Bigg)\Bigg)\Bigg/$$

$$\left((a+b)^3\left(a+b\,\text{Sec}[e+fx]^2\right)^3\right)+\frac{1}{512\,a^2\,(a+b)^3\,f\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\left(a+2b+a\,\text{Cos}[2e+2fx]\right)$$

$$\text{Csc}[e]$$
$$\text{Csc}[e+fx]$$
$$\text{Sec}[2e]$$
$$\text{Sec}[e+fx]^6$$

$$\big(-32a^4\,\text{Sin}[fx]-64a^3b\,\text{Sin}[fx]+22a^2b^2\,\text{Sin}[fx]+80ab^3\,\text{Sin}[fx]+16b^4\,\text{Sin}[fx]+32a^4\,\text{Sin}[3fx]+46a^3b\,\text{Sin}[3fx]-$$
$$54a^2b^2\,\text{Sin}[3fx]-8ab^3\,\text{Sin}[3fx]-48a^4\,\text{Sin}[2e-fx]-128a^3b\,\text{Sin}[2e-fx]-106a^2b^2\,\text{Sin}[2e-fx]+$$
$$80ab^3\,\text{Sin}[2e-fx]+16b^4\,\text{Sin}[2e-fx]+48a^4\,\text{Sin}[2e+fx]+146a^3b\,\text{Sin}[2e+fx]+182a^2b^2\,\text{Sin}[2e+fx]+$$
$$80ab^3\,\text{Sin}[2e+fx]+16b^4\,\text{Sin}[2e+fx]-32a^4\,\text{Sin}[4e+fx]-82a^3b\,\text{Sin}[4e+fx]-54a^2b^2\,\text{Sin}[4e+fx]-$$
$$80ab^3\,\text{Sin}[4e+fx]-16b^4\,\text{Sin}[4e+fx]-8a^4\,\text{Sin}[2e+3fx]+18a^3b\,\text{Sin}[2e+3fx]+54a^2b^2\,\text{Sin}[2e+3fx]+$$
$$8ab^3\,\text{Sin}[2e+3fx]+32a^4\,\text{Sin}[4e+3fx]+73a^3b\,\text{Sin}[4e+3fx]+24a^2b^2\,\text{Sin}[4e+3fx]+8ab^3\,\text{Sin}[4e+3fx]-$$
$$8a^4\,\text{Sin}[6e+3fx]-9a^3b\,\text{Sin}[6e+3fx]-24a^2b^2\,\text{Sin}[6e+3fx]-8ab^3\,\text{Sin}[6e+3fx]+8a^4\,\text{Sin}[2e+5fx]-$$
$$9a^3b\,\text{Sin}[2e+5fx]-2a^2b^2\,\text{Sin}[2e+5fx]+9a^3b\,\text{Sin}[4e+5fx]+2a^2b^2\,\text{Sin}[4e+5fx]+8a^4\,\text{Sin}[6e+5fx]\big)$$

- **Problem 65: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+fx]^4}{\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 164 leaves, 6 steps):

$$-\frac{5\,(3a-4b)\sqrt{b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b}}\right]}{8\,(a+b)^{9/2}\,f}-\frac{(a-2b)\,\text{Cot}[e+fx]}{(a+b)^4\,f}-$$

$$\frac{\text{Cot}[e+fx]^3}{3\,(a+b)^3\,f}-\frac{a\,b\,\text{Tan}[e+fx]}{4\,(a+b)^3\,f\left(a+b+b\,\text{Tan}[e+fx]^2\right)^2}-\frac{(7a-4b)\,b\,\text{Tan}[e+fx]}{8\,(a+b)^4\,f\left(a+b+b\,\text{Tan}[e+fx]^2\right)}$$

Result (type 3, 1234 leaves):

$$\left((3a-4b)\,(a+2b+a\,\text{Cos}[2e+2fx])^3\,\text{Sec}[e+fx]^6\right.$$

$$\left(\left(\left(5\,b\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathbb{i}\,b\,\text{Sin}[4e]}}-\frac{\mathbb{i}\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathbb{i}\,b\,\text{Sin}[4e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Cos}[2e]\right)\Big/\left(64\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4e]-\mathbb{i}\,b\,\text{Sin}[4e]}\right)-$$

$$\left(5\,\mathbb{i}\,b\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathbb{i}\,b\,\text{Sin}[4e]}}-\frac{\mathbb{i}\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathbb{i}\,b\,\text{Sin}[4e]}}\right)\right.\right.$$

$$\left.\left.\left.\left.(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Sin}[2e]\right)\Big/\left(64\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4e]-\mathbb{i}\,b\,\text{Sin}[4e]}\right)\right)\right)\Big/$$

$$\left((a+b)^4\left(a+b\,\text{Sec}[e+fx]^2\right)^3\right)+\frac{1}{6144\,a\,(a+b)^4\,f\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\,(a+2b+a\,\text{Cos}[2e+2fx])$$

$$\text{Csc}[e]$$
$$\text{Csc}[e+fx]^3$$
$$\text{Sec}[2e]$$
$$\text{Sec}[e+fx]^6$$

$$(-176a^4\,\text{Sin}[fx]-488a^3b\,\text{Sin}[fx]-252a^2b^2\,\text{Sin}[fx]-504ab^3\,\text{Sin}[fx]-144b^4\,\text{Sin}[fx]+96a^4\,\text{Sin}[3fx]+71a^3b\,\text{Sin}[3fx]-$$
$$344a^2b^2\,\text{Sin}[3fx]+1208ab^3\,\text{Sin}[3fx]-48b^4\,\text{Sin}[3fx]-224a^4\,\text{Sin}[2e-fx]-576a^3b\,\text{Sin}[2e-fx]-124a^2b^2\,\text{Sin}[2e-fx]+$$
$$2184ab^3\,\text{Sin}[2e-fx]-144b^4\,\text{Sin}[2e-fx]+224a^4\,\text{Sin}[2e+fx]+657a^3b\,\text{Sin}[2e+fx]+538a^2b^2\,\text{Sin}[2e+fx]-$$
$$984ab^3\,\text{Sin}[2e+fx]-144b^4\,\text{Sin}[2e+fx]-176a^4\,\text{Sin}[4e+fx]-569a^3b\,\text{Sin}[4e+fx]-666a^2b^2\,\text{Sin}[4e+fx]-$$
$$1704ab^3\,\text{Sin}[4e+fx]+144b^4\,\text{Sin}[4e+fx]-48a^4\,\text{Sin}[2e+3fx]-111a^3b\,\text{Sin}[2e+3fx]-360a^2b^2\,\text{Sin}[2e+3fx]-$$
$$312ab^3\,\text{Sin}[2e+3fx]+48b^4\,\text{Sin}[2e+3fx]+96a^4\,\text{Sin}[4e+3fx]+152a^3b\,\text{Sin}[4e+3fx]-146a^2b^2\,\text{Sin}[4e+3fx]+$$
$$728ab^3\,\text{Sin}[4e+3fx]+48b^4\,\text{Sin}[4e+3fx]-48a^4\,\text{Sin}[6e+3fx]-192a^3b\,\text{Sin}[6e+3fx]-558a^2b^2\,\text{Sin}[6e+3fx]+$$
$$168ab^3\,\text{Sin}[6e+3fx]-48b^4\,\text{Sin}[6e+3fx]-16a^4\,\text{Sin}[2e+5fx]+598a^2b^2\,\text{Sin}[2e+5fx]-48ab^3\,\text{Sin}[2e+5fx]-$$
$$72a^3b\,\text{Sin}[4e+5fx]-150a^2b^2\,\text{Sin}[4e+5fx]+48ab^3\,\text{Sin}[4e+5fx]-16a^4\,\text{Sin}[6e+5fx]-27a^3b\,\text{Sin}[6e+5fx]+$$
$$388a^2b^2\,\text{Sin}[6e+5fx]-45a^3b\,\text{Sin}[8e+5fx]+60a^2b^2\,\text{Sin}[8e+5fx]-16a^4\,\text{Sin}[4e+7fx]+83a^3b\,\text{Sin}[4e+7fx]-$$
$$6a^2b^2\,\text{Sin}[4e+7fx]-27a^3b\,\text{Sin}[6e+7fx]+6a^2b^2\,\text{Sin}[6e+7fx]-16a^4\,\text{Sin}[8e+7fx]+56a^3b\,\text{Sin}[8e+7fx])$$

- **Problem 66: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Csc}[e+fx]^6}{\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 242 leaves, 7 steps) :

$$-\frac{\sqrt{b}\,\left(15 a^2-40 a b+8 b^2\right) \text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 (a+b)^{11/2} f}-\frac{\left(5 a^2-20 a b+2 b^2\right) \text{Cot}[e+f x]}{5 (a+b)^5 f}-\frac{(10 a+b) \text{Cot}[e+f x]^3}{15 (a+b)^4 f}-\frac{\text{Cot}[e+f x]^5}{5 (a+b) f \left(a+b+b \text{Tan}[e+f x]^2\right)^2}-\frac{b \left(5 a^2+4 b^2\right) \text{Tan}[e+f x]}{20 (a+b)^4 f \left(a+b+b \text{Tan}[e+f x]^2\right)^2}-\frac{b \left(35 a^2-40 a b+24 b^2\right) \text{Tan}[e+f x]}{40 (a+b)^5 f \left(a+b+b \text{Tan}[e+f x]^2\right)}$$

Result (type 3, 908 leaves):

$$\frac{(-4 a \text{Cos}[e]+11 b \text{Cos}[e]) (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x]^2 \text{Sec}[e+f x]^6}{120 (a+b)^4 f \left(a+b \text{Sec}[e+f x]^2\right)^3}-\frac{(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Cot}[e] \text{Csc}[e+f x]^4 \text{Sec}[e+f x]^6}{40 (a+b)^3 f \left(a+b \text{Sec}[e+f x]^2\right)^3}+\left(\left(15 a^2-40 a b+8 b^2\right) (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6 \left(\left(b \text{ArcTan}\left[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}-\frac{i \text{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}\right) (-a \text{Sin}[f x]-2 b \text{Sin}[f x]+a \text{Sin}[2 e+f x])\right] \text{Cos}[2 e]\right)\Big/\left(64 \sqrt{a+b}\, f \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}\right)-\left(i b \text{ArcTan}\left[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}-\frac{i \text{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}\right) (-a \text{Sin}[f x]-2 b \text{Sin}[f x]+a \text{Sin}[2 e+f x])\right] \text{Sin}[2 e]\right)\Big/\left(64 \sqrt{a+b}\, f \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}\right)\right)\right)\Big/\left((a+b)^5 \left(a+b \text{Sec}[e+f x]^2\right)^3\right)+\frac{(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x]^5 \text{Sec}[e+f x]^6 \text{Sin}[f x]}{40 (a+b)^3 f \left(a+b \text{Sec}[e+f x]^2\right)^3}+\frac{(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x]^3 \text{Sec}[e+f x]^6 (4 a \text{Sin}[f x]-11 b \text{Sin}[f x])}{120 (a+b)^4 f \left(a+b \text{Sec}[e+f x]^2\right)^3}+\left((a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x] \text{Sec}[e+f x]^6 \left(8 a^2 \text{Sin}[f x]-59 a b \text{Sin}[f x]+23 b^2 \text{Sin}[f x]\right)\right)\Big/\left(120 (a+b)^5 f \left(a+b \text{Sec}[e+f x]^2\right)^3\right)+\frac{(a+2 b+a \text{Cos}[2 e+2 f x]) \text{Sec}[2 e] \text{Sec}[e+f x]^6 \left(-a b^2 \text{Sin}[2 e]-2 b^3 \text{Sin}[2 e]+a b^2 \text{Sin}[2 f x]\right)}{16 (a+b)^4 f \left(a+b \text{Sec}[e+f x]^2\right)^3}+\left((a+2 b+a \text{Cos}[2 e+2 f x])^2 \text{Sec}[2 e] \text{Sec}[e+f x]^6 \left(9 a^2 b \text{Sin}[2 e]+16 a b^2 \text{Sin}[2 e]-8 b^3 \text{Sin}[2 e]-9 a^2 b \text{Sin}[2 f x]+6 a b^2 \text{Sin}[2 f x]\right)\right)\Big/\left(64 (a+b)^5 f \left(a+b \text{Sec}[e+f x]^2\right)^3\right)$$

- **Problem 67: Unable to integrate problem.**

$$\int \sqrt{a+b \text{Sec}[e+f x]^2}\, \text{Sin}[e+f x]^5 \, dx$$

Optimal (type 3, 139 leaves, 6 steps):

$$\frac{\sqrt{b}\ \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{f}-\frac{\text{Cos}[e+f x]\ \sqrt{a+b\,\text{Sec}[e+f x]^2}}{f}+\frac{2\ (5 a+b)\ \text{Cos}[e+f x]^3\ \left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}{15\,a^2\,f}-\frac{\text{Cos}[e+f x]^5\ \left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}{5\,a\,f}$$

Result (type 8, 27 leaves):

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]^5\,dx$$

Problem 68: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]^3\,dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$\frac{\sqrt{b}\ \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{f}-\frac{\text{Cos}[e+f x]\ \sqrt{a+b\,\text{Sec}[e+f x]^2}}{f}+\frac{\text{Cos}[e+f x]^3\ \left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}{3\,a\,f}$$

Result (type 8, 27 leaves):

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]^3\,dx$$

Problem 69: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]\,dx$$

Optimal (type 3, 66 leaves, 4 steps):

$$\frac{\sqrt{b}\ \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{f}-\frac{\text{Cos}[e+f x]\ \sqrt{a+b\,\text{Sec}[e+f x]^2}}{f}$$

Result (type 8, 25 leaves):

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]\,dx$$

Problem 71: Unable to integrate problem.

$$\int\text{Csc}[e+f x]^3\ \sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 124 leaves, 7 steps):

$$\frac{\sqrt{b}\ \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{f}-\frac{(a+2 b)\ \text{ArcTanh}\left[\frac{\sqrt{a+b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{2 \sqrt{a+b}\ f}-\frac{\text{Cot}[e+f x]\ \text{Csc}[e+f x]\ \sqrt{a+b\,\text{Sec}[e+f x]^2}}{2 f}$$

Result (type 8, 27 leaves):

$$\int \text{Csc}[e+f x]^3 \sqrt{a+b\,\text{Sec}[e+f x]^2}\, dx$$

Problem 72: Unable to integrate problem.

$$\int \text{Csc}[e+f x]^5 \sqrt{a+b\,\text{Sec}[e+f x]^2}\, dx$$

Optimal (type 3, 183 leaves, 8 steps):

$$\frac{\sqrt{b}\ \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{f}-\frac{\left(3 a^2+12 a b+8 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{a+b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{8 (a+b)^{3/2} f}-$$
$$\frac{(3 a+4 b)\ \text{Cot}[e+f x]\ \text{Csc}[e+f x] \sqrt{a+b\,\text{Sec}[e+f x]^2}}{8 (a+b) f}-\frac{\text{Cot}[e+f x]\ \text{Csc}[e+f x]^3 \sqrt{a+b\,\text{Sec}[e+f x]^2}}{4 f}$$

Result (type 8, 27 leaves):

$$\int \text{Csc}[e+f x]^5 \sqrt{a+b\,\text{Sec}[e+f x]^2}\, dx$$

Problem 73: Unable to integrate problem.

$$\int \sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]^6\, dx$$

Optimal (type 3, 240 leaves, 9 steps):

$$\frac{\left(5 a^3-15 a^2 b-5 a b^2-b^3\right) \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{16 a^{5/2} f}+$$
$$\frac{\sqrt{b}\ \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}-\frac{(a-b) (5 a+b)\ \text{Cos}[e+f x]\ \text{Sin}[e+f x] \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{16 a^2 f}-$$
$$\frac{(5 a-b)\ \text{Cos}[e+f x]\ \text{Sin}[e+f x]^3 \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{24 a f}-\frac{\text{Cos}[e+f x]\ \text{Sin}[e+f x]^5 \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{6 f}$$

Result (type 8, 27 leaves):

$$\int \sqrt{a+b\,\text{Sec}[e+f x]^2}\ \text{Sin}[e+f x]^6\, dx$$

Problem 74: Unable to integrate problem.

$$\int \sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}\;\mathrm{Sin}[e+f\,x]^4\,dx$$

Optimal (type 3, 181 leaves, 8 steps):

$$\frac{\left(3\,a^2-6\,a\,b-b^2\right)\mathrm{ArcTan}\left[\frac{\sqrt{a}\;\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{8\,a^{3/2}\,f}+\frac{\sqrt{b}\;\mathrm{ArcTanh}\left[\frac{\sqrt{b}\;\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{f}-\frac{(3\,a-b)\,\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{8\,a\,f}-\frac{\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]^3\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{4\,f}$$

Result (type 8, 27 leaves):

$$\int \sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}\;\mathrm{Sin}[e+f\,x]^4\,dx$$

Problem 75: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}\;\mathrm{Sin}[e+f\,x]^2\,dx$$

Optimal (type 3, 123 leaves, 7 steps):

$$\frac{(a-b)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\;\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{2\,\sqrt{a}\;f}+\frac{\sqrt{b}\;\mathrm{ArcTanh}\left[\frac{\sqrt{b}\;\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{f}-\frac{\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{2\,f}$$

Result (type 3, 432 leaves):

$$\frac{1}{4\sqrt{2}\, f\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}}\, e^{-i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,\text{Cos}[e+fx]$$
$$\left(i\left(-1+e^{2i(e+fx)}\right)+\left(2e^{2i(e+fx)}\left(2afx-2bfx-i(a-b)\,\text{Log}\left[a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,\right]+\right.\right.\right.$$
$$i(a-b)\,\text{Log}\left[a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,\right]-4\sqrt{a}\sqrt{b}\,\text{Log}\Big[$$
$$\left.\left.\left.\frac{\left(-\sqrt{b}\left(-1+e^{2i(e+fx)}\right)+i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)f}{2b\left(1+e^{2i(e+fx)}\right)}\right]\right)\right)\Big/\left(\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right)\sqrt{a+b\,\text{Sec}[e+fx]^2}$$

Problem 76: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 79 leaves, 6 steps):

$$\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{f}+\frac{\sqrt{b}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{f}$$

Result (type 8, 18 leaves):

$$\int\sqrt{a+b\,\text{Sec}[e+fx]^2}\,dx$$

Problem 77: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\text{Csc}[e+fx]^2\sqrt{a+b\,\text{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 68 leaves, 4 steps):

$$\frac{\sqrt{b}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{f}-\frac{\text{Cot}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{f}$$

Result (type 3, 285 leaves):

$$-\left(\left(1+e^{2 i (e+f x)}\right) \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}\right.$$

$$\left(i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}+\sqrt{b} \left(-1+e^{2 i (e+f x)}\right) \text{Log}\left[\frac{-4 \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) f+4 i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f}{1+e^{2 i (e+f x)}}\right]\right)$$

$$\left.\sqrt{a+b \text{Sec}[e+f x]^2}\right) \Big/ \left(\sqrt{2} \left(-1+e^{2 i (e+f x)}\right) \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f \sqrt{a+2 b+a \text{Cos}[2 (e+f x)]}\right)$$

- **Problem 78: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Csc}[e+f x]^4 \sqrt{a+b \text{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 105 leaves, 5 steps) :

$$\frac{\sqrt{b} \text{ArcTanh}\left[\frac{\sqrt{b} \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{f}-\frac{\text{Cot}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{f}-\frac{\text{Cot}[e+f x]^3 \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}{3 (a+b) f}$$

Result (type 3, 309 leaves) :

$$\left(\sqrt{2}\, e^{i(e+fx)} \sqrt{4b + a e^{-2i(e+fx)} \left(1+e^{2i(e+fx)}\right)^2}\, \mathrm{Cos}[e+fx]\right.$$

$$\left(-\frac{i\left(2a\left(1-4e^{2i(e+fx)}+e^{4i(e+fx)}\right)+b\left(3-10e^{2i(e+fx)}+3e^{4i(e+fx)}\right)\right)}{(a+b)\left(-1+e^{2i(e+fx)}\right)^3} - \frac{3\sqrt{b}\, \mathrm{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4be^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\, f}{1+e^{2i(e+fx)}}\right]}{\sqrt{4be^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)$$

$$\left.\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}\right) \Big/ \left(3f\sqrt{a+2b+a\,\mathrm{Cos}[2e+2fx]}\right)$$

- **Problem 79: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[e+fx]^6 \sqrt{a+b\,\mathrm{Sec}[e+fx]^2}\, dx$$

Optimal (type 3, 149 leaves, 6 steps) :

$$\frac{\sqrt{b}\, \mathrm{ArcTanh}\left[\frac{\sqrt{b}\, \mathrm{Tan}[e+fx]}{\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}\right]}{f} - \frac{\mathrm{Cot}[e+fx]\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}{f} - \frac{2(5a+4b)\,\mathrm{Cot}[e+fx]^3\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^{3/2}}{15(a+b)^2 f} - \frac{\mathrm{Cot}[e+fx]^5\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^{3/2}}{5(a+b)f}$$

Result (type 3, 422 leaves) :

$$\frac{1}{15 f \sqrt{a+2 b+a \operatorname{Cos}[2 e+2 f x]}} \sqrt{2}\, e^{i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \operatorname{Cos}[e+f x]$$

$$\left(-\left(i \left(8 a^2 \left(1-6 e^{2 i (e+f x)}+16 e^{4 i (e+f x)}-6 e^{6 i (e+f x)}+e^{8 i (e+f x)}\right)+b^2 \left(15-80 e^{2 i (e+f x)}+178 e^{4 i (e+f x)}-80 e^{6 i (e+f x)}+15 e^{8 i (e+f x)}\right)+\right.\right.\right.$$

$$\left.\left. a b \left(25-136 e^{2 i (e+f x)}+318 e^{4 i (e+f x)}-136 e^{6 i (e+f x)}+25 e^{8 i (e+f x)}\right)\right)\right) \Big/ \left((a+b)^2 \left(-1+e^{2 i (e+f x)}\right)^5\right)-$$

$$\left.\frac{15 \sqrt{b} \operatorname{Log}\left[\frac{-4 \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) f+4 i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}}\right) \sqrt{a+b \operatorname{Sec}[e+f x]^2}$$

Problem 80: Unable to integrate problem.

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2} \operatorname{Sin}[e+f x]^5 \, dx$$

Optimal (type 3, 196 leaves, 7 steps):

$$\frac{(3 a-4 b) \sqrt{b} \operatorname{ArcTanh}\left[\frac{\sqrt{b} \operatorname{Sec}[e+f x]}{\sqrt{a+b \operatorname{Sec}[e+f x]^2}}\right]}{2 f}+\frac{(3 a-4 b) b \operatorname{Sec}[e+f x] \sqrt{a+b \operatorname{Sec}[e+f x]^2}}{2 a f}-$$

$$\frac{(3 a-4 b) \operatorname{Cos}[e+f x] \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2}}{3 a f}+\frac{2 \operatorname{Cos}[e+f x]^3 \left(a+b \operatorname{Sec}[e+f x]^2\right)^{5/2}}{3 a f}-\frac{\operatorname{Cos}[e+f x]^5 \left(a+b \operatorname{Sec}[e+f x]^2\right)^{5/2}}{5 a f}$$

Result (type 8, 27 leaves):

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2} \operatorname{Sin}[e+f x]^5 \, dx$$

Problem 81: Unable to integrate problem.

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2} \operatorname{Sin}[e+f x]^3 \, dx$$

Optimal (type 3, 162 leaves, 6 steps):

$$\frac{(3 a-2 b) \sqrt{b} \operatorname{ArcTanh}\left[\frac{\sqrt{b} \operatorname{Sec}[e+f x]}{\sqrt{a+b \operatorname{Sec}[e+f x]^2}}\right]}{2 f}+\frac{(3 a-2 b) b \operatorname{Sec}[e+f x] \sqrt{a+b \operatorname{Sec}[e+f x]^2}}{2 a f}-$$

$$\frac{(3 a-2 b) \operatorname{Cos}[e+f x] \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2}}{3 a f}+\frac{\operatorname{Cos}[e+f x]^3 \left(a+b \operatorname{Sec}[e+f x]^2\right)^{5/2}}{3 a f}$$

Result (type 8, 27 leaves):

$$\int \left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,\mathrm{Sin}[e+f\,x]^3\,dx$$

- **Problem 82: Unable to integrate problem.**

$$\int \left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,\mathrm{Sin}[e+f\,x]\,dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$\frac{3\,a\,\sqrt{b}\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{2\,f}+\frac{3\,b\,\mathrm{Sec}[e+f\,x]\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}{2\,f}-\frac{\mathrm{Cos}[e+f\,x]\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}}{f}$$

Result (type 8, 25 leaves):

$$\int \left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,\mathrm{Sin}[e+f\,x]\,dx$$

- **Problem 83: Unable to integrate problem.**

$$\int \mathrm{Csc}[e+f\,x]\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 122 leaves, 7 steps):

$$\frac{\sqrt{b}\,(3\,a+2\,b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{2\,f}-\frac{(a+b)^{3/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{f}+\frac{b\,\mathrm{Sec}[e+f\,x]\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}{2\,f}$$

Result (type 8, 25 leaves):

$$\int \mathrm{Csc}[e+f\,x]\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

- **Problem 84: Unable to integrate problem.**

$$\int \mathrm{Csc}[e+f\,x]^3\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 161 leaves, 8 steps):

$$\frac{\sqrt{b}\,(3\,a+4\,b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{2\,f}-\frac{\sqrt{a+b}\,(a+4\,b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{2\,f}+$$

$$\frac{b\,\mathrm{Sec}[e+f\,x]\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}{f}-\frac{\mathrm{Cot}[e+f\,x]\,\mathrm{Csc}[e+f\,x]\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}}{2\,f}$$

Result (type 8, 27 leaves):

$$\int \mathrm{Csc}[e+f\,x]^3\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Problem 85: Unable to integrate problem.

$$\int \mathrm{Csc}[e+f x]^5 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 218 leaves, 9 steps):

$$\frac{3\sqrt{b}\,(a+2b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Sec}[e+f x]}{\sqrt{a+b\,\mathrm{Sec}[e+f x]^2}}\right]}{2 f}-\frac{3\left(a^2+8ab+8b^2\right)\mathrm{ArcTanh}\left[\frac{\sqrt{a+b}\,\mathrm{Sec}[e+f x]}{\sqrt{a+b\,\mathrm{Sec}[e+f x]^2}}\right]}{8\sqrt{a+b}\,f}+\frac{3\,(a+4b)\,\mathrm{Sec}[e+f x]\sqrt{a+b\,\mathrm{Sec}[e+f x]^2}}{8 f}-$$
$$\frac{3\,(a+2b)\,\mathrm{Csc}[e+f x]^2\,\mathrm{Sec}[e+f x]\sqrt{a+b\,\mathrm{Sec}[e+f x]^2}}{8 f}-\frac{\mathrm{Cot}[e+f x]\,\mathrm{Csc}[e+f x]^3\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2}}{4 f}$$

Result (type 8, 27 leaves):

$$\int \mathrm{Csc}[e+f x]^5 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2} dx$$

Problem 86: Unable to integrate problem.

$$\int \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2} \mathrm{Sin}[e+f x]^6\, dx$$

Optimal (type 3, 298 leaves, 10 steps):

$$\frac{\left(5a^3-45a^2b+15ab^2+b^3\right)\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}\right]}{16\,a^{3/2}\,f}+\frac{(3a-5b)\sqrt{b}\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}\right]}{2 f}-$$
$$\frac{\left(5a^2-26ab+b^2\right)\mathrm{Tan}[e+f x]\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}{16\,a\,f}+\frac{\left(5a^2-40ab+3b^2\right)\mathrm{Sin}[e+f x]^2\,\mathrm{Tan}[e+f x]\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}{48\,a\,f}+$$
$$\frac{(5a-3b)\,\mathrm{Sin}[e+f x]^4\,\mathrm{Tan}[e+f x]\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}{24 f}-\frac{\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]^5\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}}{6 f}$$

Result (type 8, 27 leaves):

$$\int \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2} \mathrm{Sin}[e+f x]^6\, dx$$

Problem 87: Unable to integrate problem.

$$\int \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2} \mathrm{Sin}[e+f x]^4\, dx$$

Optimal (type 3, 217 leaves, 9 steps):

$$\frac{3\left(a^2-6ab+b^2\right)\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{8\sqrt{a}\,f}+\frac{3(a-b)\sqrt{b}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{2f}-\frac{3(a-3b)\,\text{Tan}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{8f}+$$

$$\frac{3(a-b)\,\text{Sin}[e+fx]^2\,\text{Tan}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{8f}-\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]^3\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{3/2}}{4f}$$

Result (type 8, 27 leaves) :

$$\int\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}\text{Sin}[e+fx]^4\,dx$$

- **Problem 88: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}\text{Sin}[e+fx]^2\,dx$$

Optimal (type 3, 161 leaves, 8 steps) :

$$\frac{\sqrt{a}\,(a-3b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{2f}+\frac{(3a-b)\sqrt{b}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{2f}+$$

$$\frac{b\,\text{Tan}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{f}-\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{3/2}}{2f}$$

Result (type 3, 493 leaves) :

$$\frac{1}{2\sqrt{2}\, f\, (a+2\, b+a\, \text{Cos}[2\, e+2\, f\, x])^{3/2}}$$

$$e^{-i\,(e+f\,x)}\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\ \text{Cos}[e+f\,x]^3\left(\frac{i\left(-1+e^{2\,i\,(e+f\,x)}\right)\left(-4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)}{\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+\right.$$

$$\left(2\,e^{2\,i\,(e+f\,x)}\left(2\sqrt{a}\,(a-3\,b)\,f\,x-i\sqrt{a}\,(a-3\,b)\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+\right.\right.$$

$$i\sqrt{a}\,(a-3\,b)\,\text{Log}\left[a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+2\sqrt{b}\,(-3\,a+b)$$

$$\left.\left.\left.\text{Log}\left[\frac{\left(\sqrt{b}\left(-1+e^{2\,i\,(e+f\,x)}\right)-i\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)f}{b\,(-3\,a+b)\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]\right)\right)\Big/\left(\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right)\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}$$

Problem 89: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 118 leaves, 7 steps):

$$\frac{a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{f}+\frac{\sqrt{b}\,(3\,a+b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{2\,f}+\frac{b\,\text{Tan}[e+f\,x]\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{2\,f}$$

Result (type 3, 527 leaves):

$$\frac{1}{f\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])^{3/2}}\sqrt{2}\,e^{i\,(e+f\,x)}\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\mathrm{Cos}[e+f\,x]^3$$

$$\left(-\frac{i\,b\left(-1+e^{2\,i\,(e+f\,x)}\right)}{\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+\frac{1}{\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}}\left(2\,a^{3/2}\,f\,x-i\,a^{3/2}\,\mathrm{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+\right.\right.$$

$$i\,a^{3/2}\,\mathrm{Log}\left[a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]-$$

$$3\,a\,\sqrt{b}\,\mathrm{Log}\left[\frac{-2\,\sqrt{b}\left(-1+e^{2\,i\,(e+f\,x)}\right)f+2\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{b\,(3\,a+b)\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]-$$

$$\left.\left.b^{3/2}\,\mathrm{Log}\left[\frac{-2\,\sqrt{b}\left(-1+e^{2\,i\,(e+f\,x)}\right)f+2\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{b\,(3\,a+b)\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]\right)\right)\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}$$

- **Problem 90: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \mathrm{Csc}[e+f\,x]^2\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}dx$$

Optimal (type 3, 105 leaves, 5 steps):

$$\frac{3\,\sqrt{b}\,(a+b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{2\,f}+\frac{3\,b\,\mathrm{Tan}[e+f\,x]\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{2\,f}-\frac{\mathrm{Cot}[e+f\,x]\left(a+b+b\,\mathrm{Tan}[e+f\,x]^2\right)^{3/2}}{f}$$

Result (type 3, 310 leaves):

$$\left(\sqrt{2}\, e^{i (e+f x)} \sqrt{4 b + a e^{-2 i (e+f x)} \left(1 + e^{2 i (e+f x)}\right)^2} \operatorname{Cos}[e+f x]^3\right.$$

$$\left(-\frac{i \left(2 a \left(1 + e^{2 i (e+f x)}\right)^2 + b \left(3 + 2 e^{2 i (e+f x)} + 3 e^{4 i (e+f x)}\right)\right)}{\left(-1 + e^{2 i (e+f x)}\right) \left(1 + e^{2 i (e+f x)}\right)^2} - \frac{3 \sqrt{b} (a+b) \operatorname{Log}\left[\frac{-4 \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) f + 4 i \sqrt{4 b e^{2 i (e+f x)} + a \left(1+e^{2 i (e+f x)}\right)^2} f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}}\right)$$

$$\left.\left(a + b \operatorname{Sec}[e+f x]^2\right)^{3/2}\right) \Big/ \left(f (a + 2 b + a \operatorname{Cos}[2 e + 2 f x])^{3/2}\right)$$

- **Problem 91: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Csc}[e+f x]^4 \left(a + b \operatorname{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 172 leaves, 6 steps) :

$$\frac{\sqrt{b} (3 a + 5 b) \operatorname{ArcTanh}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}\right]}{2 f} + \frac{b (3 a + 5 b) \operatorname{Tan}[e+f x] \sqrt{a + b + b \operatorname{Tan}[e+f x]^2}}{2 (a+b) f} -$$

$$\frac{(3 a + 5 b) \operatorname{Cot}[e+f x] \left(a + b + b \operatorname{Tan}[e+f x]^2\right)^{3/2}}{3 (a+b) f} - \frac{\operatorname{Cot}[e+f x]^3 \left(a + b + b \operatorname{Tan}[e+f x]^2\right)^{5/2}}{3 (a+b) f}$$

Result (type 3, 369 leaves) :

$$\left(\sqrt{2}\, e^{i (e+f x)} \sqrt{4 b + a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}\, \text{Cos}[e+f x]^3\right.$$

$$\left(-\left(i \left(4 a \left(1+e^{2 i (e+f x)}\right)^2 \left(1-4 e^{2 i (e+f x)}+e^{4 i (e+f x)}\right)+b \left(15-20 e^{2 i (e+f x)}-22 e^{4 i (e+f x)}-20 e^{6 i (e+f x)}+15 e^{8 i (e+f x)}\right)\right)\right)\Big/\right.$$

$$\left.\left(\left(-1+e^{2 i (e+f x)}\right)^3 \left(1+e^{2 i (e+f x)}\right)^2\right)-\frac{3 \sqrt{b}\, (3 a+5 b)\, \text{Log}\left[\frac{-4 \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) f+4 i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\, f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}}\right)$$

$$\left.\left(a+b\, \text{Sec}[e+f x]^2\right)^{3/2}\right)\Big/\left(3 f\, (a+2 b+a\, \text{Cos}[2 e+2 f x])^{3/2}\right)$$

- **Problem 92: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Csc}[e+f x]^6 \left(a+b\, \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 209 leaves, 7 steps):

$$\frac{\sqrt{b}\, (3 a+7 b)\, \text{ArcTanh}\left[\frac{\sqrt{b}\, \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{2 f}+\frac{b\, (3 a+7 b)\, \text{Tan}[e+f x] \sqrt{a+b+b\, \text{Tan}[e+f x]^2}}{2 (a+b) f}-$$

$$\frac{(3 a+7 b)\, \text{Cot}[e+f x] \left(a+b+b\, \text{Tan}[e+f x]^2\right)^{3/2}}{3 (a+b) f}-\frac{2\, \text{Cot}[e+f x]^3 \left(a+b+b\, \text{Tan}[e+f x]^2\right)^{5/2}}{3 (a+b) f}-\frac{\text{Cot}[e+f x]^5 \left(a+b+b\, \text{Tan}[e+f x]^2\right)^{5/2}}{5 (a+b) f}$$

Result (type 3, 512 leaves):

$$\frac{1}{15\,f\,(a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])^{3/2}}\sqrt{2}\,e^{i\,(e+f\,x)}\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\mathrm{Cos}[e+f\,x]^3$$

$$\left(-\frac{1}{(a+b)\left(-1+e^{2\,i\,(e+f\,x)}\right)^5\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,i\left(16\,a^2\left(1+e^{2\,i\,(e+f\,x)}\right)^2\left(1-6\,e^{2\,i\,(e+f\,x)}+16\,e^{4\,i\,(e+f\,x)}-6\,e^{6\,i\,(e+f\,x)}+e^{8\,i\,(e+f\,x)}\right)+\right.\right.$$
$$b^2\left(105-350\,e^{2\,i\,(e+f\,x)}+231\,e^{4\,i\,(e+f\,x)}+412\,e^{6\,i\,(e+f\,x)}+231\,e^{8\,i\,(e+f\,x)}-350\,e^{10\,i\,(e+f\,x)}+105\,e^{12\,i\,(e+f\,x)}\right)+$$
$$\left.a\,b\left(115-402\,e^{2\,i\,(e+f\,x)}+317\,e^{4\,i\,(e+f\,x)}+708\,e^{6\,i\,(e+f\,x)}+317\,e^{8\,i\,(e+f\,x)}-402\,e^{10\,i\,(e+f\,x)}+115\,e^{12\,i\,(e+f\,x)}\right)\right)-$$
$$\left.\frac{15\,\sqrt{b}\,(3\,a+7\,b)\,\mathrm{Log}\left[\frac{-4\,\sqrt{b}\,\left(-1+e^{2\,i\,(e+f\,x)}\right)f+4\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{1+e^{2\,i\,(e+f\,x)}}\right]}{\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}}\right)\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}$$

- **Problem 96: Unable to integrate problem.**

$$\int\frac{\mathrm{Csc}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 3, 43 leaves, 3 steps) :

$$-\frac{\mathrm{ArcTanh}\left[\frac{\sqrt{a+b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{\sqrt{a+b}\,f}$$

Result (type 8, 25 leaves) :

$$\int\frac{\mathrm{Csc}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

- **Problem 97: Unable to integrate problem.**

$$\int\frac{\mathrm{Csc}[e+f\,x]^3}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 3, 87 leaves, 5 steps) :

$$-\frac{a\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b}\,\mathrm{Sec}[e+f\,x]}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\right]}{2\,(a+b)^{3/2}\,f}-\frac{\mathrm{Cot}[e+f\,x]\,\mathrm{Csc}[e+f\,x]\,\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}{2\,(a+b)\,f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Csc}[e+f x]^3}{\sqrt{a+b \text{Sec}[e+f x]^2}} \, dx$$

Problem 98: Unable to integrate problem.

$$\int \frac{\text{Csc}[e+f x]^5}{\sqrt{a+b \text{Sec}[e+f x]^2}} \, dx$$

Optimal (type 3, 138 leaves, 6 steps):

$$-\frac{3 a^2 \text{ArcTanh}\left[\frac{\sqrt{a+b} \text{Sec}[e+f x]}{\sqrt{a+b \text{Sec}[e+f x]^2}}\right]}{8 (a+b)^{5/2} f}-\frac{(5 a+2 b) \text{Cot}[e+f x] \text{Csc}[e+f x] \sqrt{a+b \text{Sec}[e+f x]^2}}{8 (a+b)^2 f}-\frac{\text{Cot}[e+f x]^3 \text{Csc}[e+f x] \sqrt{a+b \text{Sec}[e+f x]^2}}{4 (a+b) f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Csc}[e+f x]^5}{\sqrt{a+b \text{Sec}[e+f x]^2}} \, dx$$

Problem 99: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sin}[e+f x]^6}{\sqrt{a+b \text{Sec}[e+f x]^2}} \, dx$$

Optimal (type 3, 193 leaves, 7 steps):

$$\frac{5 (a+b)^3 \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{16 a^{7/2} f}-\frac{\left(33 a^2+40 a b+15 b^2\right) \text{Cos}[e+f x] \text{Sin}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{48 a^3 f}+$$

$$\frac{(9 a+5 b) \text{Cos}[e+f x]^3 \text{Sin}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{24 a^2 f}+\frac{\text{Cos}[e+f x]^3 \text{Sin}[e+f x]^3 \sqrt{a+b+b \text{Tan}[e+f x]^2}}{6 a f}$$

Result (type 3, 2258 leaves):

$$\frac{5 \text{ArcTan}\left[\frac{\sqrt{2} \sqrt{a} \text{Sin}[e+f x]}{\sqrt{a+2 b+a \text{Cos}[2 (e+f x)]}}\right] \sqrt{a+2 b+a \text{Cos}[2 e+2 f x]} \text{Sec}[e+f x]}{64 \sqrt{2} \sqrt{a} f \sqrt{a+b \text{Sec}[e+f x]^2}}-$$

$$\frac{1}{1536 \sqrt{2} a^{7/2} f \sqrt{a+b \text{Sec}[e+f x]^2}} e^{-i (13 e+5 f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \sqrt{a+2 b+a \text{Cos}[2 e+2 f x]}$$

$$\left(\left(1+e^{14 i e}\right) \left(i \sqrt{a} \left(-60 b^2 e^{4 i f x} \left(-e^{12 i e}+e^{2 i f x}\right)+10 a b e^{2 i f x} \left(-e^{10 i e}-6 e^{4 i f x}+6 e^{2 i (6 e+f x)}+e^{2 i (e+3 f x)}\right)+\right.\right.\right.$$

$$\left.\left. a^2 \left(2 e^{8 i e}-11 e^{6 i f x}+11 e^{4 i (3 e+f x)}-5 e^{2 i (5 e+f x)}+5 e^{2 i (e+4 f x)}-2 e^{2 i (2 e+5 f x)}\right)\right)-\right.$$

$$\left(6\left(a^3+12a^2b+30ab^2+20b^3\right)e^{6ifx}\left(-i\,\text{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+e^{14ie}\left(2fx+i\,\text{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\right)\right)\right)\Big/\left(\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\Bigg)+$$

$$\left(-1+e^{14ie}\right)\left(-i\sqrt{a}\left(60b^2e^{4ifx}\left(e^{12ie}+e^{2ifx}\right)-10ab\,e^{2ifx}\left(e^{10ie}-6e^{4ifx}-6e^{2i(6e+fx)}+e^{2i(e+3fx)}\right)+a^2\left(2e^{8ie}+11e^{6ifx}+11e^{4i(3e+fx)}-5e^{2i(5e+fx)}-5e^{2i(e+4fx)}+2e^{2i(2e+5fx)}\right)\right)+\right.$$

$$\left(6\left(a^3+12a^2b+30ab^2+20b^3\right)e^{6ifx}\left(i\,\text{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+e^{14ie}\left(2fx+i\,\text{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\right)\right)\right)\Big/\left(\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\Bigg)\Bigg)$$

$$\text{Sec}[e+fx]+\frac{1}{128\sqrt{2}\,a^{3/2}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f\sqrt{a+b\,\text{Sec}[e+fx]^2}}9\,i$$

$$e^{-i(e+fx)}$$

$$\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}$$

$$\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}$$

$$\left(-\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+\right.$$

$$\sqrt{a}\,e^{2i(e+fx)}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}-2i\,a\,e^{2i(e+fx)}fx-4i\,b\,e^{2i(e+fx)}fx-$$

$$(a+2b)\,e^{2i(e+fx)}\,\text{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$

$$\left.(a+2b)\,e^{2i(e+fx)}\,\text{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\right)\text{Sec}[e+fx]+$$

$$\frac{1}{256\sqrt{2}\,a^{5/2}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f\sqrt{a+b\,\text{Sec}[e+fx]^2}}$$

$$5$$

$$e^{-3i(e+fx)}$$

$$\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}$$

$$\sqrt{a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x]}$$

$$\Bigg(i\,a^{3/2}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}-3\,i\,a^{3/2}\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}-$$

$$6\,i\,\sqrt{a}\,b\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+3\,i\,a^{3/2}\,e^{4\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$6\,i\,\sqrt{a}\,b\,e^{4\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}-i\,a^{3/2}\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$4\,a^2\,e^{4\,i\,(e+f\,x)}\,f\,x+24\,a\,b\,e^{4\,i\,(e+f\,x)}\,f\,x+24\,b^2\,e^{4\,i\,(e+f\,x)}\,f\,x-$$

$$2\,i\,\left(a^2+6\,a\,b+6\,b^2\right)\,e^{4\,i\,(e+f\,x)}\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]+$$

$$2\,i\,\left(a^2+6\,a\,b+6\,b^2\right)\,e^{4\,i\,(e+f\,x)}\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]\Bigg)\,\text{Sec}[e+f\,x]$$

- **Problem 100: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sin}[e+f\,x]^4}{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 3, 135 leaves, 6 steps):

$$\frac{3\,(a+b)^2\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{8\,a^{5/2}\,f}-$$

$$\frac{(5\,a+3\,b)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{8\,a^2\,f}+\frac{\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{4\,a\,f}$$

Result (type 3, 1286 leaves):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{2}\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+2b+a\,\text{Cos}[2(e+f x)]}}\right]\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\,\text{Sec}[e+fx]}{8\sqrt{2}\sqrt{a}\,f\sqrt{a+b\,\text{Sec}[e+fx]^2}}+$$

$$\frac{1}{32\sqrt{2}\,a^{3/2}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,3\,i\,e^{-i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}$$
$$\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\left(-\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+\sqrt{a}\,e^{2i(e+fx)}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}-\right.$$
$$2\,i\,a\,e^{2i(e+fx)}\,f x-4\,i\,b\,e^{2i(e+fx)}\,f x-(a+2b)\,e^{2i(e+fx)}\,\text{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$
$$\left.(a+2b)\,e^{2i(e+fx)}\,\text{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\right)\text{Sec}[e+fx]+$$

$$\frac{1}{64\sqrt{2}\,a^{5/2}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,e^{-3i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}$$
$$\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\left(i\,a^{3/2}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}-3\,i\,a^{3/2}\,e^{2i(e+fx)}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}-\right.$$
$$6\,i\sqrt{a}\,b\,e^{2i(e+fx)}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+3\,i\,a^{3/2}\,e^{4i(e+fx)}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+6\,i\sqrt{a}\,b\,e^{4i(e+fx)}$$
$$\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}-i\,a^{3/2}\,e^{6i(e+fx)}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+4a^2\,e^{4i(e+fx)}\,f x+24\,a\,b\,e^{4i(e+fx)}\,f x+$$
$$24\,b^2\,e^{4i(e+fx)}\,f x-2\,i\left(a^2+6ab+6b^2\right)e^{4i(e+fx)}\,\text{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$
$$\left.2\,i\left(a^2+6ab+6b^2\right)e^{4i(e+fx)}\,\text{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\right)\text{Sec}[e+fx]$$

- **Problem 101: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sin}[e+fx]^2}{\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,dx$$

Optimal (type 3, 85 leaves, 5 steps) :

$$\frac{(a+b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{2 a^{3/2} f}-\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{2 a f}$$

Result (type 3, 558 leaves):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{2}\,\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+2 b+a\,\text{Cos}[2 (e+f x)]}}\right]\sqrt{a+2 b+a\,\text{Cos}[2 e+2 f x]}\,\,\text{Sec}[e+f x]}{4\sqrt{2}\,\sqrt{a}\,f\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}+$$

$$\frac{1}{8\sqrt{2}\,a^{3/2}\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\,\,f\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,i\,e^{-i (e+f x)}\sqrt{4 b+a\,e^{-2 i (e+f x)}\left(1+e^{2 i (e+f x)}\right)^2}$$

$$\sqrt{a+2 b+a\,\text{Cos}[2 e+2 f x]}\,\left(-\sqrt{a}\,\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}+\sqrt{a}\,e^{2 i (e+f x)}\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}-\right.$$

$$2 i a\,e^{2 i (e+f x)} f x-4 i b\,e^{2 i (e+f x)} f x-(a+2 b)\,e^{2 i (e+f x)}\,\text{Log}\left[e^{-2 i e}\left(a+2 b+a\,e^{2 i (e+f x)}+\sqrt{a}\,\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+$$

$$\left.(a+2 b)\,e^{2 i (e+f x)}\,\text{Log}\left[e^{-2 i e}\left(a+a\,e^{2 i (e+f x)}+2 b\,e^{2 i (e+f x)}+\sqrt{a}\,\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\right)\right]\right)\text{Sec}[e+f x]$$

- **Problem 102: Unable to integrate problem.**

$$\int\frac{1}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 39 leaves, 3 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{\sqrt{a}\,f}$$

Result (type 8, 18 leaves):

$$\int\frac{1}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

- **Problem 109: Unable to integrate problem.**

$$\int\frac{\text{Csc}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 80 leaves, 4 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{(a+b)^{3/2} f}-\frac{b\,\text{Sec}[e+f x]}{a\ (a+b)\ f \sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Csc}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

- **Problem 110: Unable to integrate problem.**

$$\int \frac{\text{Csc}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 126 leaves, 6 steps):

$$-\frac{(a-2 b)\ \text{ArcTanh}\left[\frac{\sqrt{a+b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{2\ (a+b)^{5/2} f}-\frac{\text{Cot}[e+f x]\ \text{Csc}[e+f x]}{2\ (a+b)\ f \sqrt{a+b\,\text{Sec}[e+f x]^2}}-\frac{3 b\,\text{Sec}[e+f x]}{2\ (a+b)^2 f \sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Csc}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

- **Problem 111: Unable to integrate problem.**

$$\int \frac{\text{Csc}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 177 leaves, 7 steps):

$$-\frac{3 a\ (a-4 b)\ \text{ArcTanh}\left[\frac{\sqrt{a+b}\ \text{Sec}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\right]}{8\ (a+b)^{7/2} f}-\frac{5 a\,\text{Cot}[e+f x]\ \text{Csc}[e+f x]}{8\ (a+b)^2 f \sqrt{a+b\,\text{Sec}[e+f x]^2}}-\frac{\text{Cot}[e+f x]^3\ \text{Csc}[e+f x]}{4\ (a+b)\ f \sqrt{a+b\,\text{Sec}[e+f x]^2}}-\frac{(13 a-2 b)\ b\,\text{Sec}[e+f x]}{8\ (a+b)^3 f \sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Csc}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

- **Problem 112: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 242 leaves, 8 steps):

$$\frac{5 (a+b)^2 (a+7 b) \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{16 a^{9/2} f}-\frac{(a+b) (33 a+35 b) \text{Cos}[e+f x] \text{Sin}[e+f x]}{48 a^3 f \sqrt{a+b+b \text{Tan}[e+f x]^2}}+\frac{(9 a+7 b) \text{Cos}[e+f x]^3 \text{Sin}[e+f x]}{24 a^2 f \sqrt{a+b+b \text{Tan}[e+f x]^2}}+\frac{\text{Cos}[e+f x]^3 \text{Sin}[e+f x]^3}{6 a f \sqrt{a+b+b \text{Tan}[e+f x]^2}}-\frac{b \left(81 a^2+190 a b+105 b^2\right) \text{Tan}[e+f x]}{48 a^4 f \sqrt{a+b+b \text{Tan}[e+f x]^2}}$$

Result (type 3, 3051 leaves):

$$\Bigg(3 e^{-3 i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} (a+2 b+a \text{Cos}[2 e+2 f x])^{3/2}$$
$$\Big(i a^{7/2}+i a^{5/2} b-5 i a^{7/2} e^{2 i (e+f x)}-15 i a^{5/2} b e^{2 i (e+f x)}-10 i a^{3/2} b^2 e^{2 i (e+f x)}-13 i a^{7/2} e^{4 i (e+f x)}-$$
$$104 i a^{5/2} b e^{4 i (e+f x)}-210 i a^{3/2} b^2 e^{4 i (e+f x)}-120 i \sqrt{a} b^3 e^{4 i (e+f x)}+13 i a^{7/2} e^{6 i (e+f x)}+104 i a^{5/2} b e^{6 i (e+f x)}+$$
$$210 i a^{3/2} b^2 e^{6 i (e+f x)}+120 i \sqrt{a} b^3 e^{6 i (e+f x)}+5 i a^{7/2} e^{8 i (e+f x)}+15 i a^{5/2} b e^{8 i (e+f x)}+10 i a^{3/2} b^2 e^{8 i (e+f x)}-$$
$$i a^{7/2} e^{10 i (e+f x)}-i a^{5/2} b e^{10 i (e+f x)}+24 a^3 e^{4 i (e+f x)} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f x+$$
$$144 a^2 b e^{4 i (e+f x)} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f x+240 a b^2 e^{4 i (e+f x)} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f x+$$
$$120 b^3 e^{4 i (e+f x)} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f x-12 i \left(a^3+6 a^2 b+10 a b^2+5 b^3\right) e^{4 i (e+f x)} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}$$
$$\text{Log}\left[e^{-2 i e} \left(a+2 b+a e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+12 i \left(a^3+6 a^2 b+10 a b^2+5 b^3\right) e^{4 i (e+f x)}$$
$$\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} \text{Log}\left[e^{-2 i e} \left(a+a e^{2 i (e+f x)}+2 b e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]\Big) \text{Sec}[e+f x]^3\Bigg)\Big/$$
$$\left(512 \sqrt{2} a^{7/2} (a+b) \left(4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right) f \left(a+b \text{Sec}[e+f x]^2\right)^{3/2}\right)+$$
$$\Bigg(i e^{-5 i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} (a+2 b+a \text{Cos}[2 e+2 f x])^{3/2}$$
$$\Big(-2 a^{9/2}-2 a^{7/2} b+7 a^{9/2} e^{2 i (e+f x)}+21 a^{7/2} b e^{2 i (e+f x)}+14 a^{5/2} b^2 e^{2 i (e+f x)}-27 a^{9/2} e^{4 i (e+f x)}-167 a^{7/2} b e^{4 i (e+f x)}-$$
$$280 a^{5/2} b^2 e^{4 i (e+f x)}-140 a^{3/2} b^3 e^{4 i (e+f x)}-63 a^{9/2} e^{6 i (e+f x)}-790 a^{7/2} b e^{6 i (e+f x)}-2830 a^{5/2} b^2 e^{6 i (e+f x)}-3780 a^{3/2} b^3 e^{6 i (e+f x)}-$$
$$1680 \sqrt{a} b^4 e^{6 i (e+f x)}+63 a^{9/2} e^{8 i (e+f x)}+790 a^{7/2} b e^{8 i (e+f x)}+2830 a^{5/2} b^2 e^{8 i (e+f x)}+3780 a^{3/2} b^3 e^{8 i (e+f x)}+1680 \sqrt{a} b^4 e^{8 i (e+f x)}+$$
$$27 a^{9/2} e^{10 i (e+f x)}+167 a^{7/2} b e^{10 i (e+f x)}+280 a^{5/2} b^2 e^{10 i (e+f x)}+140 a^{3/2} b^3 e^{10 i (e+f x)}-7 a^{9/2} e^{12 i (e+f x)}-21 a^{7/2} b e^{12 i (e+f x)}-$$

$$14\,a^{5/2}\,b^2\,e^{12\,i\,(e+f\,x)}+2\,a^{9/2}\,e^{14\,i\,(e+f\,x)}+2\,a^{7/2}\,b\,e^{14\,i\,(e+f\,x)}-120\,i\,a^4\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\;f\,x-$$

$$1200\,i\,a^3\,b\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\;f\,x-3600\,i\,a^2\,b^2\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\;f\,x-$$

$$4200\,i\,a\,b^3\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\;f\,x-1680\,i\,b^4\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\;f\,x-$$

$$60\,\left(a^4+10\,a^3\,b+30\,a^2\,b^2+35\,a\,b^3+14\,b^4\right)\,e^{6\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}$$

$$\text{Log}\left[e^{-2\,i\,e}\,\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]+60\,\left(a^4+10\,a^3\,b+30\,a^2\,b^2+35\,a\,b^3+14\,b^4\right)\,e^{6\,i\,(e+f\,x)}$$

$$\left.\left.\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\;\text{Log}\left[e^{-2\,i\,e}\,\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]\right)\,\text{Sec}[e+f\,x]^3\right)\Big/$$

$$\left(1536\,\sqrt{2}\,a^{9/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\right)-$$

$$\left(e^{i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\left(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x]\right)^{3/2}\right.$$

$$\left(-3\,i\,a^{3/2}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}-4\,i\,\sqrt{a}\,b\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+\right.$$

$$3\,i\,a^{3/2}\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+4\,i\,\sqrt{a}\,b\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$4\,a^2\,f\,x+4\,a\,b\,f\,x+8\,a^2\,e^{2\,i\,(e+f\,x)}\,f\,x+24\,a\,b\,e^{2\,i\,(e+f\,x)}\,f\,x+16\,b^2\,e^{2\,i\,(e+f\,x)}\,f\,x+4\,a^2\,e^{4\,i\,(e+f\,x)}\,f\,x+4\,a\,b\,e^{4\,i\,(e+f\,x)}\,f\,x-$$

$$2\,i\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]+$$

$$\left.2\,i\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]\right)$$

$$\left.\text{Sec}[e+f\,x]^3\right)\Big/\left(64\,\sqrt{2}\,a^{3/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\right)+$$

$$\frac{3\,\left(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x]\right)^{3/2}\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{256\,(a+b)\,f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}$$

- **Problem 113: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 175 leaves, 7 steps):

$$\frac{3\,(a+b)\,(a+5\,b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{8\,a^{7/2}\,f}-\frac{5\,(a+b)\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{8\,a^2\,f\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+\frac{\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]}{4\,a\,f\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}-\frac{b\,(13\,a+15\,b)\,\text{Tan}[e+f x]}{8\,a^3\,f\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 3, 2543 leaves):

$$\Bigg(i\,e^{-i\,(e+f x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f x)}\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,\left(a+2\,b+a\,\text{Cos}[2\,e+2\,f x]\right)^{3/2}$$

$$\Bigg(-2\,a^{5/2}-2\,a^{3/2}\,b-7\,a^{5/2}\,e^{2\,i\,(e+f x)}-30\,a^{3/2}\,b\,e^{2\,i\,(e+f x)}-24\,\sqrt{a}\,b^2\,e^{2\,i\,(e+f x)}+7\,a^{5/2}\,e^{4\,i\,(e+f x)}+30\,a^{3/2}\,b\,e^{4\,i\,(e+f x)}+$$

$$24\,\sqrt{a}\,b^2\,e^{4\,i\,(e+f x)}+2\,a^{5/2}\,e^{6\,i\,(e+f x)}+2\,a^{3/2}\,b\,e^{6\,i\,(e+f x)}-12\,i\,a^2\,e^{2\,i\,(e+f x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,f x-$$

$$36\,i\,a\,b\,e^{2\,i\,(e+f x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,f x-24\,i\,b^2\,e^{2\,i\,(e+f x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,f x-$$

$$6\,\left(a^2+3\,a\,b+2\,b^2\right)\,e^{2\,i\,(e+f x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,\text{Log}\left[e^{-2\,i\,e}\left(a+2\,b+a\,e^{2\,i\,(e+f x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\right)\right]+$$

$$6\,\left(a^2+3\,a\,b+2\,b^2\right)\,e^{2\,i\,(e+f x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}$$

$$\text{Log}\left[e^{-2\,i\,e}\left(a+a\,e^{2\,i\,(e+f x)}+2\,b\,e^{2\,i\,(e+f x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\right)\right]\Bigg)\,\text{Sec}[e+f x]^3\Bigg)\Bigg/$$

$$\left(128\,\sqrt{2}\,a^{5/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2\right)\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\right)+$$

$$\Bigg(e^{-3\,i\,(e+f x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f x)}\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,\left(a+2\,b+a\,\text{Cos}[2\,e+2\,f x]\right)^{3/2}$$

$$\Bigg(i\,a^{7/2}+i\,a^{5/2}\,b-5\,i\,a^{7/2}\,e^{2\,i\,(e+f x)}-15\,i\,a^{5/2}\,b\,e^{2\,i\,(e+f x)}-10\,i\,a^{3/2}\,b^2\,e^{2\,i\,(e+f x)}-13\,i\,a^{7/2}\,e^{4\,i\,(e+f x)}-$$

$$104\,i\,a^{5/2}\,b\,e^{4\,i\,(e+f x)}-210\,i\,a^{3/2}\,b^2\,e^{4\,i\,(e+f x)}-120\,i\,\sqrt{a}\,b^3\,e^{4\,i\,(e+f x)}+13\,i\,a^{7/2}\,e^{6\,i\,(e+f x)}+104\,i\,a^{5/2}\,b\,e^{6\,i\,(e+f x)}+$$

$$210\,i\,a^{3/2}\,b^2\,e^{6\,i\,(e+f x)}+120\,i\,\sqrt{a}\,b^3\,e^{6\,i\,(e+f x)}+5\,i\,a^{7/2}\,e^{8\,i\,(e+f x)}+15\,i\,a^{5/2}\,b\,e^{8\,i\,(e+f x)}+10\,i\,a^{3/2}\,b^2\,e^{8\,i\,(e+f x)}-$$

$$i\,a^{7/2}\,e^{10\,i\,(e+f x)}-i\,a^{5/2}\,b\,e^{10\,i\,(e+f x)}+24\,a^3\,e^{4\,i\,(e+f x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,f x+$$

$$144\,a^2\,b\,e^{4\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f\,x+240\,a\,b^2\,e^{4\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f\,x+$$

$$120\,b^3\,e^{4\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f\,x-12\,i\,\left(a^3+6\,a^2\,b+10\,a\,b^2+5\,b^3\right)\,e^{4\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}$$

$$\text{Log}\left[e^{-2\,i\,e}\,\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]+12\,i\,\left(a^3+6\,a^2\,b+10\,a\,b^2+5\,b^3\right)\,e^{4\,i\,(e+f\,x)}$$

$$\left.\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]\right)\,\text{Sec}[e+f\,x]^3\Bigg)\Bigg/$$

$$\left(128\,\sqrt{2}\,a^{7/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\right)-$$

$$\Bigg(3\,e^{i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{3/2}$$

$$\Bigg(-3\,i\,a^{3/2}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}-4\,i\,\sqrt{a}\,b\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$3\,i\,a^{3/2}\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+4\,i\,\sqrt{a}\,b\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$4\,a^2\,f\,x+4\,a\,b\,f\,x+8\,a^2\,e^{2\,i\,(e+f\,x)}\,f\,x+24\,a\,b\,e^{2\,i\,(e+f\,x)}\,f\,x+16\,b^2\,e^{2\,i\,(e+f\,x)}\,f\,x+4\,a^2\,e^{4\,i\,(e+f\,x)}\,f\,x+4\,a\,b\,e^{4\,i\,(e+f\,x)}\,f\,x-$$

$$2\,i\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]+$$

$$2\,i\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,\text{Log}\left[e^{-2\,i\,e}\,\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]\Bigg)$$

$$\text{Sec}[e+f\,x]^3\Bigg)\Bigg/\left(128\,\sqrt{2}\,a^{3/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\right)+$$

$$\frac{3\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{3/2}\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{128\,(a+b)\,f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}$$

- **Problem 114: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sin}[e+f\,x]^2}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 121 leaves, 6 steps) :

$$\frac{(a+3\,b)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\Big]}{2\,a^{5/2}\,f}-\frac{\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{2\,a\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}-\frac{3\,b\,\text{Tan}[e+f\,x]}{2\,a^2\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 3, 1522 leaves) :

$$\Big(i\, e^{-i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\left(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x]\right)^{3/2}$$

$$\Big(-2\,a^{5/2}-2\,a^{3/2}\,b-7\,a^{5/2}\,e^{2\,i\,(e+f\,x)}-30\,a^{3/2}\,b\,e^{2\,i\,(e+f\,x)}-24\,\sqrt{a}\,b^2\,e^{2\,i\,(e+f\,x)}+7\,a^{5/2}\,e^{4\,i\,(e+f\,x)}+30\,a^{3/2}\,b\,e^{4\,i\,(e+f\,x)}+$$

$$24\,\sqrt{a}\,b^2\,e^{4\,i\,(e+f\,x)}+2\,a^{5/2}\,e^{6\,i\,(e+f\,x)}+2\,a^{3/2}\,b\,e^{6\,i\,(e+f\,x)}-12\,i\,a^2\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f\,x-$$

$$36\,i\,a\,b\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f\,x-24\,i\,b^2\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f\,x-$$

$$6\,\left(a^2+3\,a\,b+2\,b^2\right)\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\mathrm{Log}\Big[e^{-2\,i\,e}\,\Big(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\Big)\Big]+$$

$$6\,\left(a^2+3\,a\,b+2\,b^2\right)\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}$$

$$\mathrm{Log}\Big[e^{-2\,i\,e}\,\Big(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\Big)\Big]\Big)\,\mathrm{Sec}[e+f\,x]^3\Big)\Big/$$

$$\Big(32\,\sqrt{2}\,a^{5/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\Big)-$$

$$\Big(e^{i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\left(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x]\right)^{3/2}$$

$$\Big(-3\,i\,a^{3/2}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}-4\,i\,\sqrt{a}\,b\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$3\,i\,a^{3/2}\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+4\,i\,\sqrt{a}\,b\,e^{2\,i\,(e+f\,x)}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+$$

$$4\,a^2\,f\,x+4\,a\,b\,f\,x+8\,a^2\,e^{2\,i\,(e+f\,x)}\,f\,x+24\,a\,b\,e^{2\,i\,(e+f\,x)}\,f\,x+16\,b^2\,e^{2\,i\,(e+f\,x)}\,f\,x+4\,a^2\,e^{4\,i\,(e+f\,x)}\,f\,x+4\,a\,b\,e^{4\,i\,(e+f\,x)}\,f\,x-$$

$$2\,i\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,\mathrm{Log}\Big[e^{-2\,i\,e}\,\Big(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\Big)\Big]+$$

$$2\,i\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)\,\mathrm{Log}\Big[e^{-2\,i\,e}\,\Big(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\Big)\Big]\Big)$$

$$\mathrm{Sec}[e+f\,x]^3\Big)\Big/\Big(32\,\sqrt{2}\,a^{3/2}\,(a+b)\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\Big)+$$

$$\frac{\left(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x]\right)^{3/2}\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]}{16\,(a+b)\,f\,\sqrt{a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)]}\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}}$$

Problem 115: Unable to integrate problem.

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 77 leaves, 4 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{a^{3/2}\,f}-\frac{b\,\text{Tan}[e+f\,x]}{a\,(a+b)\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 8, 18 leaves):

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Problem 122: Unable to integrate problem.

$$\int \frac{\text{Csc}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 127 leaves, 6 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b}\,\text{Sec}[e+f\,x]}{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}\right]}{(a+b)^{5/2}\,f}-\frac{b\,\text{Sec}[e+f\,x]}{3\,a\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}-\frac{b\,(5\,a+2\,b)\,\text{Sec}[e+f\,x]}{3\,a^2\,(a+b)^2\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Csc}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Problem 123: Unable to integrate problem.

$$\int \frac{\text{Csc}[e+f\,x]^3}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 171 leaves, 7 steps):

$$-\frac{(a-4\,b)\,\text{ArcTanh}\left[\frac{\sqrt{a+b}\,\text{Sec}[e+f\,x]}{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}\right]}{2\,(a+b)^{7/2}\,f}-\frac{\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]}{2\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}-\frac{5\,b\,\text{Sec}[e+f\,x]}{6\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}-\frac{(13\,a-2\,b)\,b\,\text{Sec}[e+f\,x]}{6\,a\,(a+b)^3\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{\mathrm{Csc}[e+f x]^3}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

- **Problem 124: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Csc}[e+f x]^5}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 234 leaves, 8 steps):

$$-\frac{\left(3 a^2-24 a b+8 b^2\right) \mathrm{ArcTanh}\left[\frac{\sqrt{a+b}\,\mathrm{Sec}[e+f x]}{\sqrt{a+b\,\mathrm{Sec}[e+f x]^2}}\right]}{8 (a+b)^{9/2} f}-\frac{(5 a-2 b) \mathrm{Cot}[e+f x] \mathrm{Csc}[e+f x]}{8 (a+b)^2 f \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2}}-\frac{\mathrm{Cot}[e+f x]^3 \mathrm{Csc}[e+f x]}{4 (a+b) f \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2}}-\frac{(23 a-12 b) b\,\mathrm{Sec}[e+f x]}{24 (a+b)^3 f \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{3/2}}-\frac{5 (11 a-10 b) b\,\mathrm{Sec}[e+f x]}{24 (a+b)^4 f \sqrt{a+b\,\mathrm{Sec}[e+f x]^2}}$$

Result (type 6, 1709 leaves):

$$-\left(\left(7 a\,\mathrm{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]\mathrm{Cot}[e+f x]^4\mathrm{Csc}[e+f x]^3\right)\Big/\right.$$
$$\left(20\sqrt{2}\, f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)^{5/2}\right.$$
$$\left(5 (a+b)\,\mathrm{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]-4 a\,\mathrm{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\frac{9}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]+\right.$$
$$\left.7 a\,\mathrm{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]\mathrm{Sin}[e+f x]^2\right)$$
$$\left(-\left(7 a^2\,\mathrm{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]\mathrm{Cos}[e+f x]^4\mathrm{Cot}[e+f x]\right)\Big/\right.$$
$$\left(4\sqrt{2}\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)^{7/2}\left(5 (a+b)\,\mathrm{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]-4 a\,\mathrm{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\frac{9}{2},\right.\right.$$
$$\left.\left.\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]+7 a\,\mathrm{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]\mathrm{Sin}[e+f x]^2\right)\right)+$$
$$\left(7 a\,\mathrm{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]\mathrm{Cos}[e+f x]^2\mathrm{Cot}[e+f x]\right)\Big/$$
$$\left(10\sqrt{2}\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)^{5/2}\left(5 (a+b)\,\mathrm{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]-4 a\,\mathrm{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\right.\right.$$
$$\left.\left.\frac{9}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]+7 a\,\mathrm{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\mathrm{Csc}[e+f x]^2,\frac{(a+b)\mathrm{Csc}[e+f x]^2}{a}\right]\mathrm{Sin}[e+f x]^2\right)\right)+$$

$$\left(7\,a\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]^3\right)\Big/\left(10\,\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(5\,(a+b)\,\text{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]-4\,a\,\text{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\right.\right.$$

$$\left.\left.\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]+7\,a\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(7\,a\,\text{Cos}[e+f\,x]^2\,\text{Cot}[e+f\,x]^2\,\left(-1/(7\,a)\,25\,(a+b)\,f\,\text{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\right.\right.$$

$$\left.\left.\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2+\frac{20}{7}\,f\,\text{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2\right)\right)\Big/$$

$$\left(20\,\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(5\,(a+b)\,\text{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]-4\,a\,\text{AppellF1}\left[\frac{7}{2},-1,\right.\right.\right.$$

$$\left.\left.\left.\frac{5}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]+7\,a\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(7\,a\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cos}[e+f\,x]^2\,\text{Cot}[e+f\,x]^2\right.$$

$$\left(5\,(a+b)\,\left(-\frac{1}{9\,a}49\,(a+b)\,f\,\text{AppellF1}\left[\frac{9}{2},-2,\frac{9}{2},\frac{11}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2+\frac{28}{9}\right.\right.$$

$$\left.f\,\text{AppellF1}\left[\frac{9}{2},-1,\frac{7}{2},\frac{11}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2\right)-$$

$$4\,a\,\left(-\frac{1}{9\,a}35\,(a+b)\,f\,\text{AppellF1}\left[\frac{9}{2},-1,\frac{7}{2},\frac{11}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2+\frac{14}{9}\right.$$

$$\left.f\,\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{9}{2},\frac{11}{2},\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\right)+$$

$$14\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]+$$

$$7\,a\,\left(-\frac{1}{7\,a}25\,(a+b)\,f\,\text{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2+\frac{20}{7}\right.$$

$$\left.\left.\left.f\,\text{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2\right)\text{Sin}[e+f\,x]^2\right)\right)\Big/$$

$$\left(20\,\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(5\,(a+b)\,\text{AppellF1}\left[\frac{7}{2},-2,\frac{7}{2},\frac{9}{2},\text{Csc}[e+f\,x]^2,\frac{(a+b)\,\text{Csc}[e+f\,x]^2}{a}\right]-4\,a\,\text{AppellF1}\left[\frac{7}{2},-1,\frac{5}{2},\right.\right.\right.$$

$$\frac{9}{2},\ \mathrm{Csc}[e+f x]^2,\ \frac{(a+b)\,\mathrm{Csc}[e+f x]^2}{a}\Big] + 7\,a\,\mathrm{AppellF1}\Big[\frac{5}{2},\ -2,\ \frac{5}{2},\ \frac{7}{2},\ \mathrm{Csc}[e+f x]^2,\ \frac{(a+b)\,\mathrm{Csc}[e+f x]^2}{a}\Big]\,\mathrm{Sin}[e+f x]^2\Big)^2\Big)\Big)\Big)\Big)$$

- **Problem 125: Attempted integration timed out after 120 seconds.**

$$\int \frac{\mathrm{Sin}[e+f x]^6}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 288 leaves, 9 steps) :

$$\frac{5\,(a+b)\left(a^2+14\,a\,b+21\,b^2\right)\mathrm{ArcTan}\Big[\frac{\sqrt{a}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}\Big]}{16\,a^{11/2}\,f} - \frac{(a+b)\,(11\,a+21\,b)\,\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]}{16\,a^3\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} + \frac{3\,(a+b)\,\mathrm{Cos}[e+f x]^3\,\mathrm{Sin}[e+f x]}{8\,a^2\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} +$$

$$\frac{\mathrm{Cos}[e+f x]^3\,\mathrm{Sin}[e+f x]^3}{6\,a\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} - \frac{7\,b\,(a+b)\,(7\,a+15\,b)\,\mathrm{Tan}[e+f x]}{48\,a^4\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} - \frac{b\left(113\,a^2+420\,a\,b+315\,b^2\right)\mathrm{Tan}[e+f x]}{48\,a^5\,f\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}$$

Result (type 1, 1 leaves) :

???

- **Problem 126: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sin}[e+f x]^4}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 227 leaves, 8 steps) :

$$\frac{\left(3\,a^2+30\,a\,b+35\,b^2\right)\mathrm{ArcTan}\Big[\frac{\sqrt{a}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}\Big]}{8\,a^{9/2}\,f} - \frac{(5\,a+7\,b)\,\mathrm{Cos}[e+f x]\,\mathrm{Sin}[e+f x]}{8\,a^2\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} +$$

$$\frac{\mathrm{Cos}[e+f x]^3\,\mathrm{Sin}[e+f x]}{4\,a\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} - \frac{b\,(23\,a+35\,b)\,\mathrm{Tan}[e+f x]}{24\,a^3\,f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^{3/2}} - \frac{5\,b\,(11\,a+21\,b)\,\mathrm{Tan}[e+f x]}{24\,a^4\,f\sqrt{a+b+b\,\mathrm{Tan}[e+f x]^2}}$$

Result (type 3, 6006 leaves) :

$$\frac{1}{256\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f x])^{5/2}$$

$$\Bigg(-\frac{1}{24\sqrt{2}\,a^4\,b^2\,(a+b)^2\left(4\,b\,e^{2\,i\,(e+f x)}+a\left(1+e^{2\,i\,(e+f x)}\right)^2\right)^2 f}\,i\,e^{-i\,(17\,e+3\,f x)}\left(-1+e^{18\,i\,e}\right)\sqrt{4\,b+a\,e^{-2\,i\,(e+f x)}\left(1+e^{2\,i\,(e+f x)}\right)^2}$$

$$\Big(-13\,440\,b^7\,e^{4\,i\,e+6\,i\,f x}\left(e^{16\,i\,e}+e^{2\,i\,f x}\right)+a^7\,e^{4\,i\,f x}\left(1+e^{18\,i\,e}\right)\left(1+e^{2\,i\,(e+f x)}\right)^3-6\,a^6\,b\,e^{4\,i\,f x}\left(1+e^{18\,i\,e}\right)\left(3+8\,e^{2\,i\,(e+f x)}+8\,e^{4\,i\,(e+f x)}+\right.$$

$$\left.3\,e^{6\,i\,(e+f x)}\right)-2240\,a\,b^6\,e^{2\,i\,(e+2\,f x)}\left(2\,e^{16\,i\,e}+3\,e^{2\,i\,f x}+2\,e^{4\,i\,e+6\,i\,f x}+3\,e^{4\,i\,(5\,e+f x)}+21\,e^{2\,i\,(9\,e+f x)}+21\,e^{2\,i\,(e+2\,f x)}\right)-$$

$$24\,a^2\,b^5\,e^{2\,i\,f x}\left(7\,e^{16\,i\,e}+35\,e^{2\,i\,f x}+2710\,e^{4\,i\,e+6\,i\,f x}+840\,e^{22\,i\,e+6\,i\,f x}+560\,e^{6\,i\,e+8\,i\,f x}+35\,e^{8\,i\,(3\,e+f x)}+2710\,e^{4\,i\,(5\,e+f x)}+\right.$$

$$560\, e^{2 i (9 e+f x)}+840\, e^{2 i (e+2 f x)}+7\, e^{2 i (4 e+5 f x)}\Big)-4 a^4 b^3 \Big(-6\, e^{14 i e}+430\, e^{4 i f x}+3987\, e^{20 i e+6 i f x}+2610\, e^{22 i e+8 i f x}+84\, e^{2 i (8 e+f x)}+$$

$$3987\, e^{4 i (e+2 f x)}+1684\, e^{2 i (9 e+2 f x)}+2610\, e^{2 i (e+3 f x)}+84\, e^{4 i (2 e+3 f x)}+1684\, e^{2 i (3 e+5 f x)}+430\, e^{2 i (12 e+5 f x)}-6\, e^{2 i (5 e+7 f x)}\Big)-$$

$$6 a^5 b^2 \Big(-2\, e^{14 i e}+80\, e^{4 i f x}+407\, e^{20 i e+6 i f x}+318\, e^{22 i e+8 i f x}+14\, e^{2 i (8 e+f x)}+407\, e^{4 i (e+2 f x)}+191\, e^{2 i (9 e+2 f x)}+$$

$$318\, e^{2 i (e+3 f x)}+14\, e^{4 i (2 e+3 f x)}+191\, e^{2 i (3 e+5 f x)}+80\, e^{2 i (12 e+5 f x)}-2\, e^{2 i (5 e+7 f x)}\Big)-$$

$$12 a^3 b^4 \Big(-e^{14 i e}+175\, e^{4 i f x}+3750\, e^{20 i e+6 i f x}+1835\, e^{22 i e+8 i f x}+35\, e^{2 i (8 e+f x)}+3750\, e^{4 i (e+2 f x)}+1214\, e^{2 i (9 e+2 f x)}+$$

$$1835\, e^{2 i (e+3 f x)}+35\, e^{4 i (2 e+3 f x)}+1214\, e^{2 i (3 e+5 f x)}+175\, e^{2 i (12 e+5 f x)}-e^{2 i (5 e+7 f x)}\Big)\Big)+$$

$$\frac{1}{24 \sqrt{2}\, a^4 b^2 (a+b)^2 \left(4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^2 f}\, i\, e^{-i (17 e+3 f x)} \left(1+e^{18 i e}\right) \sqrt{4 b+a\, e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}$$

$$\Big(13440\, b^7 e^{4 i e+6 i f x} \left(-e^{16 i e}+e^{2 i f x}\right)+a^7 e^{4 i f x} \left(-1+e^{18 i e}\right) \left(1+e^{2 i (e+f x)}\right)^3-$$

$$6 a^6 b\, e^{4 i f x} \left(-1+e^{18 i e}\right) \left(3+8\, e^{2 i (e+f x)}+8\, e^{4 i (e+f x)}+3\, e^{6 i (e+f x)}\right)+$$

$$2240\, a b^6 e^{2 i (e+2 f x)} \left(-2\, e^{16 i e}+3\, e^{2 i f x}+2\, e^{4 i e+6 i f x}-3\, e^{4 i (5 e+f x)}-21\, e^{2 i (9 e+f x)}+21\, e^{2 i (e+2 f x)}\right)+$$

$$24 a^2 b^5 e^{2 i f x} \Big(-7\, e^{16 i e}+35\, e^{2 i f x}+2710\, e^{4 i e+6 i f x}-840\, e^{22 i e+6 i f x}+560\, e^{6 i e+8 i f x}-35\, e^{8 i (3 e+f x)}-2710\, e^{4 i (5 e+f x)}-$$

$$560\, e^{2 i (9 e+f x)}+840\, e^{2 i (e+2 f x)}+7\, e^{2 i (4 e+5 f x)}\Big)-12 a^3 b^4 \Big(-e^{14 i e}-175\, e^{4 i f x}+3750\, e^{20 i e+6 i f x}+1835\, e^{22 i e+8 i f x}+35\, e^{2 i (8 e+f x)}-$$

$$3750\, e^{4 i (e+2 f x)}+1214\, e^{2 i (9 e+2 f x)}-1835\, e^{2 i (e+3 f x)}-35\, e^{4 i (2 e+3 f x)}-1214\, e^{2 i (3 e+5 f x)}+175\, e^{2 i (12 e+5 f x)}+e^{2 i (5 e+7 f x)}\Big)-$$

$$6 a^5 b^2 \Big(-2\, e^{14 i e}-80\, e^{4 i f x}+407\, e^{20 i e+6 i f x}+318\, e^{22 i e+8 i f x}+14\, e^{2 i (8 e+f x)}-407\, e^{4 i (e+2 f x)}+191\, e^{2 i (9 e+2 f x)}-$$

$$318\, e^{2 i (e+3 f x)}-14\, e^{4 i (2 e+3 f x)}-191\, e^{2 i (3 e+5 f x)}+80\, e^{2 i (12 e+5 f x)}+2\, e^{2 i (5 e+7 f x)}\Big)-$$

$$4 a^4 b^3 \Big(-6\, e^{14 i e}-430\, e^{4 i f x}+3987\, e^{20 i e+6 i f x}+2610\, e^{22 i e+8 i f x}+84\, e^{2 i (8 e+f x)}-3987\, e^{4 i (e+2 f x)}+1684\, e^{2 i (9 e+2 f x)}-$$

$$2610\, e^{2 i (e+3 f x)}-84\, e^{4 i (2 e+3 f x)}-1684\, e^{2 i (3 e+5 f x)}+430\, e^{2 i (12 e+5 f x)}+6\, e^{2 i (5 e+7 f x)}\Big)\Big)+$$

$$\Bigg(5 \left(3 a^2+14 a b+14 b^2\right) e^{i (-17 e+f x)} \left(1+e^{18 i e}\right) \sqrt{4 b+a\, e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}$$

$$\Bigg(-i \operatorname{Log}\left[e^{-2 i e} \left(a+2 b+a\, e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+$$

$$e^{18 i e} \left(2 f x+i \operatorname{Log}\left[e^{-2 i e} \left(a+a\, e^{2 i (e+f x)}+2 b\, e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{2}\, a^{9/2} \sqrt{4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\, f\right)-\Bigg(5 \left(3 a^2+14 a b+14 b^2\right) e^{i (-17 e+f x)} \left(-1+e^{18 i e}\right)$$

$$\sqrt{4 b+a\, e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \Bigg(i \operatorname{Log}\left[e^{-2 i e} \left(a+2 b+a\, e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+$$

$$e^{18 i e} \left(2 f x+i \operatorname{Log}\left[e^{-2 i e} \left(a+a\, e^{2 i (e+f x)}+2 b\, e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{2}\, a^{9/2} \sqrt{4 b\, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\, f\right)\Bigg) \operatorname{Sec}[e+f x]^5-$$

$$\Big(i\, e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,(a+2b+a\,\text{Cos}[2e+2fx])^{5/2}$$

$$\Big(-25a^{7/2}-58a^{5/2}b-32a^{3/2}b^2-15a^{7/2}e^{2i(e+fx)}-$$

$$108a^{5/2}b\,e^{2i(e+fx)}-192a^{3/2}b^2e^{2i(e+fx)}-96\sqrt{a}\,b^3e^{2i(e+fx)}+$$
$$15a^{7/2}e^{4i(e+fx)}+108a^{5/2}b\,e^{4i(e+fx)}+192a^{3/2}b^2e^{4i(e+fx)}+$$
$$96\sqrt{a}\,b^3e^{4i(e+fx)}+25a^{7/2}e^{6i(e+fx)}+58a^{5/2}b\,e^{6i(e+fx)}+$$
$$32a^{3/2}b^2e^{6i(e+fx)}-24\,i\,a^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$48\,i\,a\,b\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$24\,i\,b^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$12a^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]-$$
$$24ab\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]-$$
$$12b^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$12a^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$24ab\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$12b^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]\Big)$$

$$\text{Sec}[e+fx]^5\Big)\Big/\Big(384\sqrt{2}\,a^{5/2}(a+b)^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^2$$

$$f$$

$$\left(a+b\,\text{Sec}[e+fx]^2\right)^{5/2}\Big)-\Big(i$$

$$e^{-i(e+fx)}$$

$$\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}$$

$$(a+2b+a\,\text{Cos}[2e+2fx])^{5/2}$$

$$\Big(-12\,a^{9/2}-24\,a^{7/2}\,b-12\,a^{5/2}\,b^2-113\,a^{9/2}\,e^{2\,i\,(e+f\,x)}-532\,a^{7/2}\,b\,e^{2\,i\,(e+f\,x)}-740\,a^{5/2}\,b^2\,e^{2\,i\,(e+f\,x)}-$$

$$320\,a^{3/2}\,b^3\,e^{2\,i\,(e+f\,x)}-87\,a^{9/2}\,e^{4\,i\,(e+f\,x)}-690\,a^{7/2}\,b\,e^{4\,i\,(e+f\,x)}-2040\,a^{5/2}\,b^2\,e^{4\,i\,(e+f\,x)}-$$

$$2400\,a^{3/2}\,b^3\,e^{4\,i\,(e+f\,x)}-960\,\sqrt{a}\,b^4\,e^{4\,i\,(e+f\,x)}+87\,a^{9/2}\,e^{6\,i\,(e+f\,x)}+690\,a^{7/2}\,b\,e^{6\,i\,(e+f\,x)}+$$

$$2040\,a^{5/2}\,b^2\,e^{6\,i\,(e+f\,x)}+2400\,a^{3/2}\,b^3\,e^{6\,i\,(e+f\,x)}+960\,\sqrt{a}\,b^4\,e^{6\,i\,(e+f\,x)}+113\,a^{9/2}\,e^{8\,i\,(e+f\,x)}+$$

$$532\,a^{7/2}\,b\,e^{8\,i\,(e+f\,x)}+740\,a^{5/2}\,b^2\,e^{8\,i\,(e+f\,x)}+320\,a^{3/2}\,b^3\,e^{8\,i\,(e+f\,x)}+12\,a^{9/2}\,e^{10\,i\,(e+f\,x)}+$$

$$24\,a^{7/2}\,b\,e^{10\,i\,(e+f\,x)}+12\,a^{5/2}\,b^2\,e^{10\,i\,(e+f\,x)}-120\,i\,a^3\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}f\,x-$$

$$480\,i\,a^2\,b\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}f\,x-$$

$$600\,i\,a\,b^2\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}f\,x-240\,i\,b^3\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}f\,x-$$

$$60\,a^3\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]-$$

$$240\,a^2\,b\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]-$$

$$300\,a\,b^2\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]-$$

$$120\,b^3\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]+$$

$$60\,a^3\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]+$$

$$240\,a^2\,b\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]+$$

$$300\,a\,b^2\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]+$$

$$120\,b^3\,e^{2\,i\,(e+f\,x)}\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^{3/2}\mathrm{Log}\Big[e^{-2\,i\,e}\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\Big]\Big)$$

$$\mathrm{Sec}[e+f\,x]^5\Big)\Big/\left(1536\,\sqrt{2}\,a^{7/2}\,(a+b)^2\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^2\right.$$

$$f$$

$$\left.\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{5/2}\right)+$$

$$\frac{(2\,a+3\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])^{5/2}\,\mathrm{Sec}[e+f\,x]^4\,\mathrm{Tan}[e+f\,x]}{256\,(a+b)^2\,f\,(a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])^{3/2}\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{5/2}}-$$

$$\frac{(b+(3a+2b)\,\mathrm{Cos}[2(e+fx)])\,(a+2b+a\,\mathrm{Cos}[2e+2fx])^{5/2}\,\mathrm{Sec}[e+fx]^4\,\mathrm{Tan}[e+fx]}{384\,(a+b)^2\,f\,(a+2b+a\,\mathrm{Cos}[2(e+fx)])^{3/2}\,\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^{5/2}}$$

Problem 127: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Sin}[e+fx]^2}{\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 167 leaves, 7 steps):

$$\frac{(a+5b)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}\right]}{2\,a^{7/2}\,f}-\frac{\mathrm{Cos}[e+fx]\,\mathrm{Sin}[e+fx]}{2\,a\,f\,\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^{3/2}}-\frac{5\,b\,\mathrm{Tan}[e+fx]}{6\,a^2\,f\,\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^{3/2}}-\frac{b\,(13a+15b)\,\mathrm{Tan}[e+fx]}{6\,a^3\,(a+b)\,f\,\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}$$

Result (type 3, 3247 leaves):

$$-\Bigg(\Bigg(\Bigg(i\,e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,(a+2b+a\,\mathrm{Cos}[2e+2fx])^{5/2}\Bigg(-25a^{7/2}-58a^{5/2}b-32a^{3/2}b^2-15a^{7/2}e^{2i(e+fx)}-$$
$$108a^{5/2}b\,e^{2i(e+fx)}-192a^{3/2}b^2e^{2i(e+fx)}-96\sqrt{a}\,b^3e^{2i(e+fx)}+15a^{7/2}e^{4i(e+fx)}+108a^{5/2}b\,e^{4i(e+fx)}+192a^{3/2}b^2e^{4i(e+fx)}+$$
$$96\sqrt{a}\,b^3e^{4i(e+fx)}+25a^{7/2}e^{6i(e+fx)}+58a^{5/2}b\,e^{6i(e+fx)}+32a^{3/2}b^2e^{6i(e+fx)}-24\,i\,a^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$48\,i\,a\,b\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-24\,i\,b^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$12a^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\mathrm{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]-$$
$$24ab\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\mathrm{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]-$$
$$12b^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\mathrm{Log}\left[e^{-2ie}\left(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$
$$12a^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\mathrm{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$
$$24ab\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\mathrm{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$
$$12b^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\mathrm{Log}\left[e^{-2ie}\left(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\Bigg)$$
$$\mathrm{Sec}[e+fx]^5\Bigg)\Bigg/\left(128\sqrt{2}\,a^{5/2}\,(a+b)^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^2f\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^{5/2}\right)\Bigg)+$$

$$\Big(i\, e^{-i(e+fx)}\sqrt{4b+a\, e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\ (a+2b+a\,\text{Cos}[2e+2fx])^{5/2}$$

$$\Big(-12a^{9/2}-24a^{7/2}b-12a^{5/2}b^2-113a^{9/2}e^{2i(e+fx)}-532a^{7/2}b\,e^{2i(e+fx)}-740a^{5/2}b^2e^{2i(e+fx)}-320a^{3/2}b^3e^{2i(e+fx)}-$$

$$87a^{9/2}e^{4i(e+fx)}-690a^{7/2}b\,e^{4i(e+fx)}-2040a^{5/2}b^2e^{4i(e+fx)}-2400a^{3/2}b^3e^{4i(e+fx)}-960\sqrt{a}\,b^4e^{4i(e+fx)}+87a^{9/2}e^{6i(e+fx)}+$$
$$690a^{7/2}b\,e^{6i(e+fx)}+2040a^{5/2}b^2e^{6i(e+fx)}+2400a^{3/2}b^3e^{6i(e+fx)}+960\sqrt{a}\,b^4e^{6i(e+fx)}+113a^{9/2}e^{8i(e+fx)}+$$
$$532a^{7/2}b\,e^{8i(e+fx)}+740a^{5/2}b^2e^{8i(e+fx)}+320a^{3/2}b^3e^{8i(e+fx)}+12a^{9/2}e^{10i(e+fx)}+24a^{7/2}b\,e^{10i(e+fx)}+12a^{5/2}b^2e^{10i(e+fx)}-$$
$$120\,i\,a^3e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-480\,i\,a^2b\,e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$600\,i\,a\,b^2e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-240\,i\,b^3e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}fx-$$
$$60a^3e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]-$$
$$240a^2b\,e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]-$$
$$300a\,b^2e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]-$$
$$120b^3e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$60a^3e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$240a^2b\,e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$300a\,b^2e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]+$$
$$120b^3e^{2i(e+fx)}\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2}\text{Log}\Big[e^{-2ie}\Big(a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\Big)\Big]\Big)$$
$$\text{Sec}[e+fx]^5\Big)\Big/\left(384\sqrt{2}\,a^{7/2}(a+b)^2\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^2 f\left(a+b\,\text{Sec}[e+fx]^2\right)^{5/2}\right)+$$

$$\frac{5\,(2a+3b+a\,\text{Cos}[2\,(e+fx)])\,(a+2b+a\,\text{Cos}[2e+2fx])^{5/2}\,\text{Sec}[e+fx]^4\,\text{Tan}[e+fx]}{384\,(a+b)^2 f\,(a+2b+a\,\text{Cos}[2\,(e+fx)])^{3/2}\left(a+b\,\text{Sec}[e+fx]^2\right)^{5/2}}-$$

$$\frac{(b+(3a+2b)\,\text{Cos}[2\,(e+f\,x)])\,(a+2b+a\,\text{Cos}[2e+2f\,x])^{5/2}\,\text{Sec}[e+f\,x]^4\,\text{Tan}[e+f\,x]}{384\,(a+b)^2\,f\,(a+2b+a\,\text{Cos}[2\,(e+f\,x)])^{3/2}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}$$

- **Problem 128: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 125 leaves, 6 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{a^{5/2}\,f}-\frac{b\,\text{Tan}[e+f\,x]}{3a\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^{3/2}}-\frac{b\,(5a+3b)\,\text{Tan}[e+f\,x]}{3a^2\,(a+b)^2\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 6, 1927 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\right)\Big/$$

$$\left(4\sqrt{2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)$$

$$\left(\left(15a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\,\text{Sin}[e+f\,x]^2\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{7/2}\right.\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right)$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\Big)-$$
$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]^2\right)\Big/\left(\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$
$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$
$$\left(3\,(a+b)\,\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.\right.$$
$$\left.\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\right)\Big/$$
$$\left(4\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\right.\right.\right.$$
$$\left.\left.\left.\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$
$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\right.$$
$$\left(2\,f\,\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\right.$$
$$\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]+3\,(a+b)\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\frac{4}{3} f \text{AppellF1}\left[\frac{3}{2}, -1, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \text{Sin}[e+f x]\Bigg) +$$

$$\text{Sin}[e+f x]^2 \Bigg(5 a \left(\frac{21 a f \text{AppellF1}\left[\frac{5}{2}, -2, \frac{9}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \text{Sin}[e+f x]}{5 (a+b)} -\right.$$

$$\left.\frac{12}{5} f \text{AppellF1}\left[\frac{5}{2}, -1, \frac{7}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \text{Sin}[e+f x]\right) -$$

$$4 (a+b) \Bigg(\frac{3 a f \text{AppellF1}\left[\frac{5}{2}, -1, \frac{7}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \text{Sin}[e+f x]}{a+b} -$$

$$\Bigg(6 (a+b)^3 f \text{Cot}[e+f x] \text{Csc}[e+f x]^4 \left(-1+\frac{a \text{Sin}[e+f x]^2}{a+b}\right)^2 \Bigg(\frac{\sqrt{a} \text{ArcSin}\left[\frac{\sqrt{a} \text{Sin}[e+f x]}{\sqrt{a+b}}\right] \text{Sin}[e+f x]}{\sqrt{a+b} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}} +$$

$$\left.\left.\frac{a^2 \text{Sin}[e+f x]^4}{3 (a+b)^2 \left(-1+\frac{a \text{Sin}[e+f x]^2}{a+b}\right)^2} + \frac{a \text{Sin}[e+f x]^2}{(a+b) \left(-1+\frac{a \text{Sin}[e+f x]^2}{a+b}\right)}\right)\right) \Bigg/ \left(a^3 \left(1-\frac{a \text{Sin}[e+f x]^2}{a+b}\right)^{3/2}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Bigg/$$

$$\Bigg(4 \sqrt{2} f \left(a+b-a \text{Sin}[e+f x]^2\right)^{5/2} \Bigg(3 (a+b) \text{AppellF1}\left[\frac{1}{2}, -2, \frac{5}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right] + \Bigg(5 a \text{AppellF1}\Bigg[\frac{3}{2}, -2,$$

$$\left.\left.\left.\frac{7}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right] - 4 (a+b) \text{AppellF1}\left[\frac{3}{2}, -1, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)^2\right)\Bigg)$$

Problem 132: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \text{Sec}[e+f x]^2\right)^p (d \text{Sin}[e+f x])^m \, dx$$

Optimal (type 6, 123 leaves, ? steps):

$$\frac{1}{f\,(1+m)}\text{AppellF1}\left[\frac{1+m}{2},\ \frac{1}{2}+p,\ -p,\ \frac{3+m}{2},\ \text{Sin}[e+f\,x]^2,\ \frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]$$
$$\left(\text{Cos}[e+f\,x]^2\right)^{\frac{1}{2}+p}\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,(d\,\text{Sin}[e+f\,x])^m\left(\frac{a+b-a\,\text{Sin}[e+f\,x]^2}{a+b}\right)^{-p}\text{Tan}[e+f\,x]$$

Result (type 6, 3356 leaves) :

$$\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\right.$$
$$\left.(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^p\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\text{Sin}[e+f\,x]\,(d\,\text{Sin}[e+f\,x])^m\left(\frac{\text{Tan}[e+f\,x]}{\sqrt{\text{Sec}[e+f\,x]^2}}\right)^m\right)\Big/$$
$$\left(f\,(1+m)\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3+m}{2},\ \frac{2+m}{2},\ 1-p,\ \frac{5+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$
$$\left.\left.(a+b)\,(2+m)\,\text{AppellF1}\left[\frac{3+m}{2},\ \frac{4+m}{2},\ -p,\ \frac{5+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)$$
$$\left(\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^{-1+p}\right.\right.$$
$$\left.\left(\frac{\text{Tan}[e+f\,x]}{\sqrt{\text{Sec}[e+f\,x]^2}}\right)^m\right)\Big/\left((1+m)\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3+m}{2},\ \frac{2+m}{2},\ 1-p,\ \frac{5+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$
$$\left.\left.\left.(a+b)\,(2+m)\,\text{AppellF1}\left[\frac{3+m}{2},\ \frac{4+m}{2},\ -p,\ \frac{5+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)\right)-$$
$$\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^p\right.$$
$$\left.\text{Sin}[e+f\,x]^2\left(\frac{\text{Tan}[e+f\,x]}{\sqrt{\text{Sec}[e+f\,x]^2}}\right)^m\right)\Big/\left((1+m)\left((a+b)\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f\,x]^2,\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\,\frac{2+m}{2},\,1-p,\,\frac{5+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+$$

$$(a+b)\,(2+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,\frac{4+m}{2},\,-p,\,\frac{5+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)+$$

$$\Big(2\,(a+b)\,(3+m)\,p\,\text{AppellF1}\Big[\frac{1+m}{2},\,\frac{2+m}{2},\,-p,\,\frac{3+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\big(\text{Sec}[e+f\,x]^2\big)^p$$

$$\text{Sin}[e+f\,x]^2\,\Bigg(\frac{\text{Tan}[e+f\,x]}{\sqrt{\text{Sec}[e+f\,x]^2}}\Bigg)^m\Bigg)\Big/\,\Big((1+m)\,\Big((a+b)\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\,\frac{2+m}{2},\,-p,\,\frac{3+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-$$

$$\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\,\frac{2+m}{2},\,1-p,\,\frac{5+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+$$

$$(a+b)\,(2+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,\frac{4+m}{2},\,-p,\,\frac{5+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)-$$

$$\Big(2\,a\,(a+b)\,(3+m)\,p\,\text{AppellF1}\Big[\frac{1+m}{2},\,\frac{2+m}{2},\,-p,\,\frac{3+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Cos}[e+f\,x]$$

$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\big(\text{Sec}[e+f\,x]^2\big)^p\,\text{Sin}[e+f\,x]\,\text{Sin}[2\,(e+f\,x)]\,\Bigg(\frac{\text{Tan}[e+f\,x]}{\sqrt{\text{Sec}[e+f\,x]^2}}\Bigg)^m\Bigg)\Big/$$

$$\Big((1+m)\,\Big((a+b)\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\,\frac{2+m}{2},\,-p,\,\frac{3+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-$$

$$\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\,\frac{2+m}{2},\,1-p,\,\frac{5+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+$$

$$(a+b)\,(2+m)\,\text{AppellF1}\Big[\frac{3+m}{2},\,\frac{4+m}{2},\,-p,\,\frac{5+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)+$$

$$\Big((a+b)\,(3+m)\,\text{Cos}[e+f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\big(\text{Sec}[e+f\,x]^2\big)^p\,\text{Sin}[e+f\,x]\,\Bigg(\frac{\text{Tan}[e+f\,x]}{\sqrt{\text{Sec}[e+f\,x]^2}}\Bigg)^m$$

$$\Big(1/((a+b)\,(3+m))\,2\,b\,(1+m)\,p\,\text{AppellF1}\Big[1+\frac{1+m}{2},\,\frac{2+m}{2},\,1-p,\,1+\frac{3+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$1/(3+m)\,(1+m)\,(2+m)\,\text{AppellF1}\Big[1+\frac{1+m}{2},\,1+\frac{2+m}{2},\,-p,\,1+\frac{3+m}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)\Big)\Big/$$

$$\left((1+m)\left((a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\frac{2+m}{2},-p,\frac{3+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\left(-2 b p\,\text{AppellF1}\left[\frac{3+m}{2},\frac{2+m}{2},1-p,\frac{5+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+(a+b)(2+m)\,\text{AppellF1}\left[\frac{3+m}{2},\frac{4+m}{2},-p,\frac{5+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)\right)+$$

$$\left((a+b)\,m\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\frac{2+m}{2},-p,\frac{3+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,(a+2 b+a\,\text{Cos}[2(e+f x)])^p\right.$$

$$\left.\left(\text{Sec}[e+f x]^2\right)^p\text{Sin}[e+f x]\left(\frac{\text{Tan}[e+f x]}{\sqrt{\text{Sec}[e+f x]^2}}\right)^{-1+m}\left(\sqrt{\text{Sec}[e+f x]^2}-\frac{\text{Tan}[e+f x]^2}{\sqrt{\text{Sec}[e+f x]^2}}\right)\right)\Big/$$

$$\left((1+m)\left((a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\frac{2+m}{2},-p,\frac{3+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\left(-2 b p\,\text{AppellF1}\left[\frac{3+m}{2},\frac{2+m}{2},1-p,\frac{5+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+(a+b)(2+m)\,\text{AppellF1}\left[\frac{3+m}{2},\frac{4+m}{2},-p,\frac{5+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)\right)-$$

$$\left((a+b)(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\frac{2+m}{2},-p,\frac{3+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,(a+2 b+a\,\text{Cos}[2(e+f x)])^p\right.$$

$$\left(\text{Sec}[e+f x]^2\right)^p\text{Sin}[e+f x]\left(\frac{\text{Tan}[e+f x]}{\sqrt{\text{Sec}[e+f x]^2}}\right)^{m}\left(-2\left(-2 b p\,\text{AppellF1}\left[\frac{3+m}{2},\frac{2+m}{2},1-p,\frac{5+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\right.\right.$$

$$\left.(a+b)(2+m)\,\text{AppellF1}\left[\frac{3+m}{2},\frac{4+m}{2},-p,\frac{5+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+(a+b)(3+m)$$

$$\left(\frac{1}{(a+b)(3+m)}2 b(1+m)\,p\,\text{AppellF1}\left[1+\frac{1+m}{2},\frac{2+m}{2},1-p,1+\frac{3+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\right.$$

$$\left.\frac{1}{3+m}(1+m)(2+m)\,\text{AppellF1}\left[1+\frac{1+m}{2},1+\frac{2+m}{2},-p,1+\frac{3+m}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)-$$

$$\text{Tan}[e+f x]^2\left(-2 b p\left(-\frac{1}{(a+b)(5+m)}2 b(3+m)(1-p)\,\text{AppellF1}\left[1+\frac{3+m}{2},\frac{2+m}{2},2-p,1+\frac{5+m}{2},-\text{Tan}[e+f x]^2,\right.\right.\right.$$

$$\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\frac{1}{5+m}(2+m)(3+m)\,\text{AppellF1}\left[1+\frac{3+m}{2},1+\frac{2+m}{2},1-p,\right.$$

$$1+\frac{5+m}{2},\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\ \text{Sec}[e+f x]^2\ \text{Tan}[e+f x]\Big)+(a+b)\ (2+m)\ \Bigg(\frac{1}{(a+b)\ (5+m)}$$

$$2\,b\ (3+m)\ p\ \text{AppellF1}\Big[1+\frac{3+m}{2},\ \frac{4+m}{2},\ 1-p,\ 1+\frac{5+m}{2},\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\ \text{Sec}[e+f x]^2\ \text{Tan}[e+f x]-\frac{1}{5+m}$$

$$(3+m)\ (4+m)\ \text{AppellF1}\Big[1+\frac{3+m}{2},\ 1+\frac{4+m}{2},\ -p,\ 1+\frac{5+m}{2},\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\ \text{Sec}[e+f x]^2\ \text{Tan}[e+f x]\Big)\Big)\Big)\Bigg)\Bigg/$$

$$\Bigg((1+m)\ \Bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ \frac{2+m}{2},\ -p,\ \frac{3+m}{2},\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]-$$

$$\Big(-2\,b\,p\ \text{AppellF1}\Big[\frac{3+m}{2},\ \frac{2+m}{2},\ 1-p,\ \frac{5+m}{2},\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+(a+b)\ (2+m)$$

$$\text{AppellF1}\Big[\frac{3+m}{2},\ \frac{4+m}{2},\ -p,\ \frac{5+m}{2},\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Big)\ \text{Tan}[e+f x]^2\Big)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 136: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[e+f x]\ \left(a+b\,\text{Sec}[e+f x]^2\right)^p\,dx$$

Optimal (type 6, 77 leaves, 3 steps):

$$-\frac{\text{AppellF1}\Big[\frac{1}{2},\ 1,\ -p,\ \frac{3}{2},\ \text{Sec}[e+f x]^2,\ -\frac{b\,\text{Sec}[e+f x]^2}{a}\Big]\ \text{Sec}[e+f x]\ \left(a+b\,\text{Sec}[e+f x]^2\right)^p\ \left(1+\frac{b\,\text{Sec}[e+f x]^2}{a}\right)^{-p}}{f}$$

Result (type 6, 4417 leaves):

$$\Bigg(2^p\ \text{Sec}[e+f x]\ \left(a+b\,\text{Sec}[e+f x]^2\right)^p\ \text{Tan}[e+f x]\ \left(1+\text{Tan}[e+f x]^2\right)^{-\frac{1}{2}+p}$$

$$\left(\frac{a+b+b\,\text{Tan}[e+f x]^2}{1+\text{Tan}[e+f x]^2}\right)^p\ \Bigg(-\Bigg(2\ (a+b)\ \text{AppellF1}\Big[1,\ \frac{1}{2},\ -p,\ 2,\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Bigg)\Bigg/$$

$$\Bigg(4\ (a+b)\ \text{AppellF1}\Big[1,\ \frac{1}{2},\ -p,\ 2,\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+\Bigg(2\,b\,p\ \text{AppellF1}\Big[2,\ \frac{1}{2},\ 1-p,\ 3,\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]-$$

$$(a+b)\ \text{AppellF1}\Big[2,\ \frac{3}{2},\ -p,\ 3,\ -\text{Tan}[e+f x]^2,\ -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Bigg)\ \text{Tan}[e+f x]^2\Bigg)+$$

$$\Bigg(b\ (-1+2\,p)\ \text{AppellF1}\Big[-\frac{1}{2}-p,\ -\frac{1}{2},\ -p,\ \frac{1}{2}-p,\ -\text{Cot}[e+f x]^2,\ -\frac{(a+b)\ \text{Cot}[e+f x]^2}{b}\Big]\ \left(1+\text{Tan}[e+f x]^2\right)\Bigg)\Bigg/$$

$$\Bigg((1+2\,p)\ \Bigg(-2\ (a+b)\ p\ \text{AppellF1}\Big[\frac{1}{2}-p,\ -\frac{1}{2},\ 1-p,\ \frac{3}{2}-p,\ -\text{Cot}[e+f x]^2,\ -\frac{(a+b)\ \text{Cot}[e+f x]^2}{b}\Big]-$$

$$b\,\text{AppellF1}\left[\frac{1}{2}-p,\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]+$$

$$b\,(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Tan}[e+f x]^2\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(f\Bigg(2^{1+p}\left(-\frac{1}{2}+p\right)\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]^3\left(1+\text{Tan}[e+f x]^2\right)^{-\frac{3}{2}+p}\left(\frac{a+b+b\,\text{Tan}[e+f x]^2}{1+\text{Tan}[e+f x]^2}\right)^p$$

$$\Bigg(-\Bigg(2\,(a+b)\,\text{AppellF1}\left[1,\frac{1}{2},-p,2,-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\Bigg/$$

$$\Bigg(4\,(a+b)\,\text{AppellF1}\left[1,\frac{1}{2},-p,2,-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\Bigg(2\,b\,p\,\text{AppellF1}\left[2,\frac{1}{2},1-p,3,-\text{Tan}[e+f x]^2,\right.$$

$$\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-(a+b)\,\text{AppellF1}\left[2,\frac{3}{2},-p,3,-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)+$$

$$\Bigg(b\,(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\left(1+\text{Tan}[e+f x]^2\right)\Bigg)\Bigg/$$

$$\Bigg((1+2p)\Bigg(-2\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},1-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]-$$

$$b\,\text{AppellF1}\left[\frac{1}{2}-p,\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]+$$

$$b\,(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Tan}[e+f x]^2\Bigg)\Bigg)\Bigg)+2^{1+p}\,\text{Sec}[e+f x]^2$$

$$\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{-\frac{1}{2}+p}\left(\frac{a+b+b\,\text{Tan}[e+f x]^2}{1+\text{Tan}[e+f x]^2}\right)^p\Bigg(-\Bigg(2\,(a+b)\,\text{AppellF1}\left[1,\frac{1}{2},-p,2,-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\Bigg/$$

$$\Bigg(4\,(a+b)\,\text{AppellF1}\left[1,\frac{1}{2},-p,2,-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\Bigg(2\,b\,p\,\text{AppellF1}\left[2,\frac{1}{2},1-p,3,-\text{Tan}[e+f x]^2,\right.$$

$$\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-(a+b)\,\text{AppellF1}\left[2,\frac{3}{2},-p,3,-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)+$$

$$\Bigg(b\,(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\left(1+\text{Tan}[e+f x]^2\right)\Bigg)\Bigg/$$

$$\Bigg((1+2p)\Bigg(-2\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},1-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]-$$

$$b\,\text{AppellF1}\left[\frac{1}{2}-p,\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]+$$

$$b\,(-1+2\,p)\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-\frac{1}{2},\,-p,\,\frac{1}{2}-p,\,-\text{Cot}[e+f\,x]^2,\,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Tan}[e+f\,x]^2\Bigg)\Bigg)\Bigg)+$$

$$2^p\,p\,\text{Tan}[e+f\,x]^2\,\left(1+\text{Tan}[e+f\,x]^2\right)^{-\frac{1}{2}+p}\left(\frac{a+b+b\,\text{Tan}[e+f\,x]^2}{1+\text{Tan}[e+f\,x]^2}\right)^{-1+p}\left(\frac{2\,b\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{1+\text{Tan}[e+f\,x]^2}-\right.$$

$$\left.\frac{2\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}{\left(1+\text{Tan}[e+f\,x]^2\right)^2}\right)$$

$$\left(-\left(2\,(a+b)\,\text{AppellF1}\left[1,\,\frac{1}{2},\,-p,\,2,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\right/$$

$$\left(4\,(a+b)\,\text{AppellF1}\left[1,\,\frac{1}{2},\,-p,\,2,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[2,\,\frac{1}{2},\,1-p,\,3,\,-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-(a+b)\,\text{AppellF1}\left[2,\,\frac{3}{2},\,-p,\,3,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\left(b\,(-1+2\,p)\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-\frac{1}{2},\,-p,\,\frac{1}{2}-p,\,-\text{Cot}[e+f\,x]^2,\,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\left(1+\text{Tan}[e+f\,x]^2\right)\right)\Big/$$

$$\left((1+2\,p)\,\left(-2\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2}-p,\,-\frac{1}{2},\,1-p,\,\frac{3}{2}-p,\,-\text{Cot}[e+f\,x]^2,\,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]-\right.\right.$$

$$b\,\text{AppellF1}\left[\frac{1}{2}-p,\,\frac{1}{2},\,-p,\,\frac{3}{2}-p,\,-\text{Cot}[e+f\,x]^2,\,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]+b\,(-1+2\,p)\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-\frac{1}{2},\,-p,\,\frac{1}{2}-\right.$$

$$\left.\left.\left.p,\,-\text{Cot}[e+f\,x]^2,\,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Tan}[e+f\,x]^2\right)\right)\Bigg)+2^p\,\text{Tan}[e+f\,x]^2\,\left(1+\text{Tan}[e+f\,x]^2\right)^{-\frac{1}{2}+p}$$

$$\left(\frac{a+b+b\,\text{Tan}[e+f\,x]^2}{1+\text{Tan}[e+f\,x]^2}\right)^p\left(-\left(2\,(a+b)\,\left(\frac{b\,p\,\text{AppellF1}\left[2,\,\frac{1}{2},\,1-p,\,3,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{a+b}-\right.\right.\right.$$

$$\left.\left.\frac{1}{2}\,\text{AppellF1}\left[2,\,\frac{3}{2},\,-p,\,3,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\Big/$$

$$\left(4\,(a+b)\,\text{AppellF1}\left[1,\,\frac{1}{2},\,-p,\,2,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[2,\,\frac{1}{2},\,1-p,\,3,\,-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-(a+b)\,\text{AppellF1}\left[2,\,\frac{3}{2},\,-p,\,3,\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\left(2\,b\,(-1+2\,p)\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-\frac{1}{2},\,-p,\,\frac{1}{2}-p,\,-\text{Cot}[e+f\,x]^2,\,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\Big/$$

$$\left((1+2p)\left(-2(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},1-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]-\right.\right.$$

$$b\,\text{AppellF1}\left[\frac{1}{2}-p,\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]+$$

$$\left.\left.b(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Tan}[e+fx]^2\right)\right)+$$

$$\left(b(-1+2p)\left(-1\Big/\left(b\left(\frac{1}{2}-p\right)\right)2(a+b)\left(-\frac{1}{2}-p\right)p\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},1-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,\right.\right.\right.$$

$$\left.-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2-1\Big/\left(\frac{1}{2}-p\right)\left(-\frac{1}{2}-p\right)$$

$$\left.\left.\text{AppellF1}\left[\frac{1}{2}-p,\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2\right)\left(1+\text{Tan}[e+fx]^2\right)\right)\Big/$$

$$\left((1+2p)\left(-2(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},1-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]-\right.\right.$$

$$b\,\text{AppellF1}\left[\frac{1}{2}-p,\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]+$$

$$\left.\left.b(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Tan}[e+fx]^2\right)\right)-$$

$$\left(b(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\left(1+\text{Tan}[e+fx]^2\right)\right.$$

$$\left(-2(a+b)\,p\left(\frac{1}{b\left(\frac{3}{2}-p\right)}2(a+b)\left(\frac{1}{2}-p\right)(1-p)\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},2-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\right.\right.$$

$$\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2-\frac{1}{\frac{3}{2}-p}\left(\frac{1}{2}-p\right)\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Cot}[e+fx]$$

$$\left.\text{Csc}[e+fx]^2\right)-b\left(-\frac{1}{b\left(\frac{3}{2}-p\right)}2(a+b)\left(\frac{1}{2}-p\right)p\,\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\right.$$

$$\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2+\frac{1}{\frac{3}{2}-p}\left(\frac{1}{2}-p\right)\text{AppellF1}\left[\frac{3}{2}-p,\frac{3}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]$$

$$\left.\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2\right)+2b(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-\frac{1}{2},-p,\frac{1}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]$$

$$\mathrm{Sec}[e+f x]^2 \,\mathrm{Tan}[e+f x]+b\,(-1+2 p)\,\Bigg(-\frac{1}{b\left(\frac{1}{2}-p\right)}2\,(a+b)\left(-\frac{1}{2}-p\right)p\,\mathrm{AppellF1}\Big[\frac{1}{2}-p,\,-\frac{1}{2},\,1-p,\,\frac{3}{2}-p,$$

$$-\mathrm{Cot}[e+f x]^2,\,-\frac{(a+b)\,\mathrm{Cot}[e+f x]^2}{b}\Big]\,\mathrm{Cot}[e+f x]\,\mathrm{Csc}[e+f x]^2-\frac{1}{\frac{1}{2}-p}\left(-\frac{1}{2}-p\right)$$

$$\mathrm{AppellF1}\Big[\frac{1}{2}-p,\,\frac{1}{2},\,-p,\,\frac{3}{2}-p,\,-\mathrm{Cot}[e+f x]^2,\,-\frac{(a+b)\,\mathrm{Cot}[e+f x]^2}{b}\Big]\,\mathrm{Cot}[e+f x]\,\mathrm{Csc}[e+f x]^2\Bigg)\,\mathrm{Tan}[e+f x]^2\Bigg)\Bigg)\Big/$$

$$\Bigg((1+2 p)\,\Bigg(-2\,(a+b)\,p\,\mathrm{AppellF1}\Big[\frac{1}{2}-p,\,-\frac{1}{2},\,1-p,\,\frac{3}{2}-p,\,-\mathrm{Cot}[e+f x]^2,\,-\frac{(a+b)\,\mathrm{Cot}[e+f x]^2}{b}\Big]-b$$

$$\mathrm{AppellF1}\Big[\frac{1}{2}-p,\,\frac{1}{2},\,-p,\,\frac{3}{2}-p,\,-\mathrm{Cot}[e+f x]^2,\,-\frac{(a+b)\,\mathrm{Cot}[e+f x]^2}{b}\Big]+b\,(-1+2 p)$$

$$\mathrm{AppellF1}\Big[-\frac{1}{2}-p,\,-\frac{1}{2},\,-p,\,\frac{1}{2}-p,\,-\mathrm{Cot}[e+f x]^2,\,-\frac{(a+b)\,\mathrm{Cot}[e+f x]^2}{b}\Big]\,\mathrm{Tan}[e+f x]^2\Bigg)^2\Bigg)+$$

$$\Bigg(2\,(a+b)\,\mathrm{AppellF1}\Big[1,\,\frac{1}{2},\,-p,\,2,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\Bigg(2\,\Bigg(2\,b\,p\,\mathrm{AppellF1}\Big[2,\,\frac{1}{2},\,1-p,\,3,\,-\mathrm{Tan}[e+f x]^2,$$

$$-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]-(a+b)\,\mathrm{AppellF1}\Big[2,\,\frac{3}{2},\,-p,\,3,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\Bigg)\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]+$$

$$4\,(a+b)\,\Bigg(\frac{b\,p\,\mathrm{AppellF1}\Big[2,\,\frac{1}{2},\,1-p,\,3,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]}{a+b}-$$

$$\frac{1}{2}\,\mathrm{AppellF1}\Big[2,\,\frac{3}{2},\,-p,\,3,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Bigg)+$$

$$\mathrm{Tan}[e+f x]^2\,\Bigg(2\,b\,p\,\Bigg(-\frac{1}{3\,(a+b)}4\,b\,(1-p)\,\mathrm{AppellF1}\Big[3,\,\frac{1}{2},\,2-p,\,4,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]-$$

$$\frac{2}{3}\,\mathrm{AppellF1}\Big[3,\,\frac{3}{2},\,1-p,\,4,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Bigg)-$$

$$(a+b)\,\Bigg(\frac{1}{3\,(a+b)}4\,b\,p\,\mathrm{AppellF1}\Big[3,\,\frac{3}{2},\,1-p,\,4,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]-$$

$$2\,\mathrm{AppellF1}\Big[3,\,\frac{5}{2},\,-p,\,4,\,-\mathrm{Tan}[e+f x]^2,\,-\frac{b\,\mathrm{Tan}[e+f x]^2}{a+b}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\left(4\,(a+b)\,\text{AppellF1}\left[1,\frac{1}{2},-p,2,-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[2,\frac{1}{2},1-p,3,-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-(a+b)\,\text{AppellF1}\left[2,\frac{3}{2},-p,3,-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 137: Result more than twice size of optimal antiderivative.**

$$\int \text{Csc}[e+f\,x]^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 81 leaves, 3 steps):

$$\frac{\text{AppellF1}\left[\frac{3}{2},2,-p,\frac{5}{2},\text{Sec}[e+f\,x]^2,-\frac{b\,\text{Sec}[e+f\,x]^2}{a}\right]\text{Sec}[e+f\,x]^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\left(1+\frac{b\,\text{Sec}[e+f\,x]^2}{a}\right)^{-p}}{3\,f}$$

Result (type 6, 2081 leaves):

$$-\left(\left(b\,(-3+2\,p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\right.\right.$$
$$\left.(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Csc}[e+f\,x]^3\,\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\right)\Big/$$
$$\left(f\,(-1+2\,p)\,\left(2\,(a+b)\,p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]+\right.\right.$$
$$b\,\left(\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]+\right.$$
$$\left.\left.(3-2\,p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Tan}[e+f\,x]^2\right)\right)$$
$$\left(-\left(b\,(-3+2\,p)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(-1\Big/\left(b\,\left(\frac{3}{2}-p\right)\right)2\,(a+b)\,\left(\frac{1}{2}-p\right)\,p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,\right.\right.\right.\right.$$
$$\left.-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2-1\Big/\left(\left(\frac{3}{2}-p\right)\left(\frac{1}{2}-p\right)\right.$$
$$\left.\left.\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Cot}[e+f\,x]\,\text{Csc}[e+f\,x]^2\right)\,\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}\right)\Big/$$
$$\left((-1+2\,p)\,\left(2\,(a+b)\,p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]+\right.\right.$$
$$b\,\left(\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+f\,x]^2,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]+\right.$$

$$(3-2p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Tan}[e+fx]^2\Big)\Big)\Big)+$$

$$\Big(2ab\,p\,(-3+2p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right](a+2b+a\,\text{Cos}[2(e+fx)])^{-1+p}$$

$$\left(\text{Sec}[e+fx]^2\right)^{\frac{1}{2}+p}\text{Sin}[2(e+fx)]\Big)\Big/$$

$$\Big((-1+2p)\,\Big(2(a+b)\,p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]+$$

$$b\,\Big(\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]+(3-2p)$$

$$\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Tan}[e+fx]^2\Big)\Big)\Big)-$$

$$\Big(2b\left(\frac{1}{2}+p\right)(-3+2p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right](a+2b+a\,\text{Cos}[2(e+fx)])^{p}$$

$$\left(\text{Sec}[e+fx]^2\right)^{\frac{1}{2}+p}\text{Tan}[e+fx]\Big)\Big/\Big((-1+2p)\,\Big(2(a+b)\,p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]+$$

$$b\,\Big(\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]+(3-2p)$$

$$\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Tan}[e+fx]^2\Big)\Big)\Big)+$$

$$\Big(b\,(-3+2p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right](a+2b+a\,\text{Cos}[2(e+fx)])^{p}$$

$$\left(\text{Sec}[e+fx]^2\right)^{\frac{1}{2}+p}\Big(2(a+b)\,p\,\Big(\frac{1}{b\left(\frac{5}{2}-p\right)}2(a+b)(1-p)\left(\frac{3}{2}-p\right)\text{AppellF1}\Big[\frac{5}{2}-p,-\frac{1}{2},2-p,$$

$$\frac{7}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\Big]\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2-\frac{1}{\frac{5}{2}-p}\left(\frac{3}{2}-p\right)$$

$$\text{AppellF1}\left[\frac{5}{2}-p,\frac{1}{2},1-p,\frac{7}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2\Big)+$$

$$b\,\Big(-\frac{1}{b\left(\frac{5}{2}-p\right)}2(a+b)\left(\frac{3}{2}-p\right)p\,\text{AppellF1}\left[\frac{5}{2}-p,\frac{1}{2},1-p,\frac{7}{2}-p,-\text{Cot}[e+fx]^2,-\frac{(a+b)\,\text{Cot}[e+fx]^2}{b}\right]\text{Cot}[e+fx]\,\text{Csc}[e+fx]^2+$$

$$\frac{1}{\frac{5}{2}-p}\left(\frac{3}{2}-p\right)\text{AppellF1}\left[\frac{5}{2}-p,\frac{3}{2},-p,\frac{7}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Cot}[e+f x]\,\text{Csc}[e+f x]^2+2\,(3-2p)$$

$$\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+(3-2p)\left(-\frac{1}{b\left(\frac{3}{2}-p\right)}2\,(a+\right.$$

$$b)\left(\frac{1}{2}-p\right)p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Cot}[e+f x]\,\text{Csc}[e+f x]^2-\frac{1}{\frac{3}{2}-p}$$

$$\left.\left.\left.\left(\frac{1}{2}-p\right)\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Cot}[e+f x]\,\text{Csc}[e+f x]^2\right)\text{Tan}[e+f x]^2\right)\right)\right)\Big/$$

$$\left((-1+2p)\left(2\,(a+b)\,p\,\text{AppellF1}\left[\frac{3}{2}-p,-\frac{1}{2},1-p,\frac{5}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]+\right.\right.$$

$$b\left(\text{AppellF1}\left[\frac{3}{2}-p,\frac{1}{2},-p,\frac{5}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]+\right.$$

$$\left.\left.\left.(3-2p)\,\text{AppellF1}\left[\frac{1}{2}-p,-\frac{1}{2},-p,\frac{3}{2}-p,-\text{Cot}[e+f x]^2,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Tan}[e+f x]^2\right)\right)^2\right)\right)\right)\right)$$

Problem 138: Result more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]^4\,dx$$

Optimal (type 6, 88 leaves, 3 steps):

$$\frac{1}{5f}\text{AppellF1}\left[\frac{5}{2},3,-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]^5\left(a+b+b\,\text{Tan}[e+f x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 5878 leaves): Display of huge result suppressed!

Problem 139: Result more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]^2\,dx$$

Optimal (type 6, 88 leaves, 3 steps):

$$\frac{1}{3f}\text{AppellF1}\left[\frac{3}{2},2,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]^3\left(a+b+b\,\text{Tan}[e+f x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 3781 leaves):

$$\left(3\,(a+b)\,(a+2b+a\,\text{Cos}[2\,(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{-2+p}\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]^2\,\text{Tan}[e+f x]\right.$$

$$\left(\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Big/\left(-3(a+b)\,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\right.\right.$$
$$2\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2(a+b)\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.\right.$$
$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)+\left(\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\right)\Big/$$
$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-\right.\right.$$
$$\left.\left.\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)\right)\right)\Big/$$
$$\left(f\left(3(a+b)(a+2b+a\,\text{Cos}[2(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{-1+p}\left(\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Big/\right.\right.\right.$$
$$\left(-3(a+b)\,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.\right.\right.$$
$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2(a+b)\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)+$$
$$\left(\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\right)\Big/\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},\right.\right.$$
$$\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-\right.$$
$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)\right)-$$
$$6a(a+b)p(a+2b+a\,\text{Cos}[2(e+f x)])^{-1+p}\left(\text{Sec}[e+f x]^2\right)^{-2+p}\text{Sin}[2(e+f x)]\,\text{Tan}[e+f x]$$
$$\left(\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Big/\left(-3(a+b)\,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\right.\right.$$
$$2\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2(a+b)\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.\right.$$
$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)+\left(\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\right)\Big/$$
$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}[e+f x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)\right)+$$

$$6\,(a+b)\,(-2+p)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\,\left(\text{Sec}[e+f\,x]^{2}\right)^{-2+p}\,\text{Tan}[e+f\,x]^{2}\,\left(\text{AppellF1}\left[\frac{1}{2},\,2,\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]\right/$$

$$\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,2,\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]+2\,\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},\,2,\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^{2},\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]+2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,3,\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^{2}\right)+$$

$$\left(\text{AppellF1}\left[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]\,\text{Sec}[e+f\,x]^{2}\right)\Big/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\right.\right.$$

$$\left.-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]+2\,\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]-\right.$$

$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]\right)\,\text{Tan}[e+f\,x]^{2}\right)\right)+3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}$$

$$\left(\text{Sec}[e+f\,x]^{2}\right)^{-2+p}\,\text{Tan}[e+f\,x]\,\left(\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\,2,\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]\,\text{Sec}[e+f\,x]^{2}\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\frac{4}{3}\,\text{AppellF1}\left[\frac{3}{2},\,3,\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]\,\text{Sec}[e+f\,x]^{2}\,\text{Tan}[e+f\,x]\right)\Big/$$

$$\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,2,\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]+2\,\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},\,2,\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^{2},\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]+2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,3,\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^{2}\right)+$$

$$\left(2\,\text{AppellF1}\left[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]\,\text{Sec}[e+f\,x]^{2}\,\text{Tan}[e+f\,x]\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]+2\,\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^{2}\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]\right)\,\text{Tan}[e+f\,x]^{2}\right)+$$

$$\left(\text{Sec}[e+f\,x]^{2}\,\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]\,\text{Sec}[e+f\,x]^{2}\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},\,-\text{Tan}[e+f\,x]^{2}\right]\,\text{Sec}[e+f\,x]^{2}\,\text{Tan}[e+f\,x]\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$
$$\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\Big)-$$
$$\left(\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\left(4\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.\right.\right.$$
$$\left.2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$
$$3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$
$$\left.\frac{4}{3}\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$
$$2\,\text{Tan}[e+f\,x]^2\left(-b\,p\left(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},2,2-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.\right.$$
$$\left.\frac{12}{5}\,\text{AppellF1}\left[\frac{5}{2},3,1-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$
$$2\,(a+b)\left(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},3,1-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.$$
$$\left.\left.\left.\left.\frac{18}{5}\,\text{AppellF1}\left[\frac{5}{2},4,-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\Big/$$
$$\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+2\left(-b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$
$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)^2-$$
$$\left(\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\left(4\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.\right.$$
$$\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+$$

$$3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$2\,\text{Tan}[e+f\,x]^2\left(b\,p\left(-\frac{6}{5}\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.\right.$$

$$\left.\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},2-p,1,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)-$$

$$(a+b)\left(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.$$

$$\left.\left.\left.\left.\frac{12}{5}\,\text{AppellF1}\left[\frac{5}{2},-p,3,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)^2\right)\right)\right)$$

- **Problem 140: Result more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 83 leaves, 3 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},1,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2137 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right.$$

$$\left.\text{Cos}[e+f\,x]\,\left(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]\right)^p\left(\text{Sec}[e+f\,x]^2\right)^p\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\right)\Big/$$

$$\left(f\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.\right.$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Big)\,\text{Tan}[e+f x]^2\Big)$$

$$\Bigg(\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^{-1+p}\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]^2\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)+$$

$$\Bigg(6\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]^2\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)-$$

$$\Bigg(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\,\text{Cos}[e+f x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^{-1+p}$$

$$\left(\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]\,\text{Sin}[2\,(e+f x)]\Bigg)\Bigg/\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+$$

$$2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)$$

$$\text{Tan}[e+f x]^2\Bigg)+\Bigg(3\,(a+b)\,\text{Cos}[e+f x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^p$$

$$\text{Sin}[e+f x]\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-$$

$$\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)\Big)\Big/$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)-$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Cos}[e+f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\big(\text{Sec}[e+f\,x]^2\big)^p\,\text{Sin}[e+f\,x]$$

$$\Big(4\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\Big)$$

$$\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+3\,(a+b)\,\Big(\frac{2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-$$

$$\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)+$$

$$2\,\text{Tan}[e+f\,x]^2\,\Big(b\,p\,\Big(-\frac{6}{5}\,\text{AppellF1}\Big[\frac{5}{2},\,1-p,\,2,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\Big[\frac{5}{2},\,2-p,\,1,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)-$$

$$(a+b)\,\Big(\frac{6\,b\,p\,\text{AppellF1}\Big[\frac{5}{2},\,1-p,\,2,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{5\,(a+b)}-$$

$$\frac{12}{5}\,\text{AppellF1}\Big[\frac{5}{2},\,-p,\,3,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)^2\Big)\Big)$$

- **Problem 152: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f x]^5 \left(a+b \,\text{Sec}[e+f x]^2\right) dx$$

Optimal (type 3, 98 leaves, 4 steps):

$$\frac{(6 a+5 b) \,\text{ArcTanh}[\text{Sin}[e+f x]]}{16 f}+\frac{(6 a+5 b) \,\text{Sec}[e+f x] \,\text{Tan}[e+f x]}{16 f}+\frac{(6 a+5 b) \,\text{Sec}[e+f x]^3 \,\text{Tan}[e+f x]}{24 f}+\frac{b \,\text{Sec}[e+f x]^5 \,\text{Tan}[e+f x]}{6 f}$$

Result (type 3, 445 leaves):

$$-\frac{3 a \,\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]}{8 f}-\frac{5 b \,\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]}{16 f}+$$
$$\frac{3 a \,\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]}{8 f}+\frac{5 b \,\text{Log}\left[\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right]}{16 f}+\frac{b}{48 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^6}+$$
$$\frac{a}{16 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^4}+\frac{b}{16 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^4}+\frac{3 a}{16 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^2}+$$
$$\frac{5 b}{32 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]-\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^2}-\frac{b}{48 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^6}-\frac{a}{16 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^4}-$$
$$\frac{b}{16 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^4}-\frac{3 a}{16 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^2}-\frac{5 b}{32 f \left(\text{Cos}\left[\frac{1}{2} (e+f x)\right]+\text{Sin}\left[\frac{1}{2} (e+f x)\right]\right)^2}$$

- **Problem 155: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f x] \left(a+b \,\text{Sec}[e+f x]^2\right) dx$$

Optimal (type 3, 24 leaves, 2 steps):

$$\frac{b \,\text{ArcTanh}[\text{Sin}[e+f x]]}{f}+\frac{a \,\text{Sin}[e+f x]}{f}$$

Result (type 3, 92 leaves):

$$-\frac{b \,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+\frac{b \,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+\frac{a \,\text{Cos}[f x] \,\text{Sin}[e]}{f}+\frac{a \,\text{Cos}[e] \,\text{Sin}[f x]}{f}$$

- **Problem 165: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f x]^5 \left(a+b \,\text{Sec}[e+f x]^2\right)^2 dx$$

Optimal (type 3, 165 leaves, 6 steps):

$$\frac{(48 a^2+80 a b+35 b^2) \text{ArcTanh}[\text{Sin}[e+f x]]}{128 f}+\frac{(48 a^2+80 a b+35 b^2) \text{Sec}[e+f x] \text{Tan}[e+f x]}{128 f}+\frac{(48 a^2+80 a b+35 b^2) \text{Sec}[e+f x]^3 \text{Tan}[e+f x]}{192 f}+\frac{b (10 a+7 b) \text{Sec}[e+f x]^5 \text{Tan}[e+f x]}{48 f}+\frac{b \text{Sec}[e+f x]^7 (a+b-a \text{Sin}[e+f x]^2) \text{Tan}[e+f x]}{8 f}$$

Result (type 3, 803 leaves) :

$$-\frac{3 a^2 \text{Log}[\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)]]}{8 f}-\frac{5 a b \text{Log}[\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)]]}{8 f}-\frac{35 b^2 \text{Log}[\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)]]}{128 f}+\frac{3 a^2 \text{Log}[\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)]]}{8 f}+\frac{5 a b \text{Log}[\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)]]}{8 f}+\frac{35 b^2 \text{Log}[\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)]]}{128 f}+\frac{b^2}{128 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^8}+\frac{a b}{24 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^6}+\frac{5 b^2}{192 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^6}+\frac{a^2}{16 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^4}+\frac{a b}{8 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^4}+\frac{15 b^2}{256 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^4}+\frac{3 a^2}{16 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^2}+\frac{5 a b}{16 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^2}+\frac{35 b^2}{256 f (\text{Cos}[\frac{1}{2}(e+f x)]-\text{Sin}[\frac{1}{2}(e+f x)])^2}-\frac{b^2}{128 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^8}-\frac{a b}{24 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^6}-\frac{5 b^2}{192 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^6}-\frac{a^2}{16 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^4}-\frac{a b}{8 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^4}-\frac{15 b^2}{256 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^4}-\frac{3 a^2}{16 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^2}-\frac{5 a b}{16 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^2}-\frac{35 b^2}{256 f (\text{Cos}[\frac{1}{2}(e+f x)]+\text{Sin}[\frac{1}{2}(e+f x)])^2}$$

Problem 166: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^3 (a+b \text{Sec}[e+f x]^2)^2 \, dx$$

Optimal (type 3, 129 leaves, 5 steps) :

$$\frac{(8 a^2+12 a b+5 b^2) \text{ArcTanh}[\text{Sin}[e+f x]]}{16 f}+\frac{(8 a^2+12 a b+5 b^2) \text{Sec}[e+f x] \text{Tan}[e+f x]}{16 f}+\frac{b (8 a+5 b) \text{Sec}[e+f x]^3 \text{Tan}[e+f x]}{24 f}+\frac{b \text{Sec}[e+f x]^5 (a+b-a \text{Sin}[e+f x]^2) \text{Tan}[e+f x]}{6 f}$$

Result (type 3, 601 leaves) :

$$-\frac{a^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{2 f}-\frac{3 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{4 f}-\frac{5 b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{16 f}+$$
$$\frac{a^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{2 f}+\frac{3 a b \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{4 f}+\frac{5 b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right]}{16 f}+$$
$$\frac{b^2}{48 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^6}+\frac{a b}{8 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^4}+\frac{b^2}{16 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^4}+$$
$$\frac{a^2}{4 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+\frac{3 a b}{8 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}+\frac{5 b^2}{32 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]-\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-$$
$$\frac{b^2}{48 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^6}-\frac{a b}{8 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^4}-\frac{b^2}{16 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^4}-$$
$$\frac{a^2}{4 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-\frac{3 a b}{8 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}-\frac{5 b^2}{32 f\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]+\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)^2}$$

Problem 169: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f x]^3 \left(a+b \text{Sec}[e+f x]^2\right)^2 dx$$

Optimal (type 3, 49 leaves, 4 steps):

$$\frac{b^2 \text{ArcTanh}[\text{Sin}[e+f x]]}{f}+\frac{a (a+2 b) \text{Sin}[e+f x]}{f}-\frac{a^2 \text{Sin}[e+f x]^3}{3 f}$$

Result (type 3, 134 leaves):

$$-\frac{b^2 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+\frac{b^2 \text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right]}{f}+$$
$$\frac{2 a b \text{Cos}[f x] \text{Sin}[e]}{f}+\frac{2 a b \text{Cos}[e] \text{Sin}[f x]}{f}+\frac{3 a^2 \text{Sin}[e+f x]}{4 f}+\frac{a^2 \text{Sin}[3 (e+f x)]}{12 f}$$

Problem 170: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f x]^5 \left(a+b \text{Sec}[e+f x]^2\right)^2 dx$$

Optimal (type 3, 53 leaves, 3 steps):

$$\frac{(a+b)^2 \text{Sin}[e+f x]}{f}-\frac{2 a (a+b) \text{Sin}[e+f x]^3}{3 f}+\frac{a^2 \text{Sin}[e+f x]^5}{5 f}$$

Result (type 3, 111 leaves):

$$\frac{b^2 \text{Cos}[f x] \text{Sin}[e]}{f}+\frac{b^2 \text{Cos}[e] \text{Sin}[f x]}{f}+\frac{5 a^2 \text{Sin}[e+f x]}{8 f}+\frac{3 a b \text{Sin}[e+f x]}{2 f}+\frac{5 a^2 \text{Sin}[3 (e+f x)]}{48 f}+\frac{a b \text{Sin}[3 (e+f x)]}{6 f}+\frac{a^2 \text{Sin}[5 (e+f x)]}{80 f}$$

Problem 171: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^6 \left(a+b \text{Sec}[e+f x]^2\right)^2 \, dx$$

Optimal (type 3, 106 leaves, 3 steps):

$$\frac{(a+b)^2 \text{Tan}[e+f x]}{f}+\frac{2 (a+b) (a+2 b) \text{Tan}[e+f x]^3}{3 f}+\frac{\left(a^2+6 a b+6 b^2\right) \text{Tan}[e+f x]^5}{5 f}+\frac{2 b (a+2 b) \text{Tan}[e+f x]^7}{7 f}+\frac{b^2 \text{Tan}[e+f x]^9}{9 f}$$

Result (type 3, 261 leaves):

$$\frac{8 a^2 \text{Tan}[e+f x]}{15 f}+\frac{32 a b \text{Tan}[e+f x]}{35 f}+\frac{128 b^2 \text{Tan}[e+f x]}{315 f}+\frac{4 a^2 \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{15 f}+$$
$$\frac{16 a b \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{35 f}+\frac{64 b^2 \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{315 f}+\frac{a^2 \text{Sec}[e+f x]^4 \text{Tan}[e+f x]}{5 f}+\frac{12 a b \text{Sec}[e+f x]^4 \text{Tan}[e+f x]}{35 f}+$$
$$\frac{16 b^2 \text{Sec}[e+f x]^4 \text{Tan}[e+f x]}{105 f}+\frac{2 a b \text{Sec}[e+f x]^6 \text{Tan}[e+f x]}{7 f}+\frac{8 b^2 \text{Sec}[e+f x]^6 \text{Tan}[e+f x]}{63 f}+\frac{b^2 \text{Sec}[e+f x]^8 \text{Tan}[e+f x]}{9 f}$$

Problem 172: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^4 \left(a+b \text{Sec}[e+f x]^2\right)^2 \, dx$$

Optimal (type 3, 80 leaves, 3 steps):

$$\frac{(a+b)^2 \text{Tan}[e+f x]}{f}+\frac{(a+b) (a+3 b) \text{Tan}[e+f x]^3}{3 f}+\frac{b (2 a+3 b) \text{Tan}[e+f x]^5}{5 f}+\frac{b^2 \text{Tan}[e+f x]^7}{7 f}$$

Result (type 3, 190 leaves):

$$\frac{2 a^2 \text{Tan}[e+f x]}{3 f}+\frac{16 a b \text{Tan}[e+f x]}{15 f}+\frac{16 b^2 \text{Tan}[e+f x]}{35 f}+\frac{a^2 \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 f}+\frac{8 a b \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{15 f}+$$
$$\frac{8 b^2 \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{35 f}+\frac{2 a b \text{Sec}[e+f x]^4 \text{Tan}[e+f x]}{5 f}+\frac{6 b^2 \text{Sec}[e+f x]^4 \text{Tan}[e+f x]}{35 f}+\frac{b^2 \text{Sec}[e+f x]^6 \text{Tan}[e+f x]}{7 f}$$

Problem 173: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^2 \left(a+b \text{Sec}[e+f x]^2\right)^2 \, dx$$

Optimal (type 3, 53 leaves, 3 steps):

$$\frac{(a+b)^2 \text{Tan}[e+f x]}{f}+\frac{2 b (a+b) \text{Tan}[e+f x]^3}{3 f}+\frac{b^2 \text{Tan}[e+f x]^5}{5 f}$$

Result (type 3, 116 leaves):

$$\frac{a^2 \operatorname{Tan}[e+f x]}{f}+\frac{4 a b \operatorname{Tan}[e+f x]}{3 f}+\frac{8 b^2 \operatorname{Tan}[e+f x]}{15 f}+\frac{2 a b \operatorname{Sec}[e+f x]^2 \operatorname{Tan}[e+f x]}{3 f}+\frac{4 b^2 \operatorname{Sec}[e+f x]^2 \operatorname{Tan}[e+f x]}{15 f}+\frac{b^2 \operatorname{Sec}[e+f x]^4 \operatorname{Tan}[e+f x]}{5 f}$$

Problem 174: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^2 dx$$

Optimal (type 3, 40 leaves, 4 steps):

$$a^2 x+\frac{b (2 a+b) \operatorname{Tan}[e+f x]}{f}+\frac{b^2 \operatorname{Tan}[e+f x]^3}{3 f}$$

Result (type 3, 106 leaves):

$$\left(4 \left(b+a \operatorname{Cos}[e+f x]^2\right)^2 \operatorname{Sec}[e+f x]^3 \left(3 a^2 f x \operatorname{Cos}[e+f x]^3+b^2 \operatorname{Sec}[e] \operatorname{Sin}[f x]+2 b (3 a+b) \operatorname{Cos}[e+f x]^2 \operatorname{Sec}[e] \operatorname{Sin}[f x]+b^2 \operatorname{Cos}[e+f x] \operatorname{Tan}[e]\right)\right) / \left(3 f (a+2 b+a \operatorname{Cos}[2 (e+f x)])^2\right)$$

Problem 178: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \operatorname{Sec}[c+d x]^2\right)^3 dx$$

Optimal (type 3, 73 leaves, 4 steps):

$$a^3 x+\frac{b \left(3 a^2+3 a b+b^2\right) \operatorname{Tan}[c+d x]}{d}+\frac{b^2 (3 a+2 b) \operatorname{Tan}[c+d x]^3}{3 d}+\frac{b^3 \operatorname{Tan}[c+d x]^5}{5 d}$$

Result (type 3, 268 leaves):

$$\frac{1}{480 d} \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^5 \left(150 a^3 d x \operatorname{Cos}[d x]+150 a^3 d x \operatorname{Cos}[2 c+d x]+75 a^3 d x \operatorname{Cos}[2 c+3 d x]+75 a^3 d x \operatorname{Cos}[4 c+3 d x]+15 a^3 d x \operatorname{Cos}[4 c+5 d x]+15 a^3 d x \operatorname{Cos}[6 c+5 d x]+540 a^2 b \operatorname{Sin}[d x]+420 a b^2 \operatorname{Sin}[d x]+160 b^3 \operatorname{Sin}[d x]-360 a^2 b \operatorname{Sin}[2 c+d x]-180 a b^2 \operatorname{Sin}[2 c+d x]+360 a^2 b \operatorname{Sin}[2 c+3 d x]+300 a b^2 \operatorname{Sin}[2 c+3 d x]+80 b^3 \operatorname{Sin}[2 c+3 d x]-90 a^2 b \operatorname{Sin}[4 c+3 d x]+90 a^2 b \operatorname{Sin}[4 c+5 d x]+60 a b^2 \operatorname{Sin}[4 c+5 d x]+16 b^3 \operatorname{Sin}[4 c+5 d x]\right)$$

Problem 179: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \operatorname{Sec}[c+d x]^2\right)^4 dx$$

Optimal (type 3, 111 leaves, 4 steps):

$$a^4 x+\frac{b (2 a+b) \left(2 a^2+2 a b+b^2\right) \operatorname{Tan}[c+d x]}{d}+\frac{b^2 \left(6 a^2+8 a b+3 b^2\right) \operatorname{Tan}[c+d x]^3}{3 d}+\frac{b^3 (4 a+3 b) \operatorname{Tan}[c+d x]^5}{5 d}+\frac{b^4 \operatorname{Tan}[c+d x]^7}{7 d}$$

Result (type 3, 455 leaves):

$$\frac{1}{13440\,d} \mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^7 \Big(3675\,a^4\,d\,x\,\mathrm{Cos}[d\,x]+3675\,a^4\,d\,x\,\mathrm{Cos}[2\,c+d\,x]+2205\,a^4\,d\,x\,\mathrm{Cos}[2\,c+3\,d\,x]+2205\,a^4\,d\,x\,\mathrm{Cos}[4\,c+3\,d\,x]+735\,a^4\,d\,x\,\mathrm{Cos}[4\,c+5\,d\,x]+735\,a^4\,d\,x\,\mathrm{Cos}[6\,c+5\,d\,x]+105\,a^4\,d\,x\,\mathrm{Cos}[6\,c+7\,d\,x]+105\,a^4\,d\,x\,\mathrm{Cos}[8\,c+7\,d\,x]+16800\,a^3\,b\,\mathrm{Sin}[d\,x]+18480\,a^2\,b^2\,\mathrm{Sin}[d\,x]+11200\,a\,b^3\,\mathrm{Sin}[d\,x]+3360\,b^4\,\mathrm{Sin}[d\,x]-12600\,a^3\,b\,\mathrm{Sin}[2\,c+d\,x]-10920\,a^2\,b^2\,\mathrm{Sin}[2\,c+d\,x]-4480\,a\,b^3\,\mathrm{Sin}[2\,c+d\,x]+12600\,a^3\,b\,\mathrm{Sin}[2\,c+3\,d\,x]+15120\,a^2\,b^2\,\mathrm{Sin}[2\,c+3\,d\,x]+9408\,a\,b^3\,\mathrm{Sin}[2\,c+3\,d\,x]+2016\,b^4\,\mathrm{Sin}[2\,c+3\,d\,x]-5040\,a^3\,b\,\mathrm{Sin}[4\,c+3\,d\,x]-2520\,a^2\,b^2\,\mathrm{Sin}[4\,c+3\,d\,x]+5040\,a^3\,b\,\mathrm{Sin}[4\,c+5\,d\,x]+5880\,a^2\,b^2\,\mathrm{Sin}[4\,c+5\,d\,x]+3136\,a\,b^3\,\mathrm{Sin}[4\,c+5\,d\,x]+672\,b^4\,\mathrm{Sin}[4\,c+5\,d\,x]-840\,a^3\,b\,\mathrm{Sin}[6\,c+5\,d\,x]+840\,a^3\,b\,\mathrm{Sin}[6\,c+7\,d\,x]+840\,a^2\,b^2\,\mathrm{Sin}[6\,c+7\,d\,x]+448\,a\,b^3\,\mathrm{Sin}[6\,c+7\,d\,x]+96\,b^4\,\mathrm{Sin}[6\,c+7\,d\,x]\Big)$$

- **Problem 180: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[e+f\,x]^5}{a+b\,\mathrm{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 86 leaves, 5 steps):

$$-\frac{(2\,a-b)\,\mathrm{ArcTanh}[\mathrm{Sin}[e+f\,x]]}{2\,b^2\,f}+\frac{a^{3/2}\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\mathrm{Sin}[e+f\,x]}{\sqrt{a+b}}\Big]}{b^2\,\sqrt{a+b}\,f}+\frac{\mathrm{Sec}[e+f\,x]\,\mathrm{Tan}[e+f\,x]}{2\,b\,f}$$

Result (type 3, 2519 leaves):

$$\frac{(2\,a-b)\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])\,\mathrm{Log}\Big[\mathrm{Cos}\big[\frac{e}{2}+\frac{f\,x}{2}\big]-\mathrm{Sin}\big[\frac{e}{2}+\frac{f\,x}{2}\big]\Big]\,\mathrm{Sec}[e+f\,x]^2}{4\,b^2\,f\,\big(a+b\,\mathrm{Sec}[e+f\,x]^2\big)}+$$

$$\frac{(-2\,a+b)\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])\,\mathrm{Log}\Big[\mathrm{Cos}\big[\frac{e}{2}+\frac{f\,x}{2}\big]+\mathrm{Sin}\big[\frac{e}{2}+\frac{f\,x}{2}\big]\Big]\,\mathrm{Sec}[e+f\,x]^2}{4\,b^2\,f\,\big(a+b\,\mathrm{Sec}[e+f\,x]^2\big)}+\frac{1}{4\,b^2\,\sqrt{a+b}\,f\,\big(a+b\,\mathrm{Sec}[e+f\,x]^2\big)\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}}$$

$$i\,a^{3/2}\,\mathrm{ArcTan}\Big[\Big(-i\,a\,\mathrm{Cos}[e]-i\,b\,\mathrm{Cos}[e]+i\,a\,\mathrm{Cos}[3\,e]+i\,b\,\mathrm{Cos}[3\,e]+a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f\,x]\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}+\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3\,e+f\,x]\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}+a\,\mathrm{Sin}[3\,e]+b\,\mathrm{Sin}[3\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[e-f\,x]-2\,i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[e+f\,x]+i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[3\,e+f\,x]\Big)\Big/\big(a\,\mathrm{Cos}[e]+3\,b\,\mathrm{Cos}[e]+a\,\mathrm{Cos}[3\,e]+b\,\mathrm{Cos}[3\,e]+a\,\mathrm{Cos}[e+2\,f\,x]+a\,\mathrm{Cos}[3\,e+2\,f\,x]-3\,i\,a\,\mathrm{Sin}[e]-i\,b\,\mathrm{Sin}[e]-i\,a\,\mathrm{Sin}[3\,e]-i\,b\,\mathrm{Sin}[3\,e]-i\,a\,\mathrm{Sin}[e+2\,f\,x]+i\,a\,\mathrm{Sin}[3\,e+2\,f\,x]\big)\Big]\,\mathrm{Cos}[e]\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])\,\mathrm{Sec}[e+f\,x]^2-$$

$$\Big(a^{3/2}\,\mathrm{ArcTanh}\Big[(2\,(a+b)\,\mathrm{Sin}[e])\Big/\Big(-2\,i\,a\,\mathrm{Cos}[e]-2\,i\,b\,\mathrm{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f\,x]\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}+\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3\,e+f\,x]\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[e-f\,x]+i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[3\,e+f\,x]\Big)\Big]\,\mathrm{Cos}[e]\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])\,\mathrm{Sec}[e+f\,x]^2\Big)\Big/\Big(4\,b^2\,\sqrt{a+b}\,f\,\big(a+b\,\mathrm{Sec}[e+f\,x]^2\big)\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\Big)+$$

$$\Big(a^{3/2}\,\mathrm{Cos}[e]\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])\,\mathrm{Log}\Big[a+2\,a\,\mathrm{Cos}[2\,e]+2\,b\,\mathrm{Cos}[2\,e]-a\,\mathrm{Cos}[2\,e+2\,f\,x]-2\,i\,a\,\mathrm{Sin}[2\,e]-2\,i\,b\,\mathrm{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\,\mathrm{Sin}[2\,e+f\,x]\Big]\,\mathrm{Sec}[e+f\,x]^2\Big)\Big/\Big(8\,b^2\,\sqrt{a+b}\,f\,\big(a+b\,\mathrm{Sec}[e+f\,x]^2\big)\,\sqrt{\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e]}\Big)-$$

$$\Big(a^{3/2}\,\mathrm{Cos}[e]\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])\,\mathrm{Log}\Big[-a-2\,a\,\mathrm{Cos}[2\,e]-2\,b\,\mathrm{Cos}[2\,e]+a\,\mathrm{Cos}[2\,e+2\,f\,x]+2\,i\,a\,\mathrm{Sin}[2\,e]+2\,i\,b\,\mathrm{Sin}[2\,e]+$$

$$2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[f x]+2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[2e+f x]\Big]\,\mathrm{Sec}[e+f x]^2\Big)\Big/$$

$$\left(8\,b^2\sqrt{a+b}\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)+\frac{1}{4\,b^2\sqrt{a+b}\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}}$$

$$a^{3/2}\,\mathrm{ArcTan}\Big[\Big(-i\,a\,\mathrm{Cos}[e]-i\,b\,\mathrm{Cos}[e]+i\,a\,\mathrm{Cos}[3e]+i\,b\,\mathrm{Cos}[3e]+a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f x]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+$$

$$\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3e+f x]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+a\,\mathrm{Sin}[3e]+b\,\mathrm{Sin}[3e]-i\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e-f x]-$$

$$2\,i\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e+f x]+i\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[3e+f x]\Big)\Big/$$

$$(a\,\mathrm{Cos}[e]+3\,b\,\mathrm{Cos}[e]+a\,\mathrm{Cos}[3e]+b\,\mathrm{Cos}[3e]+a\,\mathrm{Cos}[e+2 f x]+a\,\mathrm{Cos}[3e+2 f x]-3\,i\,a\,\mathrm{Sin}[e]-i\,b\,\mathrm{Sin}[e]-$$

$$i\,a\,\mathrm{Sin}[3e]-i\,b\,\mathrm{Sin}[3e]-i\,a\,\mathrm{Sin}[e+2 f x]+i\,a\,\mathrm{Sin}[3e+2 f x])\Big]\,(a+2b+a\,\mathrm{Cos}[2e+2 f x])\,\mathrm{Sec}[e+f x]^2\,\mathrm{Sin}[e]+$$

$$\Big(i\,a^{3/2}\,\mathrm{ArcTanh}\Big[(2\,(a+b)\,\mathrm{Sin}[e])\Big/\Big(-2\,i\,a\,\mathrm{Cos}[e]-2\,i\,b\,\mathrm{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f x]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3e+f x]$$

$$\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}-i\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e-f x]+i\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[3e+f x]\Big)\Big]$$

$$(a+2b+a\,\mathrm{Cos}[2e+2 f x])\,\mathrm{Sec}[e+f x]^2\,\mathrm{Sin}[e]\Big)\Big/\left(4\,b^2\sqrt{a+b}\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)-$$

$$\Big(i\,a^{3/2}\,(a+2b+a\,\mathrm{Cos}[2e+2 f x])\,\mathrm{Log}\Big[a+2\,a\,\mathrm{Cos}[2e]+2\,b\,\mathrm{Cos}[2e]-a\,\mathrm{Cos}[2e+2 f x]-2\,i\,a\,\mathrm{Sin}[2e]-2\,i\,b\,\mathrm{Sin}[2e]+$$

$$2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[f x]+2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[2e+f x]\Big]$$

$$\mathrm{Sec}[e+f x]^2\,\mathrm{Sin}[e]\Big)\Big/\left(8\,b^2\sqrt{a+b}\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)+$$

$$\Big(i\,a^{3/2}\,(a+2b+a\,\mathrm{Cos}[2e+2 f x])\,\mathrm{Log}\Big[-a-2\,a\,\mathrm{Cos}[2e]-2\,b\,\mathrm{Cos}[2e]+a\,\mathrm{Cos}[2e+2 f x]+2\,i\,a\,\mathrm{Sin}[2e]+2\,i\,b\,\mathrm{Sin}[2e]+$$

$$2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[f x]+2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[2e+f x]\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Sin}[e]\Big)\Big/$$

$$\left(8\,b^2\sqrt{a+b}\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)+\frac{(a+2b+a\,\mathrm{Cos}[2e+2 f x])\,\mathrm{Sec}[e+f x]^2}{8\,b\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\left(\mathrm{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^2}-$$

$$\frac{(a+2b+a\,\mathrm{Cos}[2e+2 f x])\,\mathrm{Sec}[e+f x]^2}{8\,b\,f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)\left(\mathrm{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]+\mathrm{Sin}\left[\frac{e}{2}+\frac{f x}{2}\right]\right)^2}$$

- **Problem 181: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[e+f x]^3}{a+b\,\mathrm{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 55 leaves, 4 steps) :

$$\frac{\mathrm{ArcTanh}[\mathrm{Sin}[e+f x]]}{b\,f}-\frac{\sqrt{a}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[e+f x]}{\sqrt{a+b}}\right]}{b\sqrt{a+b}\,f}$$

Result (type 3, 1022 leaves) :

$$\begin{aligned}
&\frac{1}{8\,b\,\sqrt{a+b}\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}}\\
&\quad(a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])\,\mathrm{Sec}[e+f\,x]^2\,\Big(-\sqrt{a}\,\mathrm{Cos}[e]\,\mathrm{Log}\Big[a+2\,(a+b)\,\mathrm{Cos}[2\,e]-a\,\mathrm{Cos}[2\,(e+f\,x)]-2\,i\,a\,\mathrm{Sin}[2\,e]-\\
&\qquad 2\,i\,b\,\mathrm{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]+\\
&\quad\sqrt{a}\,\mathrm{Cos}[e]\,\mathrm{Log}\Big[-a-2\,(a+b)\,\mathrm{Cos}[2\,e]+a\,\mathrm{Cos}[2\,(e+f\,x)]+2\,i\,a\,\mathrm{Sin}[2\,e]+2\,i\,b\,\mathrm{Sin}[2\,e]+\\
&\qquad 2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]-2\,i\,\sqrt{a}\,\mathrm{ArcTan}\Big[\\
&\quad\Big(2\,\mathrm{Sin}[e]\,\Big(i\,a+i\,b+i\,(a+b)\,\mathrm{Cos}[2\,e]+\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[f\,x]\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[2\,e+f\,x]\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}+\\
&\qquad a\,\mathrm{Sin}[2\,e]+b\,\mathrm{Sin}[2\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big)\Big)\Big/\\
&\quad(i\,(a+3\,b)\,\mathrm{Cos}[e]+i\,(a+b)\,\mathrm{Cos}[3\,e]+i\,a\,\mathrm{Cos}[e+2\,f\,x]+i\,a\,\mathrm{Cos}[3\,e+2\,f\,x]+3\,a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]+a\,\mathrm{Sin}[3\,e]+\\
&\qquad b\,\mathrm{Sin}[3\,e]+a\,\mathrm{Sin}[e+2\,f\,x]-a\,\mathrm{Sin}[3\,e+2\,f\,x])\Big]\,(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])-\\
&\quad 4\,\sqrt{a+b}\,\mathrm{Log}\Big[\mathrm{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]-\mathrm{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}+4\,\sqrt{a+b}\,\mathrm{Log}\Big[\mathrm{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\mathrm{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big]\\
&\quad\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}+i\,\sqrt{a}\,\mathrm{Log}\Big[a+2\,(a+b)\,\mathrm{Cos}[2\,e]-a\,\mathrm{Cos}[2\,(e+f\,x)]-2\,i\,a\,\mathrm{Sin}[2\,e]-2\,i\,b\,\mathrm{Sin}[2\,e]+\\
&\qquad 2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]\,\mathrm{Sin}[e]-\\
&\quad i\,\sqrt{a}\,\mathrm{Log}\Big[-a-2\,(a+b)\,\mathrm{Cos}[2\,e]+a\,\mathrm{Cos}[2\,(e+f\,x)]+2\,i\,a\,\mathrm{Sin}[2\,e]+2\,i\,b\,\mathrm{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+\\
&\qquad 2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]\,\mathrm{Sin}[e]+\\
&\quad 2\,\sqrt{a}\,\mathrm{ArcTan}\Big[\frac{(a+b)\,\mathrm{Sin}[e]}{(a+b)\,\mathrm{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,(\mathrm{Cos}[2\,e]+i\,\mathrm{Sin}[2\,e])\,\mathrm{Sin}[e+f\,x]}\Big]\,(i\,\mathrm{Cos}[e]+\mathrm{Sin}[e])\Big)
\end{aligned}$$

- **Problem 182: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[e+f\,x]}{a+b\,\mathrm{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 36 leaves, 2 steps):

$$\frac{\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\mathrm{Sin}[e+f\,x]}{\sqrt{a+b}}\Big]}{\sqrt{a}\,\sqrt{a+b}\,f}$$

Result (type 3, 653 leaves):

$$\frac{1}{8\sqrt{a}\,\sqrt{a+b}\,f\left(a+b\,\text{Sec}[e+f\,x]^2\right)\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}}$$

$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\left(-2\,\mathbb{i}\,\text{ArcTan}\left[\frac{(a+b)\,\text{Sin}[e]}{(a+b)\,\text{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,(\text{Cos}[2\,e]+\mathbb{i}\,\text{Sin}[2\,e])\,\text{Sin}[e+f\,x]}\right]+2\,\mathbb{i}\,\text{ArcTan}\Big[\right.$$

$$\Big(2\,\text{Sin}[e]\,\Big(\mathbb{i}\,a+\mathbb{i}\,b+\mathbb{i}\,(a+b)\,\text{Cos}[2\,e]+\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[f\,x]\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[2\,e+f\,x]\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}+$$

$$a\,\text{Sin}[2\,e]+b\,\text{Sin}[2\,e]-\mathbb{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]-\mathbb{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,\text{Sin}[2\,e+f\,x]\Big)\Big)\Big/$$

$$(\mathbb{i}\,(a+3\,b)\,\text{Cos}[e]+\mathbb{i}\,(a+b)\,\text{Cos}[3\,e]+\mathbb{i}\,a\,\text{Cos}[e+2\,f\,x]+\mathbb{i}\,a\,\text{Cos}[3\,e+2\,f\,x]+3\,a\,\text{Sin}[e]+b\,\text{Sin}[e]+$$

$$a\,\text{Sin}[3\,e]+b\,\text{Sin}[3\,e]+a\,\text{Sin}[e+2\,f\,x]-a\,\text{Sin}[3\,e+2\,f\,x])\Big]+$$

$$\text{Log}\Big[a+2\,(a+b)\,\text{Cos}[2\,e]-a\,\text{Cos}[2\,(e+f\,x)]-2\,\mathbb{i}\,a\,\text{Sin}[2\,e]-2\,\mathbb{i}\,b\,\text{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]+$$

$$2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,\text{Sin}[2\,e+f\,x]\Big]-$$

$$\text{Log}\Big[-a-2\,(a+b)\,\text{Cos}[2\,e]+a\,\text{Cos}[2\,(e+f\,x)]+2\,\mathbb{i}\,a\,\text{Sin}[2\,e]+2\,\mathbb{i}\,b\,\text{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]+$$

$$\left.2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])^2}\,\text{Sin}[2\,e+f\,x]\Big]\right)\text{Sec}[e+f\,x]^2\,(\text{Cos}[e]-\mathbb{i}\,\text{Sin}[e])$$

- **Problem 183: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[e+f\,x]}{a+b\,\text{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 52 leaves, 3 steps):

$$-\frac{b\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[e+f\,x]}{\sqrt{a+b}}\right]}{a^{3/2}\,\sqrt{a+b}\,f}+\frac{\text{Sin}[e+f\,x]}{a\,f}$$

Result (type 3, 941 leaves):

$$\frac{1}{8\,a^{3/2}\,\sqrt{a+b}\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}}$$

$$(a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])\,\mathrm{Sec}[e+f\,x]^2\,\Big(-b\,\mathrm{Cos}[e]\,\mathrm{Log}\Big[a+2\,(a+b)\,\mathrm{Cos}[2\,e]-a\,\mathrm{Cos}[2\,(e+f\,x)]-2\,i\,a\,\mathrm{Sin}[2\,e]-$$

$$2\,i\,b\,\mathrm{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]+$$

$$b\,\mathrm{Cos}[e]\,\mathrm{Log}\Big[-a-2\,(a+b)\,\mathrm{Cos}[2\,e]+a\,\mathrm{Cos}[2\,(e+f\,x)]+2\,i\,a\,\mathrm{Sin}[2\,e]+2\,i\,b\,\mathrm{Sin}[2\,e]+$$

$$2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]+$$

$$i\,b\,\mathrm{Log}\Big[a+2\,(a+b)\,\mathrm{Cos}[2\,e]-a\,\mathrm{Cos}[2\,(e+f\,x)]-2\,i\,a\,\mathrm{Sin}[2\,e]-2\,i\,b\,\mathrm{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+$$

$$2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]\,\mathrm{Sin}[e]-i\,b\,\mathrm{Log}\Big[-a-2\,(a+b)\,\mathrm{Cos}[2\,e]+a\,\mathrm{Cos}[2\,(e+f\,x)]+2\,i\,a\,\mathrm{Sin}[2\,e]+$$

$$2\,i\,b\,\mathrm{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big]\,\mathrm{Sin}[e]+$$

$$2\,b\,\mathrm{ArcTan}\Big[\frac{(a+b)\,\mathrm{Sin}[e]}{(a+b)\,\mathrm{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,(\mathrm{Cos}[2\,e]+i\,\mathrm{Sin}[2\,e])\,\mathrm{Sin}[e+f\,x]}\Big]\,(i\,\mathrm{Cos}[e]+\mathrm{Sin}[e])+\mathrm{ArcTan}\Big[$$

$$\Big(2\,\mathrm{Sin}[e]\,\Big(i\,a+i\,b+i\,(a+b)\,\mathrm{Cos}[2\,e]+\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[f\,x]\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[2\,e+f\,x]\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}+$$

$$a\,\mathrm{Sin}[2\,e]+b\,\mathrm{Sin}[2\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[f\,x]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[2\,e+f\,x]\Big)\Big)\Big/$$

$$(i\,(a+3\,b)\,\mathrm{Cos}[e]+i\,(a+b)\,\mathrm{Cos}[3\,e]+i\,a\,\mathrm{Cos}[e+2\,f\,x]+i\,a\,\mathrm{Cos}[3\,e+2\,f\,x]+3\,a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]+a\,\mathrm{Sin}[3\,e]+$$

$$b\,\mathrm{Sin}[3\,e]+a\,\mathrm{Sin}[e+2\,f\,x]-a\,\mathrm{Sin}[3\,e+2\,f\,x])\Big]\,(-2\,i\,b\,\mathrm{Cos}[e]-2\,b\,\mathrm{Sin}[e])+4\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^2}\,\mathrm{Sin}[e+f\,x]\Big)$$

- **Problem 186: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Sec}[e+f\,x]^6}{a+b\,\mathrm{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 77 leaves, 4 steps):

$$\frac{a^2\,\mathrm{ArcTan}\Big[\frac{\sqrt{b}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+b}}\Big]}{b^{5/2}\,\sqrt{a+b}\,f}-\frac{(a-b)\,\mathrm{Tan}[e+f\,x]}{b^2\,f}+\frac{\mathrm{Tan}[e+f\,x]^3}{3\,b\,f}$$

Result (type 3, 224 leaves):

$$\Bigg((a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]^2\,\Bigg(-3\,a^2\,\text{ArcTan}\Big[\frac{\text{Sec}[f\,x]\,(\text{Cos}[2\,e]-\mathrm{i}\,\text{Sin}[2\,e])\,(-(a+2\,b)\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])}{2\,\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}}\Big]\,(\text{Cos}[2\,e]-\mathrm{i}\,\text{Sin}[2\,e])+\sqrt{a+b}\,\text{Sec}[e+f\,x]\,\sqrt{b\,(\mathrm{i}\,\text{Cos}[e]+\text{Sin}[e])^4}\,\left(\text{Sec}[e]\,\left(-3\,a+2\,b+b\,\text{Sec}[e+f\,x]^2\right)\,\text{Sin}[f\,x]+b\,\text{Sec}[e+f\,x]\,\text{Tan}[e]\right)\Bigg)\Bigg)\Big/\left(6\,b^2\,\sqrt{a+b}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)\,\sqrt{b\,(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}\right)$$

- **Problem 187: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f\,x]^4}{a+b\,\text{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 52 leaves, 3 steps):

$$-\frac{a\,\text{ArcTan}\Big[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\Big]}{b^{3/2}\,\sqrt{a+b}\,f}+\frac{\text{Tan}[e+f\,x]}{b\,f}$$

Result (type 3, 192 leaves):

$$\Bigg((a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]^2\,\Bigg(a\,\text{ArcTan}\Big[\frac{\text{Sec}[f\,x]\,(\text{Cos}[2\,e]-\mathrm{i}\,\text{Sin}[2\,e])\,(-(a+2\,b)\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])}{2\,\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}}\Big]\,(\text{Cos}[2\,e]-\mathrm{i}\,\text{Sin}[2\,e])+\sqrt{a+b}\,\text{Sec}[e]\,\text{Sec}[e+f\,x]\,\sqrt{b\,(\mathrm{i}\,\text{Cos}[e]+\text{Sin}[e])^4}\,\text{Sin}[f\,x]\Bigg)\Bigg)\Big/\left(2\,b\,\sqrt{a+b}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)\,\sqrt{b\,(\text{Cos}[e]-\mathrm{i}\,\text{Sin}[e])^4}\right)$$

- **Problem 189: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{a+b\,\text{Sec}[e+f\,x]^2}\,dx$$

Optimal (type 3, 45 leaves, 3 steps):

$$\frac{x}{a}+\frac{\sqrt{b}\,\text{ArcTan}\Big[\frac{\sqrt{a+b}\,\text{Cot}[e+f\,x]}{\sqrt{b}}\Big]}{a\,\sqrt{a+b}\,f}$$

Result (type 3, 182 leaves):

$$\left((a+2b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]^2\left(\sqrt{a+b}\;f\,x\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}+b\,\text{ArcTan}\left[\frac{\text{Sec}[f\,x]\,(\text{Cos}[2\,e]-i\,\text{Sin}[2\,e])\,(-(a+2b)\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])}{2\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](\text{Cos}[2\,e]-i\,\text{Sin}[2\,e])\right)\right)\Big/\left(2\,a\sqrt{a+b}\;f\left(a+b\,\text{Sec}[e+f\,x]^2\right)\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)$$

- **Problem 193: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f\,x]^5}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\,dx$$

Optimal (type 3, 102 leaves, 5 steps):

$$\frac{\text{ArcTanh}[\text{Sin}[e+f\,x]]}{b^2\,f}-\frac{\sqrt{a}\,(2\,a+3\,b)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[e+f\,x]}{\sqrt{a+b}}\right]}{2\,b^2\,(a+b)^{3/2}\,f}-\frac{a\,\text{Sin}[e+f\,x]}{2\,b\,(a+b)\,f\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}$$

Result (type 3, 2333 leaves):

$$-\frac{(a+2b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]-\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\right]\text{Sec}[e+f\,x]^4}{4\,b^2\,f\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}+$$
$$\frac{(a+2b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]+\text{Sin}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\right]\text{Sec}[e+f\,x]^4}{4\,b^2\,f\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}+$$
$$\frac{1}{(a+b)\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\left(-2\,a^2-3\,a\,b\right)(a+2b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Sec}[e+f\,x]^4$$
$$\Bigg(\Bigg(i\,\text{ArcTan}\Big[\Big(-i\,a\,\text{Cos}[e]-i\,b\,\text{Cos}[e]+i\,a\,\text{Cos}[3\,e]+i\,b\,\text{Cos}[3\,e]+a\,\text{Sin}[e]+b\,\text{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+$$
$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3\,e+f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+a\,\text{Sin}[3\,e]+b\,\text{Sin}[3\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e-f\,x]-$$
$$2\,i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e+f\,x]+i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[3\,e+f\,x]\Big)\Big/$$
$$(a\,\text{Cos}[e]+3\,b\,\text{Cos}[e]+a\,\text{Cos}[3\,e]+b\,\text{Cos}[3\,e]+a\,\text{Cos}[e+2\,f\,x]+a\,\text{Cos}[3\,e+2\,f\,x]-3\,i\,a\,\text{Sin}[e]-i\,b\,\text{Sin}[e]-$$
$$i\,a\,\text{Sin}[3\,e]-i\,b\,\text{Sin}[3\,e]-i\,a\,\text{Sin}[e+2\,f\,x]+i\,a\,\text{Sin}[3\,e+2\,f\,x])\Big]\,\text{Cos}[e]\Bigg)\Big/\left(16\,\sqrt{a}\,b^2\,\sqrt{a+b}\;f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)+$$
$$\Bigg(\text{ArcTan}\Big[\Big(-i\,a\,\text{Cos}[e]-i\,b\,\text{Cos}[e]+i\,a\,\text{Cos}[3\,e]+i\,b\,\text{Cos}[3\,e]+a\,\text{Sin}[e]+b\,\text{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+$$
$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3\,e+f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+a\,\text{Sin}[3\,e]+b\,\text{Sin}[3\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e-f\,x]-$$
$$2\,i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e+f\,x]+i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[3\,e+f\,x]\Big)\Big/$$
$$(a\,\text{Cos}[e]+3\,b\,\text{Cos}[e]+a\,\text{Cos}[3\,e]+b\,\text{Cos}[3\,e]+a\,\text{Cos}[e+2\,f\,x]+a\,\text{Cos}[3\,e+2\,f\,x]-3\,i\,a\,\text{Sin}[e]-i\,b\,\text{Sin}[e]-$$

$\mathrm{i}\, a \operatorname{Sin}[3 e] - \mathrm{i}\, b \operatorname{Sin}[3 e] - \mathrm{i}\, a \operatorname{Sin}[e + 2 f x] + \mathrm{i}\, a \operatorname{Sin}[3 e + 2 f x])\Big] \operatorname{Sin}[e]\Big) \Big/ \Big(16 \sqrt{a}\, b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big)\Big) +$

$\frac{1}{(a+b)\left(a+b \operatorname{Sec}[e+f x]^2\right)^2} (2 a + 3 b) (a + 2 b + a \operatorname{Cos}[2 e + 2 f x])^2 \operatorname{Sec}[e + f x]^4$

$\Big(\Big(\sqrt{a} \operatorname{ArcTanh}\Big[(2 (a+b) \operatorname{Sin}[e]) \Big/ \Big(-2 \mathrm{i}\, a \operatorname{Cos}[e] - 2 \mathrm{i}\, b \operatorname{Cos}[e] - \sqrt{a} \sqrt{a+b} \operatorname{Cos}[e - f x] \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} +$

$\sqrt{a} \sqrt{a+b} \operatorname{Cos}[3 e + f x] \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} - \mathrm{i} \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[e - f x] +$

$\mathrm{i} \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[3 e + f x]\Big)\Big] \operatorname{Cos}[e]\Big) \Big/ \Big(16 b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big) -$

$\Big(\mathrm{i} \sqrt{a} \operatorname{ArcTanh}\Big[(2 (a+b) \operatorname{Sin}[e]) \Big/ \Big(-2 \mathrm{i}\, a \operatorname{Cos}[e] - 2 \mathrm{i}\, b \operatorname{Cos}[e] - \sqrt{a} \sqrt{a+b} \operatorname{Cos}[e - f x] \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} +$

$\sqrt{a} \sqrt{a+b} \operatorname{Cos}[3 e + f x] \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} - \mathrm{i} \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[e - f x] +$

$\mathrm{i} \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[3 e + f x]\Big)\Big] \operatorname{Sin}[e]\Big) \Big/ \Big(16 b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big)\Big) +$

$\frac{1}{(a+b)\left(a+b \operatorname{Sec}[e+f x]^2\right)^2} \left(-2 a^2 - 3 a b\right) (a + 2 b + a \operatorname{Cos}[2 e + 2 f x])^2 \operatorname{Sec}[e + f x]^4$

$\Big(\Big(\operatorname{Cos}[e] \operatorname{Log}\Big[a + 2 a \operatorname{Cos}[2 e] + 2 b \operatorname{Cos}[2 e] - a \operatorname{Cos}[2 e + 2 f x] - 2 \mathrm{i}\, a \operatorname{Sin}[2 e] - 2 \mathrm{i}\, b \operatorname{Sin}[2 e] + 2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[f x] +$

$2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[2 e + f x]\Big]\Big) \Big/ \Big(32 \sqrt{a}\, b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big) -$

$\Big(\mathrm{i} \operatorname{Log}\Big[a + 2 a \operatorname{Cos}[2 e] + 2 b \operatorname{Cos}[2 e] - a \operatorname{Cos}[2 e + 2 f x] - 2 \mathrm{i}\, a \operatorname{Sin}[2 e] - 2 \mathrm{i}\, b \operatorname{Sin}[2 e] + 2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[f x] +$

$2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[2 e + f x]\Big] \operatorname{Sin}[e]\Big) \Big/ \Big(32 \sqrt{a}\, b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big)\Big) +$

$\frac{1}{(a+b)\left(a+b \operatorname{Sec}[e+f x]^2\right)^2} (2 a + 3 b) (a + 2 b + a \operatorname{Cos}[2 e + 2 f x])^2$

$\operatorname{Sec}[e + f x]^4$

$\Big(\Big(\sqrt{a} \operatorname{Cos}[e] \operatorname{Log}\Big[-a - 2 a \operatorname{Cos}[2 e] - 2 b \operatorname{Cos}[2 e] + a \operatorname{Cos}[2 e + 2 f x] + 2 \mathrm{i}\, a \operatorname{Sin}[2 e] + 2 \mathrm{i}\, b \operatorname{Sin}[2 e] +$

$2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[f x] + 2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[2 e + f x]\Big]\Big) \Big/$

$\Big(32 b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big) - \Big(\mathrm{i} \sqrt{a} \operatorname{Log}\Big[-a - 2 a \operatorname{Cos}[2 e] - 2 b \operatorname{Cos}[2 e] + a \operatorname{Cos}[2 e + 2 f x] + 2 \mathrm{i}\, a \operatorname{Sin}[2 e] +$

$2 \mathrm{i}\, b \operatorname{Sin}[2 e] + 2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[f x] + 2 \sqrt{a} \sqrt{a+b} \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]} \operatorname{Sin}[2 e + f x]\Big] \operatorname{Sin}[e]\Big) \Big/$

$\Big(32 b^2 \sqrt{a+b}\, f \sqrt{\operatorname{Cos}[2 e] - \mathrm{i} \operatorname{Sin}[2 e]}\Big)\Big) - \frac{a (a + 2 b + a \operatorname{Cos}[2 e + 2 f x]) \operatorname{Sec}[e + f x]^3 \operatorname{Tan}[e + f x]}{4 b (a+b) f \left(a + b \operatorname{Sec}[e + f x]^2\right)^2}$

- **Problem 194: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e + f x]^3}{\left(a + b \operatorname{Sec}[e + f x]^2\right)^2} \, dx$$

Optimal (type 3, 74 leaves, 3 steps) :

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\right]}{2\sqrt{a}\,(a+b)^{3/2} f}+\frac{\text{Sin}[e+f x]}{2 (a+b) f \left(a+b-a\,\text{Sin}[e+f x]^2\right)}$$

Result (type 3, 798 leaves):

$$\frac{1}{32\sqrt{a}\,(a+b)^{3/2} f \left(a+b\,\text{Sec}[e+f x]^2\right)^2\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}(a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]^3$$
$$\left(-2 i\,\text{ArcTan}\left[\frac{(a+b)\,\text{Sin}[e]}{(a+b)\,\text{Cos}[e]-\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,(\text{Cos}[2e]+i\,\text{Sin}[2e])\,\text{Sin}[e+f x]}\right](a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]\right.$$
$$(\text{Cos}[e]-i\,\text{Sin}[e])+(a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Log}\Big[a+2(a+b)\,\text{Cos}[2e]-a\,\text{Cos}[2(e+f x)]-2 i\,a\,\text{Sin}[2e]-2 i\,b\,\text{Sin}[2e]+$$
$$2\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f x]+2\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[2e+f x]\Big]\,\text{Sec}[e+f x]\,(\text{Cos}[e]-i\,\text{Sin}[e])-$$
$$(a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Log}\Big[-a-2(a+b)\,\text{Cos}[2e]+a\,\text{Cos}[2(e+f x)]+2 i\,a\,\text{Sin}[2e]+2 i\,b\,\text{Sin}[2e]+2\sqrt{a}\sqrt{a+b}$$
$$\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f x]+2\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[2e+f x]\Big]\,\text{Sec}[e+f x]\,(\text{Cos}[e]-i\,\text{Sin}[e])+2\,\text{ArcTan}\Big[$$
$$\Big(2\,\text{Sin}[e]\,\Big(i\,a+i\,b+i\,(a+b)\,\text{Cos}[2e]+\sqrt{a}\sqrt{a+b}\,\text{Cos}[f x]\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}-\sqrt{a}\sqrt{a+b}\,\text{Cos}[2e+f x]\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}+$$
$$a\,\text{Sin}[2e]+b\,\text{Sin}[2e]-i\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f x]-i\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[2e+f x]\Big)\Big)\Big/$$
$$(i\,(a+3b)\,\text{Cos}[e]+i\,(a+b)\,\text{Cos}[3e]+i\,a\,\text{Cos}[e+2 f x]+i\,a\,\text{Cos}[3e+2 f x]+3 a\,\text{Sin}[e]+b\,\text{Sin}[e]+$$
$$a\,\text{Sin}[3e]+b\,\text{Sin}[3e]+a\,\text{Sin}[e+2 f x]-a\,\text{Sin}[3e+2 f x])\Big]$$
$$\left.(a+2b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]\,(i\,\text{Cos}[e]+\text{Sin}[e])+8\sqrt{a}\sqrt{a+b}\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}[e+f x]\right)$$

- **Problem 195: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 83 leaves, 3 steps):

$$\frac{(2a+b)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\right]}{2 a^{3/2}(a+b)^{3/2} f}-\frac{b\,\text{Sin}[e+f x]}{2 a (a+b) f \left(a+b-a\,\text{Sin}[e+f x]^2\right)}$$

Result (type 3, 819 leaves):

$$\frac{1}{32\, a^{3/2}\, (a+b)^{3/2}\, f\, \left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2 \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}} (a+2\, b+a\, \mathrm{Cos}[2\, (e+f\, x)])\, \mathrm{Sec}[e+f\, x]^3$$

$$\left(-2\, \mathrm{i}\, (2\, a+b)\, \mathrm{ArcTan}\left[\frac{(a+b)\, \mathrm{Sin}[e]}{(a+b)\, \mathrm{Cos}[e]-\sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, (\mathrm{Cos}[2\, e]+\mathrm{i}\, \mathrm{Sin}[2\, e])\, \mathrm{Sin}[e+f\, x]}\right]\right.$$
$$(a+2\, b+a\, \mathrm{Cos}[2\, (e+f\, x)])\, \mathrm{Sec}[e+f\, x]\, (\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])+$$
$$(2\, a+b)\, (a+2\, b+a\, \mathrm{Cos}[2\, (e+f\, x)])\, \mathrm{Log}\Big[a+2\, (a+b)\, \mathrm{Cos}[2\, e]-a\, \mathrm{Cos}[2\, (e+f\, x)]-2\, \mathrm{i}\, a\, \mathrm{Sin}[2\, e]-2\, \mathrm{i}\, b\, \mathrm{Sin}[2\, e]+$$
$$2\, \sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Sin}[f\, x]+2\, \sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Sin}[2\, e+f\, x]\Big]\, \mathrm{Sec}[e+f\, x]\, (\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])-$$
$$(2\, a+b)\, (a+2\, b+a\, \mathrm{Cos}[2\, (e+f\, x)])\, \mathrm{Log}\Big[-a-2\, (a+b)\, \mathrm{Cos}[2\, e]+a\, \mathrm{Cos}[2\, (e+f\, x)]+2\, \mathrm{i}\, a\, \mathrm{Sin}[2\, e]+2\, \mathrm{i}\, b\, \mathrm{Sin}[2\, e]+$$
$$2\, \sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Sin}[f\, x]+2\, \sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Sin}[2\, e+f\, x]\Big]\, \mathrm{Sec}[e+f\, x]\, (\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])+$$
$$2\, (2\, a+b)\, \mathrm{ArcTan}\Big[\Big(2\, \mathrm{Sin}[e]\, \Big(\mathrm{i}\, a+\mathrm{i}\, b+\mathrm{i}\, (a+b)\, \mathrm{Cos}[2\, e]+\sqrt{a}\, \sqrt{a+b}\, \mathrm{Cos}[f\, x]\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}-$$
$$\sqrt{a}\, \sqrt{a+b}\, \mathrm{Cos}[2\, e+f\, x]\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}+a\, \mathrm{Sin}[2\, e]+b\, \mathrm{Sin}[2\, e]-\mathrm{i}\, \sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Sin}[f\, x]-$$
$$\mathrm{i}\, \sqrt{a}\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Sin}[2\, e+f\, x]\Big)\Big)\Big/\, (\mathrm{i}\, (a+3\, b)\, \mathrm{Cos}[e]+\mathrm{i}\, (a+b)\, \mathrm{Cos}[3\, e]+\mathrm{i}\, a\, \mathrm{Cos}[e+2\, f\, x]+$$
$$\mathrm{i}\, a\, \mathrm{Cos}[3\, e+2\, f\, x]+3\, a\, \mathrm{Sin}[e]+b\, \mathrm{Sin}[e]+a\, \mathrm{Sin}[3\, e]+b\, \mathrm{Sin}[3\, e]+a\, \mathrm{Sin}[e+2\, f\, x]-a\, \mathrm{Sin}[3\, e+2\, f\, x])\Big]$$
$$\left.(a+2\, b+a\, \mathrm{Cos}[2\, (e+f\, x)])\, \mathrm{Sec}[e+f\, x]\, (\mathrm{i}\, \mathrm{Cos}[e]+\mathrm{Sin}[e])-8\, \sqrt{a}\, b\, \sqrt{a+b}\, \sqrt{(\mathrm{Cos}[e]-\mathrm{i}\, \mathrm{Sin}[e])^2}\, \mathrm{Tan}[e+f\, x]\right)$$

- **Problem 196: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Cos}[e+f\, x]}{\left(a+b\, \mathrm{Sec}[e+f\, x]^2\right)^2}\, dx$$

Optimal (type 3, 101 leaves, 5 steps):

$$-\frac{b\, (4\, a+3\, b)\, \mathrm{ArcTanh}\left[\frac{\sqrt{a}\, \mathrm{Sin}[e+f\, x]}{\sqrt{a+b}}\right]}{2\, a^{5/2}\, (a+b)^{3/2}\, f}+\frac{\mathrm{Sin}[e+f\, x]}{a^2\, f}+\frac{b^2\, \mathrm{Sin}[e+f\, x]}{2\, a^2\, (a+b)\, f\, \left(a+b-a\, \mathrm{Sin}[e+f\, x]^2\right)}$$

Result (type 3, 945 leaves):

$$\frac{1}{32\,a^{5/2}\,(a+b)^{3/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]^3\,\Bigg(-2\,i\,b\,(4\,a+3\,b)\,\text{ArcTan}\Big[$$

$$\Big(2\,\text{Sin}[e]\,\Big(i\,a+i\,b+i\,(a+b)\,\text{Cos}[2\,e]+\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[f\,x]\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[2\,e+f\,x]\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}+$$

$$a\,\text{Sin}[2\,e]+b\,\text{Sin}[2\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[2\,e+f\,x]\Big)\Big)\Big/$$

$$(i\,(a+3\,b)\,\text{Cos}[e]+i\,(a+b)\,\text{Cos}[3\,e]+i\,a\,\text{Cos}[e+2\,f\,x]+i\,a\,\text{Cos}[3\,e+2\,f\,x]+3\,a\,\text{Sin}[e]+b\,\text{Sin}[e]+a\,\text{Sin}[3\,e]+$$

$$b\,\text{Sin}[3\,e]+a\,\text{Sin}[e+2\,f\,x]-a\,\text{Sin}[3\,e+2\,f\,x])\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]\,(\text{Cos}[e]-i\,\text{Sin}[e])-$$

$$b\,(4\,a+3\,b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Log}\Big[a+2\,(a+b)\,\text{Cos}[2\,e]-a\,\text{Cos}[2\,(e+f\,x)]-2\,i\,a\,\text{Sin}[2\,e]-2\,i\,b\,\text{Sin}[2\,e]+$$

$$2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[2\,e+f\,x]\Big]\,\text{Sec}[e+f\,x]\,(\text{Cos}[e]-i\,\text{Sin}[e])+$$

$$b\,(4\,a+3\,b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Log}\Big[-a-2\,(a+b)\,\text{Cos}[2\,e]+a\,\text{Cos}[2\,(e+f\,x)]+2\,i\,a\,\text{Sin}[2\,e]+2\,i\,b\,\text{Sin}[2\,e]+$$

$$2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[2\,e+f\,x]\Big]\,\text{Sec}[e+f\,x]\,(\text{Cos}[e]-i\,\text{Sin}[e])+$$

$$8\,\sqrt{a}\,(a+b)^{3/2}\,\text{Cos}[f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[e]+$$

$$2\,b\,(4\,a+3\,b)\,\text{ArcTan}\Big[\frac{(a+b)\,\text{Sin}[e]}{(a+b)\,\text{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,(\text{Cos}[2\,e]+i\,\text{Sin}[2\,e])\,\text{Sin}[e+f\,x]}\Big]$$

$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]\,(i\,\text{Cos}[e]+\text{Sin}[e])+$$

$$8\,\sqrt{a}\,(a+b)^{3/2}\,\text{Cos}[e]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])\,\text{Sec}[e+f\,x]\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Sin}[f\,x]+$$

$$8\,\sqrt{a}\,b^2\,\sqrt{a+b}\,\sqrt{(\text{Cos}[e]-i\,\text{Sin}[e])^2}\,\text{Tan}[e+f\,x]\Bigg)$$

- **Problem 199: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f\,x]^6}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\,dx$$

Optimal (type 3, 100 leaves, 5 steps) :

$$-\frac{a\,(3\,a+4\,b)\,\text{ArcTan}\Big[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\Big]}{2\,b^{5/2}\,(a+b)^{3/2}\,f}+\frac{\text{Tan}[e+f\,x]}{b^2\,f}+\frac{a^2\,\text{Tan}[e+f\,x]}{2\,b^2\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 248 leaves) :

$$\Bigg((a+2b+a\,\text{Cos}[2(e+fx)])\,\text{Sec}[e+fx]^4\Bigg(\Bigg(a(3a+4b)\,\text{ArcTan}\Big[\frac{\text{Sec}[fx](\text{Cos}[2e]-i\,\text{Sin}[2e])(-(a+2b)\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\Big](a+2b+a\,\text{Cos}[2(e+fx)])(\text{Cos}[2e]-i\,\text{Sin}[2e])\Bigg)\Big/\Big((a+b)^{3/2}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}\Big)+2(a+2b+a\,\text{Cos}[2(e+fx)])\,\text{Sec}[e]\,\text{Sec}[e+fx]\,\text{Sin}[fx]+\frac{a(-(a+2b)\,\text{Sin}[2e]+a\,\text{Sin}[2fx])}{(a+b)(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])}\Bigg)\Bigg)\Big/\Big(8b^2f\,(a+b\,\text{Sec}[e+fx]^2)^2\Big)$$

- **Problem 201: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+fx]^2}{(a+b\,\text{Sec}[e+fx]^2)^2}\,dx$$

Optimal (type 3, 73 leaves, 3 steps):

$$\frac{\text{ArcTan}\Big[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b}}\Big]}{2\sqrt{b}\,(a+b)^{3/2}f}+\frac{\text{Tan}[e+fx]}{2(a+b)f\,(a+b+b\,\text{Tan}[e+fx]^2)}$$

Result (type 3, 211 leaves):

$$\Bigg((a+2b+a\,\text{Cos}[2(e+fx)])\,\text{Sec}[e+fx]^4\Bigg(-\Bigg(\text{ArcTan}\Big[\frac{\text{Sec}[fx](\text{Cos}[2e]-i\,\text{Sin}[2e])(-(a+2b)\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\Big](a+2b+a\,\text{Cos}[2(e+fx)])(\text{Cos}[2e]-i\,\text{Sin}[2e])\Bigg)\Big/\Big(\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}\Big)+\frac{-(a+2b)\,\text{Sin}[2e]+a\,\text{Sin}[2fx]}{a(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])}\Bigg)\Bigg)\Big/\Big(8(a+b)f\,(a+b\,\text{Sec}[e+fx]^2)^2\Big)$$

- **Problem 202: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{(a+b\,\text{Sec}[e+fx]^2)^2}\,dx$$

Optimal (type 3, 92 leaves, 5 steps):

$$\frac{x}{a^2}-\frac{\sqrt{b}\,(3a+2b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b}}\right]}{2a^2(a+b)^{3/2}f}-\frac{b\,\text{Tan}[e+fx]}{2a(a+b)f\left(a+b+b\,\text{Tan}[e+fx]^2\right)}$$

Result (type 3, 240 leaves):

$$\frac{1}{8a^2\left(a+b\,\text{Sec}[e+fx]^2\right)^2}(a+2b+a\,\text{Cos}[2(e+fx)])\,\text{Sec}[e+fx]^4\left(2x(a+2b+a\,\text{Cos}[2(e+fx)])+\left(b(3a+2b)\,\text{ArcTan}\left[\frac{\text{Sec}[fx](\text{Cos}[2e]-i\,\text{Sin}[2e])(-(a+2b)\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](a+2b+a\,\text{Cos}[2(e+fx)])(\text{Cos}[2e]-i\,\text{Sin}[2e])\right)\Big/\left((a+b)^{3/2}f\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)+\frac{b((a+2b)\,\text{Sin}[2e]-a\,\text{Sin}[2fx])}{(a+b)f(\text{Cos}[e]-\text{Sin}[e])(\text{Cos}[e]+\text{Sin}[e])}\right)$$

- **Problem 205: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[e+fx]^6}{\left(a+b\,\text{Sec}[e+fx]^2\right)^2}\,dx$$

Optimal (type 3, 278 leaves, 8 steps):

$$\frac{\left(5a^3-12a^2b+24ab^2-64b^3\right)x}{16a^5}+\frac{b^{7/2}(9a+8b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b}}\right]}{2a^5(a+b)^{3/2}f}+\frac{\left(15a^2-26ab+48b^2\right)\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{48a^3f\left(a+b+b\,\text{Tan}[e+fx]^2\right)}+\frac{(5a-8b)\,\text{Cos}[e+fx]^3\,\text{Sin}[e+fx]}{24a^2f\left(a+b+b\,\text{Tan}[e+fx]^2\right)}+\frac{\text{Cos}[e+fx]^5\,\text{Sin}[e+fx]}{6af\left(a+b+b\,\text{Tan}[e+fx]^2\right)}+\frac{b\left(5a^3-7a^2b+12ab^2+32b^3\right)\text{Tan}[e+fx]}{16a^4(a+b)f\left(a+b+b\,\text{Tan}[e+fx]^2\right)}$$

Result (type 3, 921 leaves):

$$\frac{\left(5 a^3-12 a^2 b+24 a b^2-64 b^3\right) x \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4}{64 a^5 \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+$$

$$\frac{\left(15 a^2-32 a b+48 b^2\right) \operatorname{Cos}[2 f x] \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[2 e]}{256 a^4 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+$$

$$\frac{(3 a-4 b) \operatorname{Cos}[4 f x] \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[4 e]}{256 a^3 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+\Bigg((9 a+8 b) \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2$$

$$\operatorname{Sec}[e+f x]^4 \Bigg(-\Bigg(b^4 \operatorname{ArcTan}\Bigg[\operatorname{Sec}[f x] \left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}-\frac{i \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}\right)$$

$$\left(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x]\right)\Bigg] \operatorname{Cos}[2 e]\Bigg) \Big/ \left(8 a^5 \sqrt{a+b} f \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}\right)+$$

$$\Bigg(i b^4 \operatorname{ArcTan}\Bigg[\operatorname{Sec}[f x] \left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}-\frac{i \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}\right)$$

$$\left(-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x]\right)\Bigg] \operatorname{Sin}[2 e]\Bigg) \Big/ \left(8 a^5 \sqrt{a+b} f \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}\right)\Bigg)\Bigg) \Big/$$

$$\left((a+b) \left(a+b \operatorname{Sec}[e+f x]^2\right)^2\right)+\frac{\operatorname{Cos}[6 f x] \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[6 e]}{768 a^2 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+$$

$$\frac{\left(15 a^2-32 a b+48 b^2\right) \operatorname{Cos}[2 e] \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[2 f x]}{256 a^4 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+$$

$$\frac{\left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right) \operatorname{Sec}[e+f x]^4 \left(-a b^4 \operatorname{Sin}[2 e]-2 b^5 \operatorname{Sin}[2 e]+a b^4 \operatorname{Sin}[2 f x]\right)}{8 a^5 (a+b) f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2 (\operatorname{Cos}[e]-\operatorname{Sin}[e]) (\operatorname{Cos}[e]+\operatorname{Sin}[e])}+$$

$$\frac{(3 a-4 b) \operatorname{Cos}[4 e] \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[4 f x]}{256 a^3 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+$$

$$\frac{\operatorname{Cos}[6 e] \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^2 \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[6 f x]}{768 a^2 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}$$

- **Problem 206: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Sec}[e+f x]^5}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^3} \, dx$$

Optimal (type 3, 108 leaves, 4 steps) :

$$\frac{3\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[e+f\,x]}{\sqrt{a+b}}\right]}{8\,\sqrt{a}\,(a+b)^{5/2}\,f}+\frac{\text{Sin}[e+f\,x]}{4\,(a+b)\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^2}+\frac{3\,\text{Sin}[e+f\,x]}{8\,(a+b)^2\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}$$

Result (type 3, 2171 leaves) :

$$\frac{1}{(a+b)^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6$$
$$\left(\left(3\,i\,\text{ArcTan}\left[\left(-i\,a\,\text{Cos}[e]-i\,b\,\text{Cos}[e]+i\,a\,\text{Cos}[3\,e]+i\,b\,\text{Cos}[3\,e]+a\,\text{Sin}[e]+b\,\text{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+\right.\right.\right.\right.$$
$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3\,e+f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+a\,\text{Sin}[3\,e]+b\,\text{Sin}[3\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e-f\,x]-$$
$$\left.2\,i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e+f\,x]+i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[3\,e+f\,x]\right)\Big/$$
$$(a\,\text{Cos}[e]+3\,b\,\text{Cos}[e]+a\,\text{Cos}[3\,e]+b\,\text{Cos}[3\,e]+a\,\text{Cos}[e+2\,f\,x]+a\,\text{Cos}[3\,e+2\,f\,x]-3\,i\,a\,\text{Sin}[e]-i\,b\,\text{Sin}[e]-$$
$$\left.\left.i\,a\,\text{Sin}[3\,e]-i\,b\,\text{Sin}[3\,e]-i\,a\,\text{Sin}[e+2\,f\,x]+i\,a\,\text{Sin}[3\,e+2\,f\,x])\right]\,\text{Cos}[e]\right)\Big/\left(128\,\sqrt{a}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)+$$
$$\left(3\,\text{ArcTan}\left[\left(-i\,a\,\text{Cos}[e]-i\,b\,\text{Cos}[e]+i\,a\,\text{Cos}[3\,e]+i\,b\,\text{Cos}[3\,e]+a\,\text{Sin}[e]+b\,\text{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+\right.\right.\right.$$
$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3\,e+f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+a\,\text{Sin}[3\,e]+b\,\text{Sin}[3\,e]-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e-f\,x]-$$
$$\left.2\,i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e+f\,x]+i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[3\,e+f\,x]\right)\Big/$$
$$(a\,\text{Cos}[e]+3\,b\,\text{Cos}[e]+a\,\text{Cos}[3\,e]+b\,\text{Cos}[3\,e]+a\,\text{Cos}[e+2\,f\,x]+a\,\text{Cos}[3\,e+2\,f\,x]-3\,i\,a\,\text{Sin}[e]-i\,b\,\text{Sin}[e]-$$
$$\left.\left.\left.i\,a\,\text{Sin}[3\,e]-i\,b\,\text{Sin}[3\,e]-i\,a\,\text{Sin}[e+2\,f\,x]+i\,a\,\text{Sin}[3\,e+2\,f\,x])\right]\,\text{Sin}[e]\right)\Big/\left(128\,\sqrt{a}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)\right)+$$

$$\frac{1}{(a+b)^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6$$
$$\left(-\left(3\,\text{ArcTanh}\left[(2\,(a+b)\,\text{Sin}[e])\Big/\left(-2\,i\,a\,\text{Cos}[e]-2\,i\,b\,\text{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+\right.\right.\right.\right.$$
$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3\,e+f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e-f\,x]+$$
$$\left.\left.\left.i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[3\,e+f\,x]\right)\right]\,\text{Cos}[e]\right)\Big/\left(128\,\sqrt{a}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)+$$
$$\left(3\,i\,\text{ArcTanh}\left[(2\,(a+b)\,\text{Sin}[e])\Big/\left(-2\,i\,a\,\text{Cos}[e]-2\,i\,b\,\text{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}+\right.\right.\right.$$
$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3\,e+f\,x]\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}-i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[e-f\,x]+$$
$$\left.\left.\left.\left.i\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[3\,e+f\,x]\right)\right]\,\text{Sin}[e]\right)\Big/\left(128\,\sqrt{a}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)\right)+$$

$$\frac{1}{(a+b)^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6$$
$$\left(\left(3\,\text{Cos}[e]\,\text{Log}\left[a+2\,a\,\text{Cos}[2\,e]+2\,b\,\text{Cos}[2\,e]-a\,\text{Cos}[2\,e+2\,f\,x]-2\,i\,a\,\text{Sin}[2\,e]-2\,i\,b\,\text{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right.\right.\right.$$
$$\left.\left.\text{Sin}[f\,x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[2\,e+f\,x]\right]\right)\Big/\left(256\,\sqrt{a}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)-$$
$$\left(3\,i\,\text{Log}\left[a+2\,a\,\text{Cos}[2\,e]+2\,b\,\text{Cos}[2\,e]-a\,\text{Cos}[2\,e+2\,f\,x]-2\,i\,a\,\text{Sin}[2\,e]-2\,i\,b\,\text{Sin}[2\,e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[f\,x]+\right.\right.$$
$$\left.\left.\left.2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\,\text{Sin}[2\,e+f\,x]\right]\,\text{Sin}[e]\right)\Big/\left(256\,\sqrt{a}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2\,e]-i\,\text{Sin}[2\,e]}\right)\right)+$$

$$\frac{1}{(a+b)^2 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3} (a+2b+a\,\mathrm{Cos}[2e+2fx])^3\,\mathrm{Sec}[e+fx]^6 \left(-\left(3\,\mathrm{Cos}[e]\,\mathrm{Log}\left[-a-2a\,\mathrm{Cos}[2e]-2b\,\mathrm{Cos}[2e]+a\,\mathrm{Cos}[2e+2fx]+2i\,a\,\mathrm{Sin}[2e]+2i\,b\,\mathrm{Sin}[2e]+2\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[fx]+2\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[2e+fx]\right]\right)\Big/\left(256\sqrt{a}\sqrt{a+b}\,f\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)+\left(3i\,\mathrm{Log}\left[-a-2a\,\mathrm{Cos}[2e]-2b\,\mathrm{Cos}[2e]+a\,\mathrm{Cos}[2e+2fx]+2i\,a\,\mathrm{Sin}[2e]+2i\,b\,\mathrm{Sin}[2e]+2\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[fx]+2\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[2e+fx]\right]\mathrm{Sin}[e]\right)\Big/\left(256\sqrt{a}\sqrt{a+b}\,f\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)\right)+$$

$$\frac{(a+2b+a\,\mathrm{Cos}[2e+2fx])\,\mathrm{Sec}[e+fx]^5\,\mathrm{Tan}[e+fx]}{8(a+b)\,f\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}+\frac{3(a+2b+a\,\mathrm{Cos}[2e+2fx])^2\,\mathrm{Sec}[e+fx]^5\,\mathrm{Tan}[e+fx]}{32(a+b)^2 f\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}$$

- **Problem 207: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Sec}[e+fx]^3}{\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 125 leaves, 4 steps):

$$\frac{(4a+b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[e+fx]}{\sqrt{a+b}}\right]}{8a^{3/2}(a+b)^{5/2} f}-\frac{b\,\mathrm{Sin}[e+fx]}{4a(a+b)f\left(a+b-a\,\mathrm{Sin}[e+fx]^2\right)^2}+\frac{(4a+b)\,\mathrm{Sin}[e+fx]}{8a(a+b)^2 f\left(a+b-a\,\mathrm{Sin}[e+fx]^2\right)}$$

Result (type 3, 2214 leaves):

$$\frac{1}{(a+b)^2\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}(4a+b)(a+2b+a\,\mathrm{Cos}[2e+2fx])^3\,\mathrm{Sec}[e+fx]^6\left(\left(i\,\mathrm{ArcTan}\left[\left(-i\,a\,\mathrm{Cos}[e]-i\,b\,\mathrm{Cos}[e]+i\,a\,\mathrm{Cos}[3e]+i\,b\,\mathrm{Cos}[3e]+a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]-\sqrt{a}\sqrt{a+b}\,\mathrm{Cos}[e-fx]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+\sqrt{a}\sqrt{a+b}\,\mathrm{Cos}[3e+fx]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+a\,\mathrm{Sin}[3e]+b\,\mathrm{Sin}[3e]-i\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e-fx]-2i\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e+fx]+i\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[3e+fx]\right)\Big/\left(a\,\mathrm{Cos}[e]+3b\,\mathrm{Cos}[e]+a\,\mathrm{Cos}[3e]+b\,\mathrm{Cos}[3e]+a\,\mathrm{Cos}[e+2fx]+a\,\mathrm{Cos}[3e+2fx]-3i\,a\,\mathrm{Sin}[e]-i\,b\,\mathrm{Sin}[e]-i\,a\,\mathrm{Sin}[3e]-i\,b\,\mathrm{Sin}[3e]-i\,a\,\mathrm{Sin}[e+2fx]+i\,a\,\mathrm{Sin}[3e+2fx]\right)\right]\mathrm{Cos}[e]\right)\Big/\left(128a^{3/2}\sqrt{a+b}\,f\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)+\left(\mathrm{ArcTan}\left[\left(-i\,a\,\mathrm{Cos}[e]-i\,b\,\mathrm{Cos}[e]+i\,a\,\mathrm{Cos}[3e]+i\,b\,\mathrm{Cos}[3e]+a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]-\sqrt{a}\sqrt{a+b}\,\mathrm{Cos}[e-fx]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+\sqrt{a}\sqrt{a+b}\,\mathrm{Cos}[3e+fx]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+a\,\mathrm{Sin}[3e]+b\,\mathrm{Sin}[3e]-i\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e-fx]-2i\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[e+fx]+i\sqrt{a}\sqrt{a+b}\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\,\mathrm{Sin}[3e+fx]\right)\Big/\left(a\,\mathrm{Cos}[e]+3b\,\mathrm{Cos}[e]+a\,\mathrm{Cos}[3e]+b\,\mathrm{Cos}[3e]+a\,\mathrm{Cos}[e+2fx]+a\,\mathrm{Cos}[3e+2fx]-3i\,a\,\mathrm{Sin}[e]-i\,b\,\mathrm{Sin}[e]-i\,a\,\mathrm{Sin}[3e]-i\,b\,\mathrm{Sin}[3e]-i\,a\,\mathrm{Sin}[e+2fx]+i\,a\,\mathrm{Sin}[3e+2fx]\right)\right]\mathrm{Sin}[e]\right)\Big/\left(128a^{3/2}\sqrt{a+b}\,f\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}\right)\right)+$$

$$\frac{1}{(a+b)^2\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}(-4a-b)(a+2b+a\,\mathrm{Cos}[2e+2fx])^3\,\mathrm{Sec}[e+fx]^6\left(\left(\mathrm{ArcTanh}\left[(2(a+b)\,\mathrm{Sin}[e])\Big/\left(-2i\,a\,\mathrm{Cos}[e]-2i\,b\,\mathrm{Cos}[e]-\sqrt{a}\sqrt{a+b}\,\mathrm{Cos}[e-fx]\sqrt{\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e]}+\right.\right.\right.\right.$$

$$\sqrt{a}\ \sqrt{a+b}\ \text{Cos}[3e+fx]\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ -i\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[e-fx]+ i\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[3e+fx]\Big)\Big]\ \text{Cos}[e]\Big)\Big/\left(128\,a^{3/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)-$$

$$\Big(i\,\text{ArcTanh}\Big[(2(a+b)\,\text{Sin}[e])\Big/\Big(-2\,i\,a\,\text{Cos}[e]-2\,i\,b\,\text{Cos}[e]-\sqrt{a}\ \sqrt{a+b}\ \text{Cos}[e-fx]\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ + \sqrt{a}\ \sqrt{a+b}\ \text{Cos}[3e+fx]\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ -i\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[e-fx]+ i\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[3e+fx]\Big)\Big]\ \text{Sin}[e]\Big)\Big/\left(128\,a^{3/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)\Big)+$$

$$\frac{1}{(a+b)^2\left(a+b\,\text{Sec}[e+fx]^2\right)^3}(4a+b)\,(a+2b+a\,\text{Cos}[2e+2fx])^3\,\text{Sec}[e+fx]^6$$

$$\Big(\Big(\text{Cos}[e]\ \text{Log}\Big[a+2a\,\text{Cos}[2e]+2b\,\text{Cos}[2e]-a\,\text{Cos}[2e+2fx]-2\,i\,a\,\text{Sin}[2e]-2\,i\,b\,\text{Sin}[2e]+2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[fx]+ 2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[2e+fx]\Big]\Big)\Big/\left(256\,a^{3/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)-$$

$$\Big(i\,\text{Log}\Big[a+2a\,\text{Cos}[2e]+2b\,\text{Cos}[2e]-a\,\text{Cos}[2e+2fx]-2\,i\,a\,\text{Sin}[2e]-2\,i\,b\,\text{Sin}[2e]+2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[fx]+ 2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[2e+fx]\Big]\ \text{Sin}[e]\Big)\Big/\left(256\,a^{3/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)\Big)+$$

$$\frac{1}{(a+b)^2\left(a+b\,\text{Sec}[e+fx]^2\right)^3}(-4a-b)\,(a+2b+a\,\text{Cos}[2e+2fx])^3$$

$$\text{Sec}[e+fx]^6$$

$$\Big(\Big(\text{Cos}[e]\ \text{Log}\Big[-a-2a\,\text{Cos}[2e]-2b\,\text{Cos}[2e]+a\,\text{Cos}[2e+2fx]+2\,i\,a\,\text{Sin}[2e]+2\,i\,b\,\text{Sin}[2e]+2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[fx]+2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[2e+fx]\Big]\Big)\Big/\left(256\,a^{3/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)-$$

$$\Big(i\,\text{Log}\Big[-a-2a\,\text{Cos}[2e]-2b\,\text{Cos}[2e]+a\,\text{Cos}[2e+2fx]+2\,i\,a\,\text{Sin}[2e]+2\,i\,b\,\text{Sin}[2e]+2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[fx]+ 2\sqrt{a}\ \sqrt{a+b}\ \sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\ \text{Sin}[2e+fx]\Big]\ \text{Sin}[e]\Big)\Big/\left(256\,a^{3/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e]-i\,\text{Sin}[2e]}\right)\Big)+$$

$$\frac{(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^6\,(4a\,\text{Sin}[e+fx]+b\,\text{Sin}[e+fx])}{32\,a\,(a+b)^2\,f\left(a+b\,\text{Sec}[e+fx]^2\right)^3}-$$

$$\frac{b\,(a+2b+a\,\text{Cos}[2e+2fx])\,\text{Sec}[e+fx]^5\,\text{Tan}[e+fx]}{8\,a\,(a+b)\,f\left(a+b\,\text{Sec}[e+fx]^2\right)^3}$$

- **Problem 208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+fx]}{\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 144 leaves, 4 steps):

$$\frac{\left(8a^2+8ab+3b^2\right)\text{ArcTanh}\left[\frac{\sqrt{a}\ \text{Sin}[e+fx]}{\sqrt{a+b}}\right]}{8\,a^{5/2}\,(a+b)^{5/2}\,f}-\frac{b\,\text{Cos}[e+fx]^2\,\text{Sin}[e+fx]}{4\,a\,(a+b)\,f\left(a+b-a\,\text{Sin}[e+fx]^2\right)^2}-\frac{3b\,(2a+b)\,\text{Sin}[e+fx]}{8\,a^2\,(a+b)^2\,f\left(a+b-a\,\text{Sin}[e+fx]^2\right)}$$

Result (type 3, 2256 leaves):

$$\frac{1}{(a+b)^2 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3} \left(8 a^2+8 a b+3 b^2\right) (a+2 b+a\,\mathrm{Cos}[2 e+2 f x])^3\,\mathrm{Sec}[e+f x]^6$$

$$\Big(\Big(\mathrm{i}\,\mathrm{ArcTan}\Big[\Big(-\mathrm{i}\,a\,\mathrm{Cos}[e]-\mathrm{i}\,b\,\mathrm{Cos}[e]+\mathrm{i}\,a\,\mathrm{Cos}[3 e]+\mathrm{i}\,b\,\mathrm{Cos}[3 e]+a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}+$$
$$\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3 e+f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}+a\,\mathrm{Sin}[3 e]+b\,\mathrm{Sin}[3 e]-\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[e-f x]-$$
$$2\,\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[e+f x]+\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[3 e+f x]\Big)\Big/$$
$$(a\,\mathrm{Cos}[e]+3 b\,\mathrm{Cos}[e]+a\,\mathrm{Cos}[3 e]+b\,\mathrm{Cos}[3 e]+a\,\mathrm{Cos}[e+2 f x]+a\,\mathrm{Cos}[3 e+2 f x]-3\,\mathrm{i}\,a\,\mathrm{Sin}[e]-\mathrm{i}\,b\,\mathrm{Sin}[e]-$$
$$\mathrm{i}\,a\,\mathrm{Sin}[3 e]-\mathrm{i}\,b\,\mathrm{Sin}[3 e]-\mathrm{i}\,a\,\mathrm{Sin}[e+2 f x]+\mathrm{i}\,a\,\mathrm{Sin}[3 e+2 f x])\Big]\,\mathrm{Cos}[e]\Big)\Big/\left(128\,a^{5/2}\,\sqrt{a+b}\,f\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\right)+$$
$$\Big(\mathrm{ArcTan}\Big[\Big(-\mathrm{i}\,a\,\mathrm{Cos}[e]-\mathrm{i}\,b\,\mathrm{Cos}[e]+\mathrm{i}\,a\,\mathrm{Cos}[3 e]+\mathrm{i}\,b\,\mathrm{Cos}[3 e]+a\,\mathrm{Sin}[e]+b\,\mathrm{Sin}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}+$$
$$\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3 e+f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}+a\,\mathrm{Sin}[3 e]+b\,\mathrm{Sin}[3 e]-\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[e-f x]-$$
$$2\,\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[e+f x]+\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[3 e+f x]\Big)\Big/$$
$$(a\,\mathrm{Cos}[e]+3 b\,\mathrm{Cos}[e]+a\,\mathrm{Cos}[3 e]+b\,\mathrm{Cos}[3 e]+a\,\mathrm{Cos}[e+2 f x]+a\,\mathrm{Cos}[3 e+2 f x]-3\,\mathrm{i}\,a\,\mathrm{Sin}[e]-\mathrm{i}\,b\,\mathrm{Sin}[e]-$$
$$\mathrm{i}\,a\,\mathrm{Sin}[3 e]-\mathrm{i}\,b\,\mathrm{Sin}[3 e]-\mathrm{i}\,a\,\mathrm{Sin}[e+2 f x]+\mathrm{i}\,a\,\mathrm{Sin}[3 e+2 f x])\Big]\,\mathrm{Sin}[e]\Big)\Big/\left(128\,a^{5/2}\,\sqrt{a+b}\,f\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\right)\Big)+$$

$$\frac{1}{(a+b)^2 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3} \left(-8 a^2-8 a b-3 b^2\right) (a+2 b+a\,\mathrm{Cos}[2 e+2 f x])^3$$
$$\mathrm{Sec}[e+f x]^6$$
$$\Big(\Big(\mathrm{ArcTanh}\Big[(2\,(a+b)\,\mathrm{Sin}[e])\Big/\Big(-2\,\mathrm{i}\,a\,\mathrm{Cos}[e]-2\,\mathrm{i}\,b\,\mathrm{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}+$$
$$\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3 e+f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}-\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[e-f x]+$$
$$\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[3 e+f x]\Big)\Big]\,\mathrm{Cos}[e]\Big)\Big/\left(128\,a^{5/2}\,\sqrt{a+b}\,f\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\right)-$$
$$\Big(\mathrm{i}\,\mathrm{ArcTanh}\Big[(2\,(a+b)\,\mathrm{Sin}[e])\Big/\Big(-2\,\mathrm{i}\,a\,\mathrm{Cos}[e]-2\,\mathrm{i}\,b\,\mathrm{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[e-f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}+$$
$$\sqrt{a}\,\sqrt{a+b}\,\mathrm{Cos}[3 e+f x]\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}-\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[e-f x]+$$
$$\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[3 e+f x]\Big)\Big]\,\mathrm{Sin}[e]\Big)\Big/\left(128\,a^{5/2}\,\sqrt{a+b}\,f\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\right)\Big)+$$

$$\frac{1}{(a+b)^2 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3} \left(8 a^2+8 a b+3 b^2\right) (a+2 b+a\,\mathrm{Cos}[2 e+2 f x])^3$$
$$\mathrm{Sec}[e+f x]^6$$
$$\Big(\Big(\mathrm{Cos}[e]\,\mathrm{Log}\Big[a+2 a\,\mathrm{Cos}[2 e]+2 b\,\mathrm{Cos}[2 e]-a\,\mathrm{Cos}[2 e+2 f x]-2\,\mathrm{i}\,a\,\mathrm{Sin}[2 e]-2\,\mathrm{i}\,b\,\mathrm{Sin}[2 e]+2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[f x]+$$
$$2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[2 e+f x]\Big]\Big)\Big/\left(256\,a^{5/2}\,\sqrt{a+b}\,f\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\right)-$$
$$\Big(\mathrm{i}\,\mathrm{Log}\Big[a+2 a\,\mathrm{Cos}[2 e]+2 b\,\mathrm{Cos}[2 e]-a\,\mathrm{Cos}[2 e+2 f x]-2\,\mathrm{i}\,a\,\mathrm{Sin}[2 e]-2\,\mathrm{i}\,b\,\mathrm{Sin}[2 e]+2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[f x]+$$
$$2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\,\mathrm{Sin}[2 e+f x]\Big]\,\mathrm{Sin}[e]\Big)\Big/\left(256\,a^{5/2}\,\sqrt{a+b}\,f\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}\right)\Big)+$$

$$\frac{1}{(a+b)^2 \left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3} \left(-8 a^2-8 a b-3 b^2\right) (a+2 b+a\,\mathrm{Cos}[2 e+2 f x])^3$$
$$\mathrm{Sec}[e+f x]^6$$
$$\Big(\Big(\mathrm{Cos}[e]\,\mathrm{Log}\Big[-a-2 a\,\mathrm{Cos}[2 e]-2 b\,\mathrm{Cos}[2 e]+a\,\mathrm{Cos}[2 e+2 f x]+2\,\mathrm{i}\,a\,\mathrm{Sin}[2 e]+2\,\mathrm{i}\,b\,\mathrm{Sin}[2 e]+2\sqrt{a}\,\sqrt{a+b}\,\sqrt{\mathrm{Cos}[2 e]-\mathrm{i}\,\mathrm{Sin}[2 e]}$$

$$\text{Sin}[f x] + 2\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[2e+fx]\Big]\Big) \Big/ \left(256 a^{5/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\right) -$$
$$\Big(i\,\text{Log}\Big[-a - 2a\,\text{Cos}[2e] - 2b\,\text{Cos}[2e] + a\,\text{Cos}[2e+2fx] + 2i\,a\,\text{Sin}[2e] + 2i\,b\,\text{Sin}[2e] + 2\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[fx] +$$
$$2\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[2e+fx]\Big]\ \text{Sin}[e]\Big) \Big/ \left(256 a^{5/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\right)\Big) +$$
$$\frac{(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^6\left(-8ab\,\text{Sin}[e+fx] - 5b^2\,\text{Sin}[e+fx]\right)}{32a^2(a+b)^2 f\left(a+b\,\text{Sec}[e+fx]^2\right)^3} +$$
$$\frac{b^2(a+2b+a\,\text{Cos}[2e+2fx])\,\text{Sec}[e+fx]^5\,\text{Tan}[e+fx]}{8a^2(a+b)f\left(a+b\,\text{Sec}[e+fx]^2\right)^3}$$

Problem 209: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[e+fx]}{\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 156 leaves, 6 steps):

$$-\frac{3b\left(4(a+b)^2+(2a+b)^2\right)\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[e+fx]}{\sqrt{a+b}}\right]}{8a^{7/2}(a+b)^{5/2}f} + \frac{\text{Sin}[e+fx]}{a^3 f} - \frac{b^3\,\text{Sin}[e+fx]}{4a^3(a+b)f\left(a+b-a\,\text{Sin}[e+fx]^2\right)^2} + \frac{3b^2(4a+3b)\,\text{Sin}[e+fx]}{8a^3(a+b)^2 f\left(a+b-a\,\text{Sin}[e+fx]^2\right)}$$

Result (type 3, 2382 leaves):

$$\frac{\text{Cos}[fx](a+2b+a\,\text{Cos}[2e+2fx])^3\,\text{Sec}[e+fx]^6\,\text{Sin}[e]}{8a^3 f\left(a+b\,\text{Sec}[e+fx]^2\right)^3} +$$
$$\frac{1}{(a+b)^2\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\left(8a^2b+12ab^2+5b^3\right)(a+2b+a\,\text{Cos}[2e+2fx])^3\,\text{Sec}[e+fx]^6$$
$$\Big(-\Big(3i\,\text{ArcTan}\Big[\Big(-i\,a\,\text{Cos}[e] - i\,b\,\text{Cos}[e] + i\,a\,\text{Cos}[3e] + i\,b\,\text{Cos}[3e] + a\,\text{Sin}[e] + b\,\text{Sin}[e] - \sqrt{a}\sqrt{a+b}\ \text{Cos}[e-fx]\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]} +$$
$$\sqrt{a}\sqrt{a+b}\ \text{Cos}[3e+fx]\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]} + a\,\text{Sin}[3e] + b\,\text{Sin}[3e] - i\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[e-fx] -$$
$$2i\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[e+fx] + i\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[3e+fx]\Big) \Big/$$
$$(a\,\text{Cos}[e] + 3b\,\text{Cos}[e] + a\,\text{Cos}[3e] + b\,\text{Cos}[3e] + a\,\text{Cos}[e+2fx] + a\,\text{Cos}[3e+2fx] - 3i\,a\,\text{Sin}[e] - i\,b\,\text{Sin}[e] -$$
$$i\,a\,\text{Sin}[3e] - i\,b\,\text{Sin}[3e] - i\,a\,\text{Sin}[e+2fx] + i\,a\,\text{Sin}[3e+2fx])\Big]\ \text{Cos}[e]\Big) \Big/ \left(128a^{7/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\right) -$$
$$\Big(3\,\text{ArcTan}\Big[\Big(-i\,a\,\text{Cos}[e] - i\,b\,\text{Cos}[e] + i\,a\,\text{Cos}[3e] + i\,b\,\text{Cos}[3e] + a\,\text{Sin}[e] + b\,\text{Sin}[e] - \sqrt{a}\sqrt{a+b}\ \text{Cos}[e-fx]\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]} +$$
$$\sqrt{a}\sqrt{a+b}\ \text{Cos}[3e+fx]\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]} + a\,\text{Sin}[3e] + b\,\text{Sin}[3e] - i\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[e-fx] -$$
$$2i\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[e+fx] + i\sqrt{a}\sqrt{a+b}\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\ \text{Sin}[3e+fx]\Big) \Big/$$
$$(a\,\text{Cos}[e] + 3b\,\text{Cos}[e] + a\,\text{Cos}[3e] + b\,\text{Cos}[3e] + a\,\text{Cos}[e+2fx] + a\,\text{Cos}[3e+2fx] - 3i\,a\,\text{Sin}[e] - i\,b\,\text{Sin}[e] -$$
$$i\,a\,\text{Sin}[3e] - i\,b\,\text{Sin}[3e] - i\,a\,\text{Sin}[e+2fx] + i\,a\,\text{Sin}[3e+2fx])\Big]\ \text{Sin}[e]\Big) \Big/ \left(128a^{7/2}\sqrt{a+b}\ f\sqrt{\text{Cos}[2e] - i\,\text{Sin}[2e]}\right)\Big) +$$
$$\frac{1}{(a+b)^2\left(a+b\,\text{Sec}[e+fx]^2\right)^3}\left(8a^2b+12ab^2+5b^3\right)(a+2b+a\,\text{Cos}[2e+2fx])^3$$

$$\text{Sec}[e+f x]^6$$

$$\left(\left(3\,\text{ArcTanh}\left[(2\,(a+b)\,\text{Sin}[e])\Big/\left(-2\,\mathrm{i}\,a\,\text{Cos}[e]-2\,\mathrm{i}\,b\,\text{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f x]\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,+\right.\right.\right.\right.$$

$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3 e+f x]\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}-\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[e-f x]+$$

$$\left.\left.\left.\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[3 e+f x]\right)\right]\,\text{Cos}[e]\right)\Big/\left(128\,a^{7/2}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right)-$$

$$\left(3\,\mathrm{i}\,\text{ArcTanh}\left[(2\,(a+b)\,\text{Sin}[e])\Big/\left(-2\,\mathrm{i}\,a\,\text{Cos}[e]-2\,\mathrm{i}\,b\,\text{Cos}[e]-\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[e-f x]\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,+\right.\right.\right.$$

$$\sqrt{a}\,\sqrt{a+b}\,\text{Cos}[3 e+f x]\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}-\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[e-f x]+$$

$$\left.\left.\left.\left.\mathrm{i}\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[3 e+f x]\right)\right]\,\text{Sin}[e]\right)\Big/\left(128\,a^{7/2}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right)\right)+$$

$$\frac{1}{(a+b)^2\,\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\left(8\,a^2\,b+12\,a\,b^2+5\,b^3\right)\,(a+2\,b+a\,\text{Cos}[2 e+2 f x])^3$$

$$\text{Sec}[e+f x]^6$$

$$\left(-\left(3\,\text{Cos}[e]\,\text{Log}\left[a+2\,a\,\text{Cos}[2 e]+2\,b\,\text{Cos}[2 e]-a\,\text{Cos}[2 e+2 f x]-2\,\mathrm{i}\,a\,\text{Sin}[2 e]-2\,\mathrm{i}\,b\,\text{Sin}[2 e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right.\right.\right.$$

$$\left.\left.\text{Sin}[f x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[2 e+f x]\right]\right)\Big/\left(256\,a^{7/2}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right)+$$

$$\left(3\,\mathrm{i}\,\text{Log}\left[a+2\,a\,\text{Cos}[2 e]+2\,b\,\text{Cos}[2 e]-a\,\text{Cos}[2 e+2 f x]-2\,\mathrm{i}\,a\,\text{Sin}[2 e]-2\,\mathrm{i}\,b\,\text{Sin}[2 e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[f x]+\right.\right.$$

$$\left.\left.\left.2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[2 e+f x]\right]\,\text{Sin}[e]\right)\Big/\left(256\,a^{7/2}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right)\right)+$$

$$\frac{1}{(a+b)^2\,\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\left(8\,a^2\,b+12\,a\,b^2+5\,b^3\right)\,(a+2\,b+a\,\text{Cos}[2 e+2 f x])^3$$

$$\text{Sec}[e+f x]^6$$

$$\left(\left(3\,\text{Cos}[e]\,\text{Log}\left[-a-2\,a\,\text{Cos}[2 e]-2\,b\,\text{Cos}[2 e]+a\,\text{Cos}[2 e+2 f x]+2\,\mathrm{i}\,a\,\text{Sin}[2 e]+2\,\mathrm{i}\,b\,\text{Sin}[2 e]+\right.\right.\right.$$

$$\left.\left.2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[f x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[2 e+f x]\right]\right)\Big/$$

$$\left(256\,a^{7/2}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right)-\left(3\,\mathrm{i}\,\text{Log}\left[-a-2\,a\,\text{Cos}[2 e]-2\,b\,\text{Cos}[2 e]+a\,\text{Cos}[2 e+2 f x]+2\,\mathrm{i}\,a\,\text{Sin}[2 e]+\right.\right.$$

$$\left.\left.2\,\mathrm{i}\,b\,\text{Sin}[2 e]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[f x]+2\,\sqrt{a}\,\sqrt{a+b}\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\,\text{Sin}[2 e+f x]\right]\,\text{Sin}[e]\right)\Big/$$

$$\left.\left(256\,a^{7/2}\,\sqrt{a+b}\,f\,\sqrt{\text{Cos}[2 e]-\mathrm{i}\,\text{Sin}[2 e]}\right)\right)+\frac{\text{Cos}[e]\,(a+2\,b+a\,\text{Cos}[2 e+2 f x])^3\,\text{Sec}[e+f x]^6\,\text{Sin}[f x]}{8\,a^3\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^3}+$$

$$\frac{3\,(a+2\,b+a\,\text{Cos}[2 e+2 f x])^2\,\text{Sec}[e+f x]^6\,\left(4\,a\,b^2\,\text{Sin}[e+f x]+3\,b^3\,\text{Sin}[e+f x]\right)}{32\,a^3\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^3}-$$

$$\frac{b^3\,(a+2\,b+a\,\text{Cos}[2 e+2 f x])\,\text{Sec}[e+f x]^5\,\text{Tan}[e+f x]}{8\,a^3\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^3}$$

- **Problem 211: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 214 leaves, 6 steps):

$$-\frac{b^3\left(80 a^2+140 a b+63 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{a} \text{Sin}[e+f x]}{\sqrt{a+b}}\right]}{8 a^{11/2} (a+b)^{5/2} f}+\frac{\left(a^2-3 a b+6 b^2\right) \text{Sin}[e+f x]}{a^5 f}-\frac{(2 a-3 b) \text{Sin}[e+f x]^3}{3 a^4 f}+\frac{\text{Sin}[e+f x]^5}{5 a^3 f}-\frac{b^5 \text{Sin}[e+f x]}{4 a^5 (a+b) f \left(a+b-a \text{Sin}[e+f x]^2\right)^2}+\frac{b^4 (20 a+17 b) \text{Sin}[e+f x]}{8 a^5 (a+b)^2 f \left(a+b-a \text{Sin}[e+f x]^2\right)}$$

Result (type 3, 2670 leaves):

$$\frac{\left(5 a^2-18 a b+48 b^2\right) \text{Cos}[f x] (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6 \text{Sin}[e]}{64 a^5 f \left(a+b \text{Sec}[e+f x]^2\right)^3}+$$

$$\frac{1}{(a+b)^2 \left(a+b \text{Sec}[e+f x]^2\right)^3}\left(-80 a^2 b^3-140 a b^4-63 b^5\right) (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6$$
$$\left(\left(\text{i} \text{ArcTan}\left[\left(-\text{i} a \text{Cos}[e]-\text{i} b \text{Cos}[e]+\text{i} a \text{Cos}[3 e]+\text{i} b \text{Cos}[3 e]+a \text{Sin}[e]+b \text{Sin}[e]-\sqrt{a} \sqrt{a+b} \text{Cos}[e-f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}+\right.\right.\right.\right.$$
$$\sqrt{a} \sqrt{a+b} \text{Cos}[3 e+f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}+a \text{Sin}[3 e]+b \text{Sin}[3 e]-\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[e-f x]-$$
$$\left.2 \text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[e+f x]+\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[3 e+f x]\right)\Big/$$
$$(a \text{Cos}[e]+3 b \text{Cos}[e]+a \text{Cos}[3 e]+b \text{Cos}[3 e]+a \text{Cos}[e+2 f x]+a \text{Cos}[3 e+2 f x]-3 \text{i} a \text{Sin}[e]-\text{i} b \text{Sin}[e]-$$
$$\left.\left.\text{i} a \text{Sin}[3 e]-\text{i} b \text{Sin}[3 e]-\text{i} a \text{Sin}[e+2 f x]+\text{i} a \text{Sin}[3 e+2 f x])\right] \text{Cos}[e]\right)\Big/\left(128 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}\right)+$$
$$\left(\text{ArcTan}\left[\left(-\text{i} a \text{Cos}[e]-\text{i} b \text{Cos}[e]+\text{i} a \text{Cos}[3 e]+\text{i} b \text{Cos}[3 e]+a \text{Sin}[e]+b \text{Sin}[e]-\sqrt{a} \sqrt{a+b} \text{Cos}[e-f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}+\right.\right.\right.$$
$$\sqrt{a} \sqrt{a+b} \text{Cos}[3 e+f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}+a \text{Sin}[3 e]+b \text{Sin}[3 e]-\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[e-f x]-$$
$$\left.2 \text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[e+f x]+\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[3 e+f x]\right)\Big/$$
$$(a \text{Cos}[e]+3 b \text{Cos}[e]+a \text{Cos}[3 e]+b \text{Cos}[3 e]+a \text{Cos}[e+2 f x]+a \text{Cos}[3 e+2 f x]-3 \text{i} a \text{Sin}[e]-\text{i} b \text{Sin}[e]-$$
$$\left.\left.\left.\text{i} a \text{Sin}[3 e]-\text{i} b \text{Sin}[3 e]-\text{i} a \text{Sin}[e+2 f x]+\text{i} a \text{Sin}[3 e+2 f x])\right] \text{Sin}[e]\right)\Big/\left(128 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}\right)\right)+$$

$$\frac{1}{(a+b)^2 \left(a+b \text{Sec}[e+f x]^2\right)^3}\left(80 a^2 b^3+140 a b^4+63 b^5\right) (a+2 b+a \text{Cos}[2 e+2 f x])^3$$
$$\text{Sec}[e+f x]^6$$
$$\left(\left(\text{ArcTanh}\left[(2 (a+b) \text{Sin}[e])\Big/\left(-2 \text{i} a \text{Cos}[e]-2 \text{i} b \text{Cos}[e]-\sqrt{a} \sqrt{a+b} \text{Cos}[e-f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}+\right.\right.\right.\right.$$
$$\sqrt{a} \sqrt{a+b} \text{Cos}[3 e+f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}-\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[e-f x]+$$
$$\left.\left.\left.\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[3 e+f x]\right)\right] \text{Cos}[e]\right)\Big/\left(128 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}\right)-$$
$$\left(\text{i} \text{ArcTanh}\left[(2 (a+b) \text{Sin}[e])\Big/\left(-2 \text{i} a \text{Cos}[e]-2 \text{i} b \text{Cos}[e]-\sqrt{a} \sqrt{a+b} \text{Cos}[e-f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}+\right.\right.\right.$$
$$\sqrt{a} \sqrt{a+b} \text{Cos}[3 e+f x] \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}-\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[e-f x]+$$
$$\left.\left.\left.\left.\text{i} \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]} \text{Sin}[3 e+f x]\right)\right] \text{Sin}[e]\right)\Big/\left(128 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-\text{i} \text{Sin}[2 e]}\right)\right)+$$

$$\frac{1}{(a+b)^2 \left(a+b \text{Sec}[e+f x]^2\right)^3}\left(-80 a^2 b^3-140 a b^4-63 b^5\right) (a+2 b+a \text{Cos}[2 e+2 f x])^3$$

$$\text{Sec}[e+f x]^6 \left(\left(\text{Cos}[e] \,\text{Log}\left[a+2 a \,\text{Cos}[2 e]+2 b \,\text{Cos}[2 e]-a \,\text{Cos}[2 e+2 f x]-2 i a \,\text{Sin}[2 e]-2 i b \,\text{Sin}[2 e]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[f x]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[2 e+f x]\right]\right) \Big/ \left(256 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]}\right)-\left(i \,\text{Log}\left[a+2 a \,\text{Cos}[2 e]+2 b \,\text{Cos}[2 e]-a \,\text{Cos}[2 e+2 f x]-2 i a \,\text{Sin}[2 e]-2 i b \,\text{Sin}[2 e]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[f x]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[2 e+f x]\right] \text{Sin}[e]\right) \Big/ \left(256 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]}\right)\right)+$$

$$\frac{1}{(a+b)^2 \left(a+b \,\text{Sec}[e+f x]^2\right)^3} \left(80 a^2 b^3+140 a b^4+63 b^5\right) (a+2 b+a \,\text{Cos}[2 e+2 f x])^3 \,\text{Sec}[e+f x]^6 \left(\left(\text{Cos}[e] \,\text{Log}\left[-a-2 a \,\text{Cos}[2 e]-2 b \,\text{Cos}[2 e]+a \,\text{Cos}[2 e+2 f x]+2 i a \,\text{Sin}[2 e]+2 i b \,\text{Sin}[2 e]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[f x]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[2 e+f x]\right]\right) \Big/ \left(256 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]}\right)-\left(i \,\text{Log}\left[-a-2 a \,\text{Cos}[2 e]-2 b \,\text{Cos}[2 e]+a \,\text{Cos}[2 e+2 f x]+2 i a \,\text{Sin}[2 e]+2 i b \,\text{Sin}[2 e]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[f x]+2 \sqrt{a} \sqrt{a+b} \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]} \,\text{Sin}[2 e+f x]\right] \text{Sin}[e]\right) \Big/ \left(256 a^{11/2} \sqrt{a+b} f \sqrt{\text{Cos}[2 e]-i \,\text{Sin}[2 e]}\right)\right)+$$

$$\frac{(5 a-12 b) \,\text{Cos}[3 f x] (a+2 b+a \,\text{Cos}[2 e+2 f x])^3 \,\text{Sec}[e+f x]^6 \,\text{Sin}[3 e]}{384 a^4 f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}+\frac{\text{Cos}[5 f x] (a+2 b+a \,\text{Cos}[2 e+2 f x])^3 \,\text{Sec}[e+f x]^6 \,\text{Sin}[5 e]}{640 a^3 f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}+$$

$$\frac{\left(5 a^2-18 a b+48 b^2\right) \text{Cos}[e] (a+2 b+a \,\text{Cos}[2 e+2 f x])^3 \,\text{Sec}[e+f x]^6 \,\text{Sin}[f x]}{64 a^5 f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}+\frac{(5 a-12 b) \,\text{Cos}[3 e] (a+2 b+a \,\text{Cos}[2 e+2 f x])^3 \,\text{Sec}[e+f x]^6 \,\text{Sin}[3 f x]}{384 a^4 f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}+$$

$$\frac{\text{Cos}[5 e] (a+2 b+a \,\text{Cos}[2 e+2 f x])^3 \,\text{Sec}[e+f x]^6 \,\text{Sin}[5 f x]}{640 a^3 f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}+\frac{(a+2 b+a \,\text{Cos}[2 e+2 f x])^2 \,\text{Sec}[e+f x]^6 \left(20 a b^4 \,\text{Sin}[e+f x]+17 b^5 \,\text{Sin}[e+f x]\right)}{32 a^5 (a+b)^2 f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}-$$

$$\frac{b^5 (a+2 b+a \,\text{Cos}[2 e+2 f x]) \,\text{Sec}[e+f x]^5 \,\text{Tan}[e+f x]}{8 a^5 (a+b) f \left(a+b \,\text{Sec}[e+f x]^2\right)^3}$$

- **Problem 213: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]^4}{\left(a+b \,\text{Sec}[e+f x]^2\right)^3} \, dx$$

Optimal (type 3, 123 leaves, 4 steps):

$$\frac{(a+4b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8\,b^{3/2}\,(a+b)^{5/2}\,f}-\frac{a\,\text{Tan}[e+f x]}{4\,b\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}+\frac{(a+4b)\,\text{Tan}[e+f x]}{8\,b\,(a+b)^2\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 539 leaves):

$$\Bigg((-a-4b)\,(a+2b+a\,\text{Cos}[2e+2fx])^3\,\text{Sec}[e+fx]^6$$
$$\Bigg(\Bigg(\text{ArcTan}\Big[\text{Sec}[f x]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)$$
$$(-a\,\text{Sin}[f x]-2b\,\text{Sin}[f x]+a\,\text{Sin}[2e+f x])\Big]\,\text{Cos}[2e]\Bigg)\Big/\left(64\,b\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)-$$
$$\Bigg(i\,\text{ArcTan}\Big[\text{Sec}[f x]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)$$
$$(-a\,\text{Sin}[f x]-2b\,\text{Sin}[f x]+a\,\text{Sin}[2e+f x])\Big]\,\text{Sin}[2e]\Bigg)\Big/\left(64\,b\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)\Bigg)\Bigg)\Big/$$
$$\left((a+b)^2\,\left(a+b\,\text{Sec}[e+fx]^2\right)^3\right)+\frac{(a+2b+a\,\text{Cos}[2e+2fx])\,\text{Sec}[e+fx]^6\,(-a\,\text{Sin}[2e]-2b\,\text{Sin}[2e]+a\,\text{Sin}[2fx])}{16\,a\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+fx]^2\right)^3\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}+$$
$$\frac{(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^6\,(a\,\text{Sin}[2e]+4b\,\text{Sin}[2e]-a\,\text{Sin}[2fx]+2b\,\text{Sin}[2fx])}{64\,b\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+fx]^2\right)^3\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}$$

- **Problem 214: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Sec}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 106 leaves, 4 steps):

$$\frac{3\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8\sqrt{b}\,(a+b)^{5/2}\,f}+\frac{\text{Tan}[e+f x]}{4\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}+\frac{3\,\text{Tan}[e+f x]}{8\,(a+b)^2\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 265 leaves):

$$\left((a+2b+a\,\mathrm{Cos}[2(e+fx)])\,\mathrm{Sec}[e+fx]^6\right.$$

$$\left(-\left(3\,\mathrm{ArcTan}\left[\frac{\mathrm{Sec}[fx]\,(\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e])\,(-(a+2b)\,\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])}{2\sqrt{a+b}\,\sqrt{b\,(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}}\right](a+2b+a\,\mathrm{Cos}[2(e+fx)])^2\,(\mathrm{Cos}[2e]-i\,\mathrm{Sin}[2e])\right)\Big/\right.$$

$$\left(\sqrt{a+b}\,\sqrt{b\,(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}\right)+\frac{4b\,(a+b)\,\mathrm{Sec}[2e]\,((a+2b)\,\mathrm{Sin}[2e]-a\,\mathrm{Sin}[2fx])}{a^2}+$$

$$\left.\left.\frac{(a+2b+a\,\mathrm{Cos}[2(e+fx)])\,\mathrm{Sec}[2e]\left(-\left(5a^2+16ab+8b^2\right)\mathrm{Sin}[2e]+a\,(5a+2b)\,\mathrm{Sin}[2fx]\right)}{a^2}\right)\right)\Big/\left(64\,(a+b)^2 f\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3\right)$$

- **Problem 215: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^3}\,dx$$

Optimal (type 3, 144 leaves, 6 steps):

$$\frac{x}{a^3}-\frac{\sqrt{b}\left(15a^2+20ab+8b^2\right)\mathrm{ArcTan}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b}}\right]}{8a^3\,(a+b)^{5/2}f}-\frac{b\,\mathrm{Tan}[e+fx]}{4a\,(a+b)\,f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)^2}-\frac{b\,(7a+4b)\,\mathrm{Tan}[e+fx]}{8a^2\,(a+b)^2 f\left(a+b+b\,\mathrm{Tan}[e+fx]^2\right)}$$

Result (type 3, 627 leaves):

$$\frac{x\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6}{8\,a^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}+\Bigg(\left(15\,a^2+20\,a\,b+8\,b^2\right)\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3$$

$$\text{Sec}[e+f\,x]^6\,\Bigg(\Bigg(b\,\text{ArcTan}\Big[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)$$

$$(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\Big]\,\text{Cos}[2\,e]\Bigg)\Big/\left(64\,a^3\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)-$$

$$\Bigg(i\,b\,\text{ArcTan}\Big[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)\,(-a\,\text{Sin}[f\,x]-$$

$$2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\Big]\,\text{Sin}[2\,e]\Bigg)\Big/\left(64\,a^3\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)\Bigg)\Bigg)\Big/\left((a+b)^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\right)+$$

$$\left((a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Sec}[e+f\,x]^6\,\left(9\,a^2\,b\,\text{Sin}[2\,e]+28\,a\,b^2\,\text{Sin}[2\,e]+16\,b^3\,\text{Sin}[2\,e]-9\,a^2\,b\,\text{Sin}[2\,f\,x]-6\,a\,b^2\,\text{Sin}[2\,f\,x]\right)\right)\Big/$$

$$\left(64\,a^3\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])\right)+$$

$$\frac{(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])\,\text{Sec}[e+f\,x]^6\,\left(-a\,b^2\,\text{Sin}[2\,e]-2\,b^3\,\text{Sin}[2\,e]+a\,b^2\,\text{Sin}[2\,f\,x]\right)}{16\,a^3\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}$$

- **Problem 217: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[e+f\,x]^4}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 269 leaves, 8 steps):

$$\frac{3\,\left(a^2-4\,a\,b+16\,b^2\right)\,x}{8\,a^5}-\frac{3\,b^{5/2}\,\left(21\,a^2+36\,a\,b+16\,b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{8\,a^5\,(a+b)^{5/2}\,f}+\frac{(3\,a-8\,b)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{8\,a^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+$$

$$\frac{\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]}{4\,a\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+\frac{b\,\left(3\,a^2-7\,a\,b-12\,b^2\right)\,\text{Tan}[e+f\,x]}{8\,a^3\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+\frac{3\,b\,(a+2\,b)\,\left(a^2-4\,a\,b-4\,b^2\right)\,\text{Tan}[e+f\,x]}{8\,a^4\,(a+b)^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 1430 leaves):

$$\left(\left(21\,a^2+36\,a\,b+16\,b^2\right)\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6\right.$$

$$\left(\left(\left(3\,b^3\,\text{ArcTan}\left[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\right]\,\text{Cos}[2\,e]\right)\Big/\left(64\,a^5\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)-$$

$$\left(3\,i\,b^3\,\text{ArcTan}\left[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)\right.\right.$$

$$\left.\left.\left.\left.(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\right]\,\text{Sin}[2\,e]\right)\Big/\left(64\,a^5\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)\right)\right)\Big/$$

$$\left((a+b)^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\right)+\frac{1}{2048\,a^5\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])$$

$$\text{Sec}[2\,e]$$

$$\text{Sec}[e+f\,x]^6$$

$$\begin{aligned}
&\left(144\,a^6\,f\,x\,\text{Cos}[2\,e]+96\,a^5\,b\,f\,x\,\text{Cos}[2\,e]+912\,a^4\,b^2\,f\,x\,\text{Cos}[2\,e]+6720\,a^3\,b^3\,f\,x\,\text{Cos}[2\,e]+16\,512\,a^2\,b^4\,f\,x\,\text{Cos}[2\,e]+\right.\\
&\quad 16\,896\,a\,b^5\,f\,x\,\text{Cos}[2\,e]+6144\,b^6\,f\,x\,\text{Cos}[2\,e]+96\,a^6\,f\,x\,\text{Cos}[2\,f\,x]+480\,a^4\,b^2\,f\,x\,\text{Cos}[2\,f\,x]+4416\,a^3\,b^3\,f\,x\,\text{Cos}[2\,f\,x]+\\
&\quad 6912\,a^2\,b^4\,f\,x\,\text{Cos}[2\,f\,x]+3072\,a\,b^5\,f\,x\,\text{Cos}[2\,f\,x]+96\,a^6\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+480\,a^4\,b^2\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+\\
&\quad 4416\,a^3\,b^3\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+6912\,a^2\,b^4\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+3072\,a\,b^5\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+24\,a^6\,f\,x\,\text{Cos}[2\,e+4\,f\,x]-\\
&\quad 48\,a^5\,b\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+216\,a^4\,b^2\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+672\,a^3\,b^3\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+384\,a^2\,b^4\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+\\
&\quad 24\,a^6\,f\,x\,\text{Cos}[6\,e+4\,f\,x]-48\,a^5\,b\,f\,x\,\text{Cos}[6\,e+4\,f\,x]+216\,a^4\,b^2\,f\,x\,\text{Cos}[6\,e+4\,f\,x]+672\,a^3\,b^3\,f\,x\,\text{Cos}[6\,e+4\,f\,x]+\\
&\quad 384\,a^2\,b^4\,f\,x\,\text{Cos}[6\,e+4\,f\,x]+816\,a^3\,b^3\,\text{Sin}[2\,e]+2848\,a^2\,b^4\,\text{Sin}[2\,e]+3968\,a\,b^5\,\text{Sin}[2\,e]+1792\,b^6\,\text{Sin}[2\,e]+44\,a^6\,\text{Sin}[2\,f\,x]+\\
&\quad 104\,a^5\,b\,\text{Sin}[2\,f\,x]-180\,a^4\,b^2\,\text{Sin}[2\,f\,x]-1696\,a^3\,b^3\,\text{Sin}[2\,f\,x]-3264\,a^2\,b^4\,\text{Sin}[2\,f\,x]-1664\,a\,b^5\,\text{Sin}[2\,f\,x]+\\
&\quad 44\,a^6\,\text{Sin}[4\,e+2\,f\,x]+104\,a^5\,b\,\text{Sin}[4\,e+2\,f\,x]-180\,a^4\,b^2\,\text{Sin}[4\,e+2\,f\,x]-608\,a^3\,b^3\,\text{Sin}[4\,e+2\,f\,x]-192\,a^2\,b^4\,\text{Sin}[4\,e+2\,f\,x]+\\
&\quad 128\,a\,b^5\,\text{Sin}[4\,e+2\,f\,x]+38\,a^6\,\text{Sin}[2\,e+4\,f\,x]+60\,a^5\,b\,\text{Sin}[2\,e+4\,f\,x]-170\,a^4\,b^2\,\text{Sin}[2\,e+4\,f\,x]-640\,a^3\,b^3\,\text{Sin}[2\,e+4\,f\,x]-\\
&\quad 400\,a^2\,b^4\,\text{Sin}[2\,e+4\,f\,x]+38\,a^6\,\text{Sin}[6\,e+4\,f\,x]+60\,a^5\,b\,\text{Sin}[6\,e+4\,f\,x]-170\,a^4\,b^2\,\text{Sin}[6\,e+4\,f\,x]-368\,a^3\,b^3\,\text{Sin}[6\,e+4\,f\,x]-\\
&\quad 176\,a^2\,b^4\,\text{Sin}[6\,e+4\,f\,x]+12\,a^6\,\text{Sin}[4\,e+6\,f\,x]+8\,a^5\,b\,\text{Sin}[4\,e+6\,f\,x]-20\,a^4\,b^2\,\text{Sin}[4\,e+6\,f\,x]-16\,a^3\,b^3\,\text{Sin}[4\,e+6\,f\,x]+\\
&\quad 12\,a^6\,\text{Sin}[8\,e+6\,f\,x]+8\,a^5\,b\,\text{Sin}[8\,e+6\,f\,x]-20\,a^4\,b^2\,\text{Sin}[8\,e+6\,f\,x]-16\,a^3\,b^3\,\text{Sin}[8\,e+6\,f\,x]+a^6\,\text{Sin}[6\,e+8\,f\,x]+\\
&\quad \left.2\,a^5\,b\,\text{Sin}[6\,e+8\,f\,x]+a^4\,b^2\,\text{Sin}[6\,e+8\,f\,x]+a^6\,\text{Sin}[10\,e+8\,f\,x]+2\,a^5\,b\,\text{Sin}[10\,e+8\,f\,x]+a^4\,b^2\,\text{Sin}[10\,e+8\,f\,x]\right)
\end{aligned}$$

- **Problem 218: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[e+f\,x]^6}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 352 leaves, 9 steps) :

$$\frac{\left(5\,a^3-18\,a^2\,b+48\,a\,b^2-160\,b^3\right)\,x}{16\,a^6}+\frac{b^{7/2}\,\left(99\,a^2+176\,a\,b+80\,b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{8\,a^6\,(a+b)^{5/2}\,f}+$$

$$\frac{\left(15\,a^2-34\,a\,b+80\,b^2\right)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{48\,a^3\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+\frac{5\,(a-2\,b)\,\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]}{24\,a^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+\frac{\text{Cos}[e+f\,x]^5\,\text{Sin}[e+f\,x]}{6\,a\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+$$

$$\frac{b\,\left(15\,a^3-29\,a^2\,b+64\,a\,b^2+120\,b^3\right)\,\text{Tan}[e+f\,x]}{48\,a^4\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}+\frac{b\,\left(5\,a^4-8\,a^3\,b+17\,a^2\,b^2+116\,a\,b^3+80\,b^4\right)\,\text{Tan}[e+f\,x]}{16\,a^5\,(a+b)^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 1770 leaves) :

$$\Bigg(\left(99\,a^2+176\,a\,b+80\,b^2\right)\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])^3\,\mathrm{Sec}[e+f\,x]^6$$

$$\left(-\left(b^4\,\mathrm{ArcTan}\left[\mathrm{Sec}[f\,x]\,\left(\frac{\mathrm{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}-\frac{i\,\mathrm{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\mathrm{Sin}[f\,x]-2\,b\,\mathrm{Sin}[f\,x]+a\,\mathrm{Sin}[2\,e+f\,x])\right]\,\mathrm{Cos}[2\,e]\right)\Big/\left(64\,a^6\,\sqrt{a+b}\,f\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}\right)+$$

$$\left(i\,b^4\,\mathrm{ArcTan}\left[\mathrm{Sec}[f\,x]\,\left(\frac{\mathrm{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}-\frac{i\,\mathrm{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\,\mathrm{Sin}[f\,x]-2\,b\,\mathrm{Sin}[f\,x]+a\,\mathrm{Sin}[2\,e+f\,x])\right]\,\mathrm{Sin}[2\,e]\right)\Big/\left(64\,a^6\,\sqrt{a+b}\,f\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}\right)\right)\Bigg)\Big/$$

$$\left((a+b)^2\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^3\right)+\frac{1}{12\,288\,a^6\,(a+b)^2\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])$$

$$\mathrm{Sec}[2\,e]$$

$$\mathrm{Sec}[e+f\,x]^6$$

$$\big(720\,a^7\,f\,x\,\mathrm{Cos}[2\,e]+768\,a^6\,b\,f\,x\,\mathrm{Cos}[2\,e]+1296\,a^5\,b^2\,f\,x\,\mathrm{Cos}[2\,e]-8352\,a^4\,b^3\,f\,x\,\mathrm{Cos}[2\,e]-64\,128\,a^3\,b^4\,f\,x\,\mathrm{Cos}[2\,e]-$$
$$158\,976\,a^2\,b^5\,f\,x\,\mathrm{Cos}[2\,e]-165\,888\,a\,b^6\,f\,x\,\mathrm{Cos}[2\,e]-61\,440\,b^7\,f\,x\,\mathrm{Cos}[2\,e]+480\,a^7\,f\,x\,\mathrm{Cos}[2\,f\,x]+192\,a^6\,b\,f\,x\,\mathrm{Cos}[2\,f\,x]+$$
$$96\,a^5\,b^2\,f\,x\,\mathrm{Cos}[2\,f\,x]-4608\,a^4\,b^3\,f\,x\,\mathrm{Cos}[2\,f\,x]-41\,856\,a^3\,b^4\,f\,x\,\mathrm{Cos}[2\,f\,x]-67\,584\,a^2\,b^5\,f\,x\,\mathrm{Cos}[2\,f\,x]-30\,720\,a\,b^6\,f\,x\,\mathrm{Cos}[2\,f\,x]+$$
$$480\,a^7\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]+192\,a^6\,b\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]+96\,a^5\,b^2\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]-4608\,a^4\,b^3\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]-$$
$$41\,856\,a^3\,b^4\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]-67\,584\,a^2\,b^5\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]-30\,720\,a\,b^6\,f\,x\,\mathrm{Cos}[4\,e+2\,f\,x]+120\,a^7\,f\,x\,\mathrm{Cos}[2\,e+4\,f\,x]-$$
$$192\,a^6\,b\,f\,x\,\mathrm{Cos}[2\,e+4\,f\,x]+408\,a^5\,b^2\,f\,x\,\mathrm{Cos}[2\,e+4\,f\,x]-1968\,a^4\,b^3\,f\,x\,\mathrm{Cos}[2\,e+4\,f\,x]-6528\,a^3\,b^4\,f\,x\,\mathrm{Cos}[2\,e+4\,f\,x]-$$
$$3840\,a^2\,b^5\,f\,x\,\mathrm{Cos}[2\,e+4\,f\,x]+120\,a^7\,f\,x\,\mathrm{Cos}[6\,e+4\,f\,x]-192\,a^6\,b\,f\,x\,\mathrm{Cos}[6\,e+4\,f\,x]+408\,a^5\,b^2\,f\,x\,\mathrm{Cos}[6\,e+4\,f\,x]-$$
$$1968\,a^4\,b^3\,f\,x\,\mathrm{Cos}[6\,e+4\,f\,x]-6528\,a^3\,b^4\,f\,x\,\mathrm{Cos}[6\,e+4\,f\,x]-3840\,a^2\,b^5\,f\,x\,\mathrm{Cos}[6\,e+4\,f\,x]-6048\,a^3\,b^4\,\mathrm{Sin}[2\,e]-21\,312\,a^2\,b^5\,\mathrm{Sin}[2\,e]-$$
$$29\,952\,a\,b^6\,\mathrm{Sin}[2\,e]-13\,824\,b^7\,\mathrm{Sin}[2\,e]+262\,a^7\,\mathrm{Sin}[2\,f\,x]+524\,a^6\,b\,\mathrm{Sin}[2\,f\,x]-26\,a^5\,b^2\,\mathrm{Sin}[2\,f\,x]+1728\,a^4\,b^3\,\mathrm{Sin}[2\,f\,x]+$$
$$14\,976\,a^3\,b^4\,\mathrm{Sin}[2\,f\,x]+28\,416\,a^2\,b^5\,\mathrm{Sin}[2\,f\,x]+14\,592\,a\,b^6\,\mathrm{Sin}[2\,f\,x]+262\,a^7\,\mathrm{Sin}[4\,e+2\,f\,x]+524\,a^6\,b\,\mathrm{Sin}[4\,e+2\,f\,x]-$$
$$26\,a^5\,b^2\,\mathrm{Sin}[4\,e+2\,f\,x]+1728\,a^4\,b^3\,\mathrm{Sin}[4\,e+2\,f\,x]+6912\,a^3\,b^4\,\mathrm{Sin}[4\,e+2\,f\,x]+5376\,a^2\,b^5\,\mathrm{Sin}[4\,e+2\,f\,x]+768\,a\,b^6\,\mathrm{Sin}[4\,e+2\,f\,x]+$$
$$238\,a^7\,\mathrm{Sin}[2\,e+4\,f\,x]+304\,a^6\,b\,\mathrm{Sin}[2\,e+4\,f\,x]-250\,a^5\,b^2\,\mathrm{Sin}[2\,e+4\,f\,x]+1556\,a^4\,b^3\,\mathrm{Sin}[2\,e+4\,f\,x]+5904\,a^3\,b^4\,\mathrm{Sin}[2\,e+4\,f\,x]+$$
$$3744\,a^2\,b^5\,\mathrm{Sin}[2\,e+4\,f\,x]+238\,a^7\,\mathrm{Sin}[6\,e+4\,f\,x]+304\,a^6\,b\,\mathrm{Sin}[6\,e+4\,f\,x]-250\,a^5\,b^2\,\mathrm{Sin}[6\,e+4\,f\,x]+1556\,a^4\,b^3\,\mathrm{Sin}[6\,e+4\,f\,x]+$$
$$3888\,a^3\,b^4\,\mathrm{Sin}[6\,e+4\,f\,x]+2016\,a^2\,b^5\,\mathrm{Sin}[6\,e+4\,f\,x]+87\,a^7\,\mathrm{Sin}[4\,e+6\,f\,x]+46\,a^6\,b\,\mathrm{Sin}[4\,e+6\,f\,x]-9\,a^5\,b^2\,\mathrm{Sin}[4\,e+6\,f\,x]+$$
$$192\,a^4\,b^3\,\mathrm{Sin}[4\,e+6\,f\,x]+160\,a^3\,b^4\,\mathrm{Sin}[4\,e+6\,f\,x]+87\,a^7\,\mathrm{Sin}[8\,e+6\,f\,x]+46\,a^6\,b\,\mathrm{Sin}[8\,e+6\,f\,x]-9\,a^5\,b^2\,\mathrm{Sin}[8\,e+6\,f\,x]+$$
$$192\,a^4\,b^3\,\mathrm{Sin}[8\,e+6\,f\,x]+160\,a^3\,b^4\,\mathrm{Sin}[8\,e+6\,f\,x]+13\,a^7\,\mathrm{Sin}[6\,e+8\,f\,x]+16\,a^6\,b\,\mathrm{Sin}[6\,e+8\,f\,x]-7\,a^5\,b^2\,\mathrm{Sin}[6\,e+8\,f\,x]-$$
$$10\,a^4\,b^3\,\mathrm{Sin}[6\,e+8\,f\,x]+13\,a^7\,\mathrm{Sin}[10\,e+8\,f\,x]+16\,a^6\,b\,\mathrm{Sin}[10\,e+8\,f\,x]-7\,a^5\,b^2\,\mathrm{Sin}[10\,e+8\,f\,x]-10\,a^4\,b^3\,\mathrm{Sin}[10\,e+8\,f\,x]+$$
$$a^7\,\mathrm{Sin}[8\,e+10\,f\,x]+2\,a^6\,b\,\mathrm{Sin}[8\,e+10\,f\,x]+a^5\,b^2\,\mathrm{Sin}[8\,e+10\,f\,x]+a^7\,\mathrm{Sin}[12\,e+10\,f\,x]+2\,a^6\,b\,\mathrm{Sin}[12\,e+10\,f\,x]+a^5\,b^2\,\mathrm{Sin}[12\,e+10\,f\,x]\big)$$

- **Problem 219: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\left(a+b\,\mathrm{Sec}[c+d\,x]^2\right)^4}\,dx$$

Optimal (type 3, 204 leaves, 7 steps) :

$$\frac{x}{a^4}-\frac{\sqrt{b}\,\left(35 a^3+70 a^2 b+56 a b^2+16 b^3\right) \text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[c+d x]}{\sqrt{a+b}}\right]}{16 a^4 (a+b)^{7/2} d}-$$

$$\frac{b \,\text{Tan}[c+d x]}{6 a (a+b) d \left(a+b+b \,\text{Tan}[c+d x]^2\right)^3}-\frac{b (11 a+6 b) \,\text{Tan}[c+d x]}{24 a^2 (a+b)^2 d \left(a+b+b \,\text{Tan}[c+d x]^2\right)^2}-\frac{b \left(19 a^2+22 a b+8 b^2\right) \text{Tan}[c+d x]}{16 a^3 (a+b)^3 d \left(a+b+b \,\text{Tan}[c+d x]^2\right)}$$

Result (type 3, 1411 leaves) :

$$\Bigg(\left(35 a^3+70 a^2 b+56 a b^2+16 b^3\right) (a+2 b+a \,\text{Cos}[2 c+2 d x])^4 \,\text{Sec}[c+d x]^8$$

$$\Bigg(\Bigg(\Bigg(b \,\text{ArcTan}\Bigg[\text{Sec}[d x] \left(\frac{\text{Cos}[2 c]}{2 \sqrt{a+b} \sqrt{b \,\text{Cos}[4 c]-i b \,\text{Sin}[4 c]}}-\frac{i \,\text{Sin}[2 c]}{2 \sqrt{a+b} \sqrt{b \,\text{Cos}[4 c]-i b \,\text{Sin}[4 c]}}\right)$$

$$(-a \,\text{Sin}[d x]-2 b \,\text{Sin}[d x]+a \,\text{Sin}[2 c+d x])\Bigg] \text{Cos}[2 c]\Bigg) \Bigg/ \left(256 a^4 \sqrt{a+b}\, d \sqrt{b \,\text{Cos}[4 c]-i b \,\text{Sin}[4 c]}\right)-$$

$$\Bigg(i b \,\text{ArcTan}\Bigg[\text{Sec}[d x] \left(\frac{\text{Cos}[2 c]}{2 \sqrt{a+b} \sqrt{b \,\text{Cos}[4 c]-i b \,\text{Sin}[4 c]}}-\frac{i \,\text{Sin}[2 c]}{2 \sqrt{a+b} \sqrt{b \,\text{Cos}[4 c]-i b \,\text{Sin}[4 c]}}\right)$$

$$(-a \,\text{Sin}[d x]-2 b \,\text{Sin}[d x]+a \,\text{Sin}[2 c+d x])\Bigg] \text{Sin}[2 c]\Bigg) \Bigg/ \left(256 a^4 \sqrt{a+b}\, d \sqrt{b \,\text{Cos}[4 c]-i b \,\text{Sin}[4 c]}\right)\Bigg)\Bigg)\Bigg/$$

$$\left((a+b)^3 \left(a+b \,\text{Sec}[c+d x]^2\right)^4\right)+\frac{1}{3072 a^4 (a+b)^3 d \left(a+b \,\text{Sec}[c+d x]^2\right)^4} (a+2 b+a \,\text{Cos}[2 c+2 d x])$$

$$\text{Sec}[2 c]$$

$$\text{Sec}[c+d x]^8$$

$$\Big(480 a^6 d x \,\text{Cos}[2 c]+3168 a^5 b d x \,\text{Cos}[2 c]+8928 a^4 b^2 d x \,\text{Cos}[2 c]+14112 a^3 b^3 d x \,\text{Cos}[2 c]+13248 a^2 b^4 d x \,\text{Cos}[2 c]+$$
$$6912 a b^5 d x \,\text{Cos}[2 c]+1536 b^6 d x \,\text{Cos}[2 c]+360 a^6 d x \,\text{Cos}[2 d x]+2232 a^5 b d x \,\text{Cos}[2 d x]+5688 a^4 b^2 d x \,\text{Cos}[2 d x]+$$
$$7272 a^3 b^3 d x \,\text{Cos}[2 d x]+4608 a^2 b^4 d x \,\text{Cos}[2 d x]+1152 a b^5 d x \,\text{Cos}[2 d x]+360 a^6 d x \,\text{Cos}[4 c+2 d x]+$$
$$2232 a^5 b d x \,\text{Cos}[4 c+2 d x]+5688 a^4 b^2 d x \,\text{Cos}[4 c+2 d x]+7272 a^3 b^3 d x \,\text{Cos}[4 c+2 d x]+4608 a^2 b^4 d x \,\text{Cos}[4 c+2 d x]+$$
$$1152 a b^5 d x \,\text{Cos}[4 c+2 d x]+144 a^6 d x \,\text{Cos}[2 c+4 d x]+720 a^5 b d x \,\text{Cos}[2 c+4 d x]+1296 a^4 b^2 d x \,\text{Cos}[2 c+4 d x]+$$
$$1008 a^3 b^3 d x \,\text{Cos}[2 c+4 d x]+288 a^2 b^4 d x \,\text{Cos}[2 c+4 d x]+144 a^6 d x \,\text{Cos}[6 c+4 d x]+720 a^5 b d x \,\text{Cos}[6 c+4 d x]+$$
$$1296 a^4 b^2 d x \,\text{Cos}[6 c+4 d x]+1008 a^3 b^3 d x \,\text{Cos}[6 c+4 d x]+288 a^2 b^4 d x \,\text{Cos}[6 c+4 d x]+24 a^6 d x \,\text{Cos}[4 c+6 d x]+$$
$$72 a^5 b d x \,\text{Cos}[4 c+6 d x]+72 a^4 b^2 d x \,\text{Cos}[4 c+6 d x]+24 a^3 b^3 d x \,\text{Cos}[4 c+6 d x]+24 a^6 d x \,\text{Cos}[8 c+6 d x]+$$
$$72 a^5 b d x \,\text{Cos}[8 c+6 d x]+72 a^4 b^2 d x \,\text{Cos}[8 c+6 d x]+24 a^3 b^3 d x \,\text{Cos}[8 c+6 d x]+870 a^5 b \,\text{Sin}[2 c]+4292 a^4 b^2 \,\text{Sin}[2 c]+$$
$$8792 a^3 b^3 \,\text{Sin}[2 c]+9936 a^2 b^4 \,\text{Sin}[2 c]+5824 a b^5 \,\text{Sin}[2 c]+1408 b^6 \,\text{Sin}[2 c]-870 a^5 b \,\text{Sin}[2 d x]-3792 a^4 b^2 \,\text{Sin}[2 d x]-$$
$$6432 a^3 b^3 \,\text{Sin}[2 d x]-4608 a^2 b^4 \,\text{Sin}[2 d x]-1248 a b^5 \,\text{Sin}[2 d x]+435 a^5 b \,\text{Sin}[4 c+2 d x]+2124 a^4 b^2 \,\text{Sin}[4 c+2 d x]+$$
$$3972 a^3 b^3 \,\text{Sin}[4 c+2 d x]+3072 a^2 b^4 \,\text{Sin}[4 c+2 d x]+864 a b^5 \,\text{Sin}[4 c+2 d x]-435 a^5 b \,\text{Sin}[2 c+4 d x]-$$
$$1374 a^4 b^2 \,\text{Sin}[2 c+4 d x]-1248 a^3 b^3 \,\text{Sin}[2 c+4 d x]-384 a^2 b^4 \,\text{Sin}[2 c+4 d x]+87 a^5 b \,\text{Sin}[6 c+4 d x]+366 a^4 b^2 \,\text{Sin}[6 c+4 d x]+$$
$$408 a^3 b^3 \,\text{Sin}[6 c+4 d x]+144 a^2 b^4 \,\text{Sin}[6 c+4 d x]-87 a^5 b \,\text{Sin}[4 c+6 d x]-116 a^4 b^2 \,\text{Sin}[4 c+6 d x]-44 a^3 b^3 \,\text{Sin}[4 c+6 d x]\Big)$$

Problem 228: Unable to integrate problem.

$$\int \text{Sec}[e+f x]^5 \sqrt{a+b\,\text{Sec}[e+f x]^2}\, dx$$

Optimal (type 4, 372 leaves, 11 steps):

$$-\frac{\left(2 a^2-3 a b-8 b^2\right) \text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a\,\text{Sin}[e+f x]^2\right)}}{15 b^2 f}+\frac{1}{15 b^2 f \sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}$$

$$\left(2 a^2-3 a b-8 b^2\right) \sqrt{\text{Cos}[e+f x]^2}\, \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a\,\text{Sin}[e+f x]^2\right)} -$$

$$\left((a-8 b) (a+b) \sqrt{\text{Cos}[e+f x]^2}\, \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a\,\text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}\right) \Big/$$

$$\left(15 b f \left(a+b-a\,\text{Sin}[e+f x]^2\right)\right)+\frac{(a+4 b) \text{Sec}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a\,\text{Sin}[e+f x]^2\right)}\, \text{Tan}[e+f x]}{15 b f}+$$

$$\frac{\text{Sec}[e+f x]^3 \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a\,\text{Sin}[e+f x]^2\right)}\, \text{Tan}[e+f x]}{5 f}$$

Result (type 8, 27 leaves):

$$\int \text{Sec}[e+f x]^5 \sqrt{a+b\,\text{Sec}[e+f x]^2}\, dx$$

Problem 229: Unable to integrate problem.

$$\int \text{Sec}[e+f x]^3 \sqrt{a+b\,\text{Sec}[e+f x]^2}\, dx$$

Optimal (type 4, 288 leaves, 10 steps):

$$\frac{(a+2b)\,\text{Sin}[e+f x]\,\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}{3\,b\,f}-$$

$$\frac{(a+2b)\,\sqrt{\text{Cos}[e+f x]^2}\;\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}{3\,b\,f\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}+$$

$$\left(2\,(a+b)\,\sqrt{\text{Cos}[e+f x]^2}\;\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}\right)\Big/$$

$$\left(3\,f\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)\right)+\frac{\text{Sec}[e+f x]\,\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}\;\text{Tan}[e+f x]}{3\,f}$$

Result (type 8, 27 leaves) :

$$\int \text{Sec}[e+f x]^3\,\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

- **Problem 230: Unable to integrate problem.**

$$\int \text{Sec}[e+f x]\,\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 4, 218 leaves, 10 steps) :

$$\frac{\text{Sin}[e+f x]\,\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}{f}-$$

$$\frac{\sqrt{\text{Cos}[e+f x]^2}\;\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}{f\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}+\frac{1}{f\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}$$

$$(a+b)\,\sqrt{\text{Cos}[e+f x]^2}\;\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}$$

Result (type 8, 25 leaves) :

$$\int \text{Sec}[e+f x]\,\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

- **Problem 232: Unable to integrate problem.**

$$\int \text{Cos}[e+f x]^3\,\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 4, 246 leaves, 9 steps) :

$$\frac{\text{Cos}[e+f x]^2 \,\text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)}}{3 f}+$$

$$\frac{(2 a+b) \sqrt{\text{Cos}[e+f x]^2} \,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)}}{3 a f \sqrt{1-\frac{a \,\text{Sin}[e+f x]^2}{a+b}}}-$$

$$\left(b (a+b) \sqrt{\text{Cos}[e+f x]^2} \,\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \,\text{Sin}[e+f x]^2}{a+b}}\right) \Big/$$

$$\left(3 a f \left(a+b-a \,\text{Sin}[e+f x]^2\right)\right)$$

Result (type 8, 27 leaves) :

$$\int \text{Cos}[e+f x]^3 \sqrt{a+b \,\text{Sec}[e+f x]^2} \, dx$$

- **Problem 233: Unable to integrate problem.**

$$\int \text{Cos}[e+f x]^5 \sqrt{a+b \,\text{Sec}[e+f x]^2} \, dx$$

Optimal (type 4, 338 leaves, 10 steps) :

$$\frac{2 (2 a-b) \,\text{Cos}[e+f x]^2 \,\text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)}}{15 a f}+$$

$$\frac{\text{Cos}[e+f x]^2 \,\text{Sin}[e+f x] \left(a+b-a \,\text{Sin}[e+f x]^2\right) \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)}}{5 a f}+\frac{1}{15 a^2 f \sqrt{1-\frac{a \,\text{Sin}[e+f x]^2}{a+b}}}$$

$$\left(8 a^2+3 a b-2 b^2\right) \sqrt{\text{Cos}[e+f x]^2} \,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)}-$$

$$\left(2 (2 a-b) b (a+b) \sqrt{\text{Cos}[e+f x]^2} \,\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \,\text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \,\text{Sin}[e+f x]^2}{a+b}}\right) \Big/$$

$$\left(15 a^2 f \left(a+b-a \,\text{Sin}[e+f x]^2\right)\right)$$

Result (type 8, 27 leaves) :

$$\int \text{Cos}[e+f x]^5 \sqrt{a+b \,\text{Sec}[e+f x]^2} \, dx$$

Problem 234: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^6 \sqrt{a+b \text{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 186 leaves, 6 steps):

$$\frac{(a+b)\left(a^2-2 a b+5 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{b} \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{16 b^{5/2} f}+\frac{\left(a^2-2 a b+5 b^2\right) \text{Tan}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{16 b^2 f}-\frac{(3 a-5 b) \text{Tan}[e+f x]\left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}{24 b^2 f}+\frac{\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}{6 b f}$$

Result (type 3, 407 leaves):

$$\left(e^{i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)}\left(1+e^{2 i (e+f x)}\right)^2} \text{Cos}[e+f x]\right.$$
$$\left(-1 / \left(1+e^{2 i (e+f x)}\right)^6 i \sqrt{b}\left(-1+e^{2 i (e+f x)}\right)\left(-3 a^2\left(1+e^{2 i (e+f x)}\right)^4+4 a b\left(1+e^{2 i (e+f x)}\right)^2\left(1+4 e^{2 i (e+f x)}+e^{4 i (e+f x)}\right)+\right.\right.$$
$$\left.b^2\left(15+100 e^{2 i (e+f x)}+298 e^{4 i (e+f x)}+100 e^{6 i (e+f x)}+15 e^{8 i (e+f x)}\right)\right)-$$
$$\left.\frac{3\left(a^3-a^2 b+3 a b^2+5 b^3\right) \text{Log}\left[\frac{-4 \sqrt{b}\left(-1+e^{2 i (e+f x)}\right) f+4 i \sqrt{4 b e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2} f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}}\right)$$
$$\left.\sqrt{a+b \text{Sec}[e+f x]^2}\right) / \left(24 \sqrt{2} b^{5/2} f \sqrt{a+2 b+a \text{Cos}[2 e+2 f x]}\right)$$

Problem 235: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^4 \sqrt{a+b \text{Sec}[e+f x]^2} \, dx$$

Optimal (type 3, 122 leaves, 5 steps):

$$-\frac{(a-3b)(a+b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{8\,b^{3/2}\,f}-\frac{(a-3b)\,\text{Tan}[e+fx]\,\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{8\,b\,f}+\frac{\text{Tan}[e+fx]\,\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{3/2}}{4\,b\,f}$$

Result (type 3, 322 leaves) :

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,\text{Cos}[e+fx]\left(-\frac{i\sqrt{b}\left(-1+e^{2i(e+fx)}\right)\left(a\left(1+e^{2i(e+fx)}\right)^2+b\left(3+14\,e^{2i(e+fx)}+3\,e^{4i(e+fx)}\right)\right)}{\left(1+e^{2i(e+fx)}\right)^4}+\frac{\left(a^2-2ab-3b^2\right)\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f}{1+e^{2i(e+fx)}}\right]}{\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)\sqrt{a+b\,\text{Sec}[e+fx]^2}\right)\Big/\left(4\sqrt{2}\,b^{3/2}\,f\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\right)$$

Problem 236: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+fx]^2\sqrt{a+b\,\text{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 76 leaves, 4 steps) :

$$\frac{(a+b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{2\sqrt{b}\,f}+\frac{\text{Tan}[e+fx]\,\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{2\,f}$$

Result (type 3, 257 leaves) :

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,\text{Cos}[e+fx]\left(-\frac{i\left(-1+e^{2i(e+fx)}\right)}{\left(1+e^{2i(e+fx)}\right)^2}-\frac{(a+b)\,\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f}{1+e^{2i(e+fx)}}\right]}{\sqrt{b}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)\sqrt{a+b\,\text{Sec}[e+fx]^2}\right)\Big/\left(\sqrt{2}\,f\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\right)$$

Problem 237: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 79 leaves, 6 steps) :

$$\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}+\frac{\sqrt{b}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}$$

Result (type 8, 18 leaves) :

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

- **Problem 238: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\text{Cos}[e+f x]^2\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 82 leaves, 4 steps) :

$$\frac{(a+b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{2\sqrt{a}\,f}+\frac{\text{Cos}[e+f x]\,\text{Sin}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{2 f}$$

Result (type 3, 322 leaves) :

$$\left(e^{-i(e+f x)}\sqrt{4 b+a\,e^{-2 i(e+f x)}\left(1+e^{2 i(e+f x)}\right)^2}\,\text{Cos}[e+f x]\right.$$
$$\left(-i\left(-1+e^{2 i(e+f x)}\right)+\left(2(a+b)\,e^{2 i(e+f x)}\left(2 f x-i\,\text{Log}\left[a+2 b+a\,e^{2 i(e+f x)}+\sqrt{a}\sqrt{4 b\,e^{2 i(e+f x)}+a\left(1+e^{2 i(e+f x)}\right)^2}\right]+\right.\right.\right.$$
$$\left.\left.\left.i\,\text{Log}\left[a+a\,e^{2 i(e+f x)}+2 b\,e^{2 i(e+f x)}+\sqrt{a}\sqrt{4 b\,e^{2 i(e+f x)}+a\left(1+e^{2 i(e+f x)}\right)^2}\right]\right)\right)\right/$$
$$\left.\left(\sqrt{a}\sqrt{4 b\,e^{2 i(e+f x)}+a\left(1+e^{2 i(e+f x)}\right)^2}\right)\right)\sqrt{a+b\,\text{Sec}[e+f x]^2}\right)\Big/\left(4\sqrt{2}\,f\sqrt{a+2 b+a\,\text{Cos}[2 e+2 f x]}\right)$$

- **Problem 239: Unable to integrate problem.**

$$\int\text{Cos}[e+f x]^4\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 140 leaves, 5 steps) :

$$\frac{(3 a-b)(a+b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{8 a^{3/2} f}+$$
$$\frac{(3 a-b)\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{8 a f}+\frac{\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]\left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}{4 a f}$$

Result (type 8, 27 leaves) :

$$\int \text{Cos}[e+f x]^4 \sqrt{a+b \,\text{Sec}[e+f x]^2}\, dx$$

- **Problem 240: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f x]^6 \sqrt{a+b \,\text{Sec}[e+f x]^2}\, dx$$

Optimal (type 3, 196 leaves, 7 steps):

$$\frac{(a+b)\left(5 a^2-2 a b+b^2\right) \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Tan}[e+f x]}{\sqrt{a+b+b \,\text{Tan}[e+f x]^2}}\right]}{16 a^{5/2} f}+\frac{(3 a-b)(5 a+3 b) \text{Cos}[e+f x] \,\text{Sin}[e+f x] \sqrt{a+b+b \,\text{Tan}[e+f x]^2}}{48 a^2 f}+$$
$$\frac{(5 a+b) \text{Cos}[e+f x]^3 \,\text{Sin}[e+f x] \sqrt{a+b+b \,\text{Tan}[e+f x]^2}}{24 a f}+\frac{\text{Cos}[e+f x]^5 \,\text{Sin}[e+f x] \sqrt{a+b+b \,\text{Tan}[e+f x]^2}}{6 f}$$

Result (type 6, 1902 leaves):

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^{10} \sqrt{a+2 b+a \,\text{Cos}[2 (e+f x)]}\, \sqrt{a+b \,\text{Sec}[e+f x]^2}\, \text{Sin}[e+f x]\right) \Big/$$
$$\left(f \left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$
$$\left(a \,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]+4 (a+b) \text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]\right)$$
$$\left.\text{Sin}[e+f x]^2\right) \left(\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^5 \sqrt{a+2 b+a \,\text{Cos}[2 (e+f x)]}\right) \Big/\right.$$
$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]-\left(a \,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]+\right.\right.$$
$$\left.\left.4 (a+b) \text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)-$$
$$\left(12 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^3 \sqrt{a+2 b+a \,\text{Cos}[2 (e+f x)]}\, \text{Sin}[e+f x]^2\right) \Big/$$
$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]-\left(a \,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \,\text{Sin}[e+f x]^2}{a+b}\right]+\right.\right.$$

$$4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Sin}[e+f x]^2\Bigg)+\Bigg(3\,(a+b)\,\text{Cos}[e+f x]^4$$

$$\sqrt{a+2 b+a\,\text{Cos}[2\,(e+f x)]}\,\text{Sin}[e+f x]\left(-\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)\Bigg)\Bigg/$$

$$\Bigg(f\,\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\Bigg(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+$$

$$4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Sin}[e+f x]^2\Bigg)\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^4\,\sqrt{a+2 b+a\,\text{Cos}[2\,(e+f x)]}\,\text{Sin}[e+f x]$$

$$\Bigg(-2\,f\,\Bigg(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\Bigg)$$

$$\text{Cos}[e+f x]\,\text{Sin}[e+f x]+3\,(a+b)\left(-\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)-$$

$$\text{Sin}[e+f x]^2\,\Bigg(a\,\left(\frac{3\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{3}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-\right.$$

$$\frac{12}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-1,\frac{1}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)+$$

$$4\,(a+b)\left(-\frac{3\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-1,\frac{1}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-\right.$$

$$\frac{6}{5}\,f\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\left(1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right)^{3/2}\left(\frac{5}{6\left(1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right)}+\left(5\,(a+b)^3\,\text{Csc}[e+f x]^6\left(-\frac{2\,a\,\text{Sin}[e+f x]^2}{a+b}-\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{4\,a^2\,\text{Sin}[e+f x]^4}{3\,(a+b)^2}+\frac{2\sqrt{a}\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\right]\text{Sin}[e+f x]}{\sqrt{a+b}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}\right)\right)\Bigg/\left(32\,a^3\left(1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right)\right)\right)\right)\right)\Bigg/$$

$$\left(f\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\left(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\right.\right.\right.\right.$$

$$\left.\left.\left.\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)^2\right)-$$

$$\left(3\,a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^4\,\text{Sin}[e+f x]\,\text{Sin}[2\,(e+f x)]\right)\Bigg/$$

$$\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,-\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\left(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\right.\right.$$

$$\left.\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,-\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)\right)$$

■ Problem 241: Unable to integrate problem.

$$\int \text{Sec}[e+f x]^5\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}dx$$

Optimal (type 4, 450 leaves, 12 steps):

$$-\frac{2\,(a+2\,b)\,\left(a^2-4\,a\,b-4\,b^2\right)\,\mathrm{Sin}[e+f\,x]\,\sqrt{\mathrm{Sec}[e+f\,x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)}}{35\,b^2\,f}+\frac{1}{35\,b^2\,f\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}}}$$

$$2\,(a+2\,b)\,\left(a^2-4\,a\,b-4\,b^2\right)\,\sqrt{\mathrm{Cos}[e+f\,x]^2}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}[\mathrm{Sin}[e+f\,x]],\,\frac{a}{a+b}\right]\,\sqrt{\mathrm{Sec}[e+f\,x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)}\,-$$

$$\left((a+b)\,\left(a^2-16\,a\,b-16\,b^2\right)\,\sqrt{\mathrm{Cos}[e+f\,x]^2}\;\mathrm{EllipticF}\left[\mathrm{ArcSin}[\mathrm{Sin}[e+f\,x]],\,\frac{a}{a+b}\right]\right.$$

$$\left.\sqrt{\mathrm{Sec}[e+f\,x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)}\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}}\right)\Big/\left(35\,b\,f\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)\right)+$$

$$\frac{\left(a^2+11\,a\,b+8\,b^2\right)\,\mathrm{Sec}[e+f\,x]\,\sqrt{\mathrm{Sec}[e+f\,x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)}\;\mathrm{Tan}[e+f\,x]}{35\,b\,f}+$$

$$\frac{2\,(4\,a+3\,b)\,\mathrm{Sec}[e+f\,x]^3\,\sqrt{\mathrm{Sec}[e+f\,x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)}\;\mathrm{Tan}[e+f\,x]}{35\,f}+$$

$$\frac{b\,\mathrm{Sec}[e+f\,x]^5\,\sqrt{\mathrm{Sec}[e+f\,x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)}\;\mathrm{Tan}[e+f\,x]}{7\,f}$$

Result (type 8, 27 leaves):

$$\int \mathrm{Sec}[e+f\,x]^5\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

- **Problem 242: Unable to integrate problem.**

$$\int \mathrm{Sec}[e+f\,x]^3\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 4, 371 leaves, 11 steps):

$$\frac{\left(3 a^2+13 a b+8 b^2\right) \text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}{15 b f}-\frac{1}{15 b f \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}$$

$$\left(3 a^2+13 a b+8 b^2\right) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}+$$

$$\left((a+b) (9 a+8 b) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}\right)/$$

$$\left(15 f \left(a+b-a \text{Sin}[e+f x]^2\right)\right)+\frac{2 (3 a+2 b) \text{Sec}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \text{Tan}[e+f x]}{15 f}+$$

$$\frac{b \text{Sec}[e+f x]^3 \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \text{Tan}[e+f x]}{5 f}$$

Result (type 8, 27 leaves) :

$$\int \text{Sec}[e+f x]^3 \left(a+b \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Problem 243: Unable to integrate problem.

$$\int \text{Sec}[e+f x] \left(a+b \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 4, 290 leaves, 10 steps) :

$$\frac{2 (2 a+b) \text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}{3 f}-\frac{1}{3 f \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}$$

$$2 (2 a+b) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}+$$

$$\left((a+b) (3 a+2 b) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}\right)/$$

$$\left(3 f \left(a+b-a \text{Sin}[e+f x]^2\right)\right)+\frac{b \text{Sec}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \text{Tan}[e+f x]}{3 f}$$

Result (type 8, 25 leaves) :

$$\int \text{Sec}[e+f x] \left(a+b \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Problem 244: Unable to integrate problem.

$$\int \text{Cos}[e+f x] \left(a+b \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 4, 224 leaves, 9 steps):

$$\frac{b \text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}{f}+\frac{(a-b) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}{f \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}+\frac{1}{f \left(a+b-a \text{Sin}[e+f x]^2\right)} b (a+b) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}$$

Result (type 8, 25 leaves):

$$\int \text{Cos}[e+f x] \left(a+b \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Problem 246: Unable to integrate problem.

$$\int \text{Cos}[e+f x]^5 \left(a+b \text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 4, 319 leaves, 10 steps):

$$-\frac{2 (a-3 (a+b)) \text{Cos}[e+f x]^2 \text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}{15 f}+\frac{a \text{Cos}[e+f x]^4 \text{Sin}[e+f x] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}{5 f}+\frac{1}{15 a f \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}} \left(8 a^2+13 a b+3 b^2\right) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} - \left(b (a+b) (4 a+3 b) \sqrt{\text{Cos}[e+f x]^2} \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}\right) \Big/ \left(15 a f \left(a+b-a \text{Sin}[e+f x]^2\right)\right)$$

Result (type 8, 27 leaves):

$$\int \text{Cos}[e+f x]^5 \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} dx$$

Problem 247: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^6 \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 243 leaves, 7 steps):

$$\frac{(a+b)^2 \left(3 a^2-10 a b+35 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{b} \,\text{Tan}[e+f x]}{\sqrt{a+b+b \,\text{Tan}[e+f x]^2}}\right]}{128 b^{5/2} f}+$$
$$\frac{(a+b) \left(3 a^2-10 a b+35 b^2\right) \text{Tan}[e+f x] \sqrt{a+b+b \,\text{Tan}[e+f x]^2}}{128 b^2 f}+\frac{\left(3 a^2-10 a b+35 b^2\right) \text{Tan}[e+f x] \left(a+b+b \,\text{Tan}[e+f x]^2\right)^{3/2}}{192 b^2 f}-$$
$$\frac{(3 a-7 b) \,\text{Tan}[e+f x] \left(a+b+b \,\text{Tan}[e+f x]^2\right)^{5/2}}{48 b^2 f}+\frac{\text{Sec}[e+f x]^2 \,\text{Tan}[e+f x] \left(a+b+b \,\text{Tan}[e+f x]^2\right)^{5/2}}{8 b f}$$

Result (type 3, 512 leaves):

$$\frac{1}{96 \sqrt{2} \, b^{5/2} f \,(a+2 b+a \,\text{Cos}[2 e+2 f x])^{3/2}} e^{i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \,\text{Cos}[e+f x]^3$$
$$\left(-\frac{1}{\left(1+e^{2 i (e+f x)}\right)^8} i \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) \left(-9 a^3 \left(1+e^{2 i (e+f x)}\right)^6+3 a^2 b \left(1+e^{2 i (e+f x)}\right)^4 \left(5+18 e^{2 i (e+f x)}+5 e^{4 i (e+f x)}\right)+\right.\right.$$
$$a b^2 \left(1+e^{2 i (e+f x)}\right)^2 \left(145+948 e^{2 i (e+f x)}+2758 e^{4 i (e+f x)}+948 e^{6 i (e+f x)}+145 e^{8 i (e+f x)}\right)+$$
$$\left.b^3 \left(105+910 e^{2 i (e+f x)}+3591 e^{4 i (e+f x)}+8644 e^{6 i (e+f x)}+3591 e^{8 i (e+f x)}+910 e^{10 i (e+f x)}+105 e^{12 i (e+f x)}\right)\right)-$$
$$\left.\frac{3 (a+b)^2 \left(3 a^2-10 a b+35 b^2\right) \text{Log}\left[\frac{-4 \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) f+4 i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} \, f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}}\right) \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2}$$

Problem 248: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Sec}[e+f x]^4 \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 165 leaves, 6 steps):

$$-\frac{(a-5b)(a+b)^2\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{16\,b^{3/2}\,f}-\frac{(a-5b)(a+b)\,\text{Tan}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{16\,b\,f}-\frac{(a-5b)\,\text{Tan}[e+fx]\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{3/2}}{24\,b\,f}+\frac{\text{Tan}[e+fx]\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{5/2}}{6\,b\,f}$$

Result (type 3, 400 leaves):

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,\text{Cos}[e+fx]^3\left(-1/\left(\left(1+e^{2i(e+fx)}\right)^6 i\sqrt{b}\left(-1+e^{2i(e+fx)}\right)\left(3a^2\left(1+e^{2i(e+fx)}\right)^4+2ab\left(1+e^{2i(e+fx)}\right)^2\left(11+50e^{2i(e+fx)}+11e^{4i(e+fx)}\right)+b^2\left(15+100e^{2i(e+fx)}+298e^{4i(e+fx)}+100e^{6i(e+fx)}+15e^{8i(e+fx)}\right)\right)\right)+\frac{3(a-5b)(a+b)^2\,\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f}{1+e^{2i(e+fx)}}\right]}{\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}\right)\Big/\left(12\sqrt{2}\,b^{3/2}\,f\,(a+2b+a\,\text{Cos}[2e+2fx])^{3/2}\right)$$

■ **Problem 249: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+fx]^2\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}dx$$

Optimal (type 3, 111 leaves, 5 steps):

$$\frac{3(a+b)^2\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{8\sqrt{b}\,f}+\frac{3(a+b)\,\text{Tan}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{8f}+\frac{\text{Tan}[e+fx]\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{3/2}}{4f}$$

Result (type 3, 313 leaves):

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,\mathrm{Cos}[e+fx]^3\right.$$

$$\left(-\frac{i\left(-1+e^{2i(e+fx)}\right)\left(5a\left(1+e^{2i(e+fx)}\right)^2+b\left(3+14\,e^{2i(e+fx)}+3\,e^{4i(e+fx)}\right)\right)}{\left(1+e^{2i(e+fx)}\right)^4}-\frac{3(a+b)^2\,\mathrm{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f}{1+e^{2i(e+fx)}}\right]}{\sqrt{b}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)$$

$$\left.\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^{3/2}\right)\Big/\left(2\sqrt{2}\,f\,(a+2b+a\,\mathrm{Cos}[2e+2fx])^{3/2}\right)$$

- **Problem 250: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^{3/2}\,dx$$

Optimal (type 3, 118 leaves, 7 steps) :

$$\frac{a^{3/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}\right]}{f}+\frac{\sqrt{b}\,(3a+b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}\right]}{2f}+\frac{b\,\mathrm{Tan}[e+fx]\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}{2f}$$

Result (type 3, 527 leaves) :

$$\frac{1}{f\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{3/2}}\sqrt{2}\,e^{i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\text{Cos}[e+f\,x]^3$$

$$\left(-\frac{i\,b\,\left(-1+e^{2\,i\,(e+f\,x)}\right)}{\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+\frac{1}{\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}}\left(2\,a^{3/2}\,f\,x-i\,a^{3/2}\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+\right.\right.$$

$$i\,a^{3/2}\,\text{Log}\left[a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]-$$

$$3\,a\,\sqrt{b}\,\text{Log}\left[\frac{-2\,\sqrt{b}\,\left(-1+e^{2\,i\,(e+f\,x)}\right)\,f+2\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{b\,(3\,a+b)\,\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]-$$

$$\left.\left.b^{3/2}\,\text{Log}\left[\frac{-2\,\sqrt{b}\,\left(-1+e^{2\,i\,(e+f\,x)}\right)\,f+2\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{b\,(3\,a+b)\,\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]\right)\right)\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}$$

- **Problem 251: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f\,x]^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 124 leaves, 7 steps) :

$$\frac{\sqrt{a}\,(a+3\,b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{2\,f}+\frac{b^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{f}+\frac{a\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{2\,f}$$

Result (type 3, 466 leaves) :

$$\frac{1}{2\sqrt{2}\, f\, (a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{3/2}}$$

$$e^{-i\,(e+f\,x)}\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\ \text{Cos}[e+f\,x]^3\left(-i\,a\left(-1+e^{2\,i\,(e+f\,x)}\right)+\frac{1}{\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}}\right.$$

$$2\,e^{2\,i\,(e+f\,x)}\left(2\,a^{3/2}\,f\,x+6\,\sqrt{a}\,b\,f\,x-i\,\sqrt{a}\,(a+3\,b)\,\text{Log}\left[e^{-2\,i\,e}\left(a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]+\right.$$

$$i\,\sqrt{a}\,(a+3\,b)\,\text{Log}\left[e^{-2\,i\,e}\left(a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right]-$$

$$\left.\left.4\,b^{3/2}\,\text{Log}\left[-\frac{e^{3\,i\,e}\left(\sqrt{b}\left(-1+e^{2\,i\,(e+f\,x)}\right)-i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)f}{2\,b^2\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]\right)\right)\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}$$

- **Problem 252: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f\,x]^4\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 125 leaves, 5 steps) :

$$\frac{3\,(a+b)^2\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{8\,\sqrt{a}\,f}+$$

$$\frac{3\,(a+b)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{8\,f}+\frac{\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^{3/2}}{4\,f}$$

Result (type 3, 369 leaves) :

$$\left(e^{-3 i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \operatorname{Cos}[e+f x]^3 \left(-i \left(-1+e^{2 i (e+f x)}\right) \left(10 b e^{2 i (e+f x)}+a \left(1+8 e^{2 i (e+f x)}+e^{4 i (e+f x)}\right)\right)+\right.\right.$$
$$12 (a+b)^2 e^{4 i (e+f x)} \left(2 f x-i \operatorname{Log}\left[a+2 b+a e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]+\right.$$
$$\left.\left.\left. i \operatorname{Log}\left[a+a e^{2 i (e+f x)}+2 b e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]\right)\right)\right/$$
$$\left(\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right) \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2}\right) \Big/ \left(16 \sqrt{2} f (a+2 b+a \operatorname{Cos}[2 e+2 f x])^{3/2}\right)$$

- **Problem 253: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cos}[e+f x]^6 \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 193 leaves, 6 steps) :

$$\frac{(5 a-b) (a+b)^2 \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[e+f x]}{\sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}\right]}{16 a^{3/2} f}+\frac{(5 a-b) (a+b) \operatorname{Cos}[e+f x] \operatorname{Sin}[e+f x] \sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}{16 a f}+$$
$$\frac{(5 a-b) \operatorname{Cos}[e+f x]^3 \operatorname{Sin}[e+f x] \left(a+b+b \operatorname{Tan}[e+f x]^2\right)^{3/2}}{24 a f}+\frac{\operatorname{Cos}[e+f x]^5 \operatorname{Sin}[e+f x] \left(a+b+b \operatorname{Tan}[e+f x]^2\right)^{5/2}}{6 a f}$$

Result (type 3, 453 leaves) :

$$\frac{1}{96 \sqrt{2} a^{3/2} f (a+2 b+a \operatorname{Cos}[2 e+2 f x])^{3/2}} e^{-5 i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \operatorname{Cos}[e+f x]^3$$
$$\left(-i \sqrt{a} \left(-1+e^{2 i (e+f x)}\right) \left(6 b^2 e^{4 i (e+f x)}+a b e^{2 i (e+f x)} \left(7+58 e^{2 i (e+f x)}+7 e^{4 i (e+f x)}\right)+a^2 \left(1+9 e^{2 i (e+f x)}+46 e^{4 i (e+f x)}+9 e^{6 i (e+f x)}+e^{8 i (e+f x)}\right)\right)+\right.$$
$$12 (5 a-b) (a+b)^2 e^{6 i (e+f x)} \left(2 f x-i \operatorname{Log}\left[a+2 b+a e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]+i \operatorname{Log}\left[a+a e^{2 i (e+f x)}+\right.\right.$$
$$\left.\left.\left.2 b e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]\right)\right) \Big/ \left(\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right) \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2}$$

- **Problem 254: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \left(a+b \operatorname{Sec}[c+d x]^2\right)^{5/2} dx$$

Optimal (type 3, 166 leaves, 8 steps) :

$$\frac{a^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+b+b\,\text{Tan}[c+d\,x]^2}}\right]}{d}+\frac{\sqrt{b}\,\left(15\,a^2+10\,a\,b+3\,b^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[c+d\,x]}{\sqrt{a+b+b\,\text{Tan}[c+d\,x]^2}}\right]}{8\,d}+$$
$$\frac{b\,(7\,a+3\,b)\,\text{Tan}[c+d\,x]\,\sqrt{a+b+b\,\text{Tan}[c+d\,x]^2}}{8\,d}+\frac{b\,\text{Tan}[c+d\,x]\,\left(a+b+b\,\text{Tan}[c+d\,x]^2\right)^{3/2}}{4\,d}$$

Result (type 3, 706 leaves):

$$\frac{1}{\sqrt{2}\,d\,(a+2\,b+a\,\text{Cos}[2\,c+2\,d\,x])^{5/2}}$$
$$e^{i\,(c+d\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}\,\text{Cos}[c+d\,x]^5\,\left(-\frac{i\,b\,\left(-1+e^{2\,i\,(c+d\,x)}\right)\,\left(9\,a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2+b\,\left(3+14\,e^{2\,i\,(c+d\,x)}+3\,e^{4\,i\,(c+d\,x)}\right)\right)}{\left(1+e^{2\,i\,(c+d\,x)}\right)^4}+\right.$$
$$\frac{1}{\sqrt{4\,b\,e^{2\,i\,(c+d\,x)}+a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}}\left(8\,a^{5/2}\,d\,x-4\,i\,a^{5/2}\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(c+d\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(c+d\,x)}+a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}\right]+\right.$$
$$4\,i\,a^{5/2}\,\text{Log}\left[a+a\,e^{2\,i\,(c+d\,x)}+2\,b\,e^{2\,i\,(c+d\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(c+d\,x)}+a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}\right]-$$
$$15\,a^2\,\sqrt{b}\,\text{Log}\left[\frac{-4\,\sqrt{b}\,d\,\left(-1+e^{2\,i\,(c+d\,x)}\right)+4\,i\,d\,\sqrt{4\,b\,e^{2\,i\,(c+d\,x)}+a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}}{b\,\left(15\,a^2+10\,a\,b+3\,b^2\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right]-$$
$$10\,a\,b^{3/2}\,\text{Log}\left[\frac{-4\,\sqrt{b}\,d\,\left(-1+e^{2\,i\,(c+d\,x)}\right)+4\,i\,d\,\sqrt{4\,b\,e^{2\,i\,(c+d\,x)}+a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}}{b\,\left(15\,a^2+10\,a\,b+3\,b^2\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right]-$$
$$\left.\left.3\,b^{5/2}\,\text{Log}\left[\frac{-4\,\sqrt{b}\,d\,\left(-1+e^{2\,i\,(c+d\,x)}\right)+4\,i\,d\,\sqrt{4\,b\,e^{2\,i\,(c+d\,x)}+a\,\left(1+e^{2\,i\,(c+d\,x)}\right)^2}}{b\,\left(15\,a^2+10\,a\,b+3\,b^2\right)\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right]\right)\right)\,\left(a+b\,\text{Sec}[c+d\,x]^2\right)^{5/2}$$

- **Problem 255: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\left(1+\text{Sec}[x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 42 leaves, 6 steps):

$$2\,\text{ArcSinh}\left[\frac{\text{Tan}[x]}{\sqrt{2}}\right]+\text{ArcTan}\left[\frac{\text{Tan}[x]}{\sqrt{2+\text{Tan}[x]^2}}\right]+\frac{1}{2}\,\text{Tan}[x]\,\sqrt{2+\text{Tan}[x]^2}$$

Result (type 3, 109 leaves):

$$\frac{1}{(3+\text{Cos}[2\,x])^{3/2}}\left(1+\text{Cos}[x]^2\right)\,\text{Sec}[x]\,\sqrt{1+\text{Sec}[x]^2}$$
$$\left(4\,\sqrt{2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\text{Sin}[x]}{\sqrt{3+\text{Cos}[2\,x]}}\right]\,\text{Cos}[x]^2-2\,i\,\sqrt{2}\,\text{Cos}[x]^2\,\text{Log}\left[\sqrt{3+\text{Cos}[2\,x]}+i\,\sqrt{2}\,\text{Sin}[x]\right]+\sqrt{3+\text{Cos}[2\,x]}\,\text{Sin}[x]\right)$$

- **Problem 256: Result more than twice size of optimal antiderivative.**

$$\int\sqrt{1+\text{Sec}[x]^2}\,dx$$

Optimal (type 3, 24 leaves, 5 steps):

$$\text{ArcSinh}\left[\frac{\text{Tan}[x]}{\sqrt{2}}\right]+\text{ArcTan}\left[\frac{\text{Tan}[x]}{\sqrt{2+\text{Tan}[x]^2}}\right]$$

Result (type 3, 57 leaves):

$$\frac{\sqrt{2}\,\left(\text{ArcSin}\left[\frac{\text{Sin}[x]}{\sqrt{2}}\right]+\text{ArcTanh}\left[\frac{\sqrt{2}\,\text{Sin}[x]}{\sqrt{3+\text{Cos}[2\,x]}}\right]\right)\,\text{Cos}[x]\,\sqrt{1+\text{Sec}[x]^2}}{\sqrt{3+\text{Cos}[2\,x]}}$$

- **Problem 257: Unable to integrate problem.**

$$\int\frac{\text{Sec}[e+f\,x]^5}{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 4, 330 leaves, 10 steps):

$$\frac{2\,(a-b)\,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f\,x]],\,\frac{a}{a+b}\right]\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}{3\,b^2\,f\,\sqrt{\text{Cos}[e+f\,x]^2}\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}\,\sqrt{1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}}}-\frac{(a-2\,b)\,\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f\,x]],\,\frac{a}{a+b}\right]\,\sqrt{1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}}}{3\,b\,f\,\sqrt{\text{Cos}[e+f\,x]^2}\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}}-$$
$$\frac{2\,(a-b)\,\text{Sec}[e+f\,x]\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\,\text{Tan}[e+f\,x]}{3\,b^2\,f\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}}+\frac{\text{Sec}[e+f\,x]^3\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\,\text{Tan}[e+f\,x]}{3\,b\,f\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Sec}[e+f x]^5}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 258: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 4, 170 leaves, 7 steps):

$$-\frac{\sqrt{a}\,\sqrt{a+b}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\right],\frac{a+b}{a}\right]\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}{b f \sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}+\frac{\text{Sec}[e+f x]\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)\text{Tan}[e+f x]}{b f \sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Sec}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 260: Unable to integrate problem.

$$\int \frac{\text{Cos}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 4, 105 leaves, 5 steps):

$$\frac{\sqrt{a+b}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\right],\frac{a+b}{a}\right]\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}{\sqrt{a}\,f \sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Cos}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 261: Unable to integrate problem.

$$\int \frac{\text{Cos}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 4, 255 leaves, 9 steps):

$$\frac{\text{Sin}[e+f x]\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{3\,a\,f\,\sqrt{\text{Sec}[e+f x]^2}\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+\frac{2\,(a-b)\,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{3\,a^2\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2\left(a+b-a\,\text{Sin}[e+f x]^2\right)}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}-$$

$$\frac{(a-2\,b)\,b\,\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}{3\,a^2\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 27 leaves) :

$$\int\frac{\text{Cos}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 262: Unable to integrate problem.

$$\int\frac{\text{Cos}[e+f x]^5}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 4, 345 leaves, 10 steps) :

$$\frac{4\,(a-b)\,\text{Sin}[e+f x]\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{15\,a^2\,f\,\sqrt{\text{Sec}[e+f x]^2}\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+\frac{\text{Cos}[e+f x]^2\,\text{Sin}[e+f x]\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{5\,a\,f\,\sqrt{\text{Sec}[e+f x]^2}\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+$$

$$\frac{\left(8\,a^2-7\,a\,b+8\,b^2\right)\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{15\,a^3\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2\left(a+b-a\,\text{Sin}[e+f x]^2\right)}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}-$$

$$\frac{b\left(4\,a^2-3\,a\,b+8\,b^2\right)\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}{15\,a^3\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2\left(a+b-a\,\text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 27 leaves) :

$$\int\frac{\text{Cos}[e+f x]^5}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 263: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Sec}[e+f x]^6}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 137 leaves, 5 steps) :

$$\frac{\left(3 a^2-2 a b+3 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{8 b^{5/2} f}-\frac{3 (a-b) \text{Tan}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{8 b^2 f}+\frac{\text{Sec}[e+f x]^2 \text{Tan}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{4 b f}$$

Result (type 3, 326 leaves):

$$\left(e^{i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \sqrt{a+2 b+a \text{Cos}[2 e+2 f x]}\right.$$

$$\left(-\frac{i \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) \left(-3 a \left(1+e^{2 i (e+f x)}\right)^2+b \left(3+14 e^{2 i (e+f x)}+3 e^{4 i (e+f x)}\right)\right)}{\left(1+e^{2 i (e+f x)}\right)^4}-\right.$$

$$\left.\left.\frac{\left(3 a^2-2 a b+3 b^2\right) \text{Log}\left[\frac{-4 \sqrt{b} \left(-1+e^{2 i (e+f x)}\right) f+4 i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2} f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}}\right) \text{Sec}[e+f x]\right) \Big/ \left(8 \sqrt{2} b^{5/2} f \sqrt{a+b \text{Sec}[e+f x]^2}\right)$$

- **Problem 264: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Sec}[e+f x]^4}{\sqrt{a+b \text{Sec}[e+f x]^2}}\, dx$$

Optimal (type 3, 81 leaves, 4 steps):

$$-\frac{(a-b) \text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{2 b^{3/2} f}+\frac{\text{Tan}[e+f x] \sqrt{a+b+b \text{Tan}[e+f x]^2}}{2 b f}$$

Result (type 3, 266 leaves):

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\ \sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\right.$$

$$\left.\left(-\frac{i\sqrt{b}\left(-1+e^{2i(e+fx)}\right)}{\left(1+e^{2i(e+fx)}\right)^2}+\frac{(a-b)\,\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\ f}{1+e^{2i(e+fx)}}\right]}{\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)\text{Sec}[e+fx]\right)\Bigg/\left(2\sqrt{2}\ b^{3/2}\ f\sqrt{a+b\,\text{Sec}[e+fx]^2}\right)$$

- **Problem 265: Unable to integrate problem.**

$$\int\frac{\text{Sec}[e+fx]^2}{\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,dx$$

Optimal (type 3, 39 leaves, 3 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{b}\ \text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{\sqrt{b}\ f}$$

Result (type 8, 27 leaves):

$$\int\frac{\text{Sec}[e+fx]^2}{\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,dx$$

- **Problem 266: Unable to integrate problem.**

$$\int\frac{1}{\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,dx$$

Optimal (type 3, 39 leaves, 3 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{\sqrt{a}\ f}$$

Result (type 8, 18 leaves):

$$\int\frac{1}{\sqrt{a+b\,\text{Sec}[e+fx]^2}}\,dx$$

- **Problem 267: Unable to integrate problem.**

$$\int \frac{\cos[e+f x]^2}{\sqrt{a+b \sec[e+f x]^2}} \, dx$$

Optimal (type 3, 87 leaves, 4 steps):

$$\frac{(a-b) \operatorname{ArcTan}\left[\frac{\sqrt{a} \tan[e+f x]}{\sqrt{a+b+b \tan[e+f x]^2}}\right]}{2 a^{3/2} f}+\frac{\cos[e+f x] \sin[e+f x] \sqrt{a+b+b \tan[e+f x]^2}}{2 a f}$$

Result (type 8, 27 leaves):

$$\int \frac{\cos[e+f x]^2}{\sqrt{a+b \sec[e+f x]^2}} \, dx$$

- **Problem 268: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\cos[e+f x]^4}{\sqrt{a+b \sec[e+f x]^2}} \, dx$$

Optimal (type 3, 143 leaves, 6 steps):

$$\frac{\left(3 a^2-2 a b+3 b^2\right) \operatorname{ArcTan}\left[\frac{\sqrt{a} \tan[e+f x]}{\sqrt{a+b+b \tan[e+f x]^2}}\right]}{8 a^{5/2} f}+$$
$$\frac{3 (a-b) \cos[e+f x] \sin[e+f x] \sqrt{a+b+b \tan[e+f x]^2}}{8 a^2 f}+\frac{\cos[e+f x]^3 \sin[e+f x] \sqrt{a+b+b \tan[e+f x]^2}}{4 a f}$$

Result (type 6, 1840 leaves):

$$\left(3 (a+b) \operatorname{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\sin[e+f x]^2,\frac{a \sin[e+f x]^2}{a+b}\right] \cos[e+f x]^8 \sin[e+f x]\right) \Big/$$
$$\left(f \sqrt{a+2 b+a \cos[2 (e+f x)]} \sqrt{a+b \sec[e+f x]^2} \left(3 (a+b) \operatorname{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\sin[e+f x]^2,\frac{a \sin[e+f x]^2}{a+b}\right]+\right.\right.$$
$$\left(a \operatorname{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\sin[e+f x]^2,\frac{a \sin[e+f x]^2}{a+b}\right]-4 (a+b) \operatorname{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\sin[e+f x]^2,\frac{a \sin[e+f x]^2}{a+b}\right]\right)$$

$$\text{Sin}[e+f x]^2\Bigg)\Bigg/\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^5\right)\Bigg/\right.$$

$$\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\,\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)-$$

$$\left(12\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]^2\right)\Bigg/\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{Cos}[e+f x]^4\,\text{Sin}[e+f x]\left(\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)\right)\Bigg/$$

$$\left(f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\,\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^4\,\text{Sin}[e+f x]\right.$$

$$\left(2\,f\left(a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\right.$$

$$\text{Cos}[e+f x]\,\text{Sin}[e+f x]+3\,(a+b)\,\Bigg(\frac{a\,f\,\text{AppellF1}\Big[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-$$

$$\frac{4}{3}\,f\,\text{AppellF1}\Big[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)+$$

$$\text{Sin}[e+f x]^2\,\Bigg(a\,\Bigg(\frac{9\,a\,f\,\text{AppellF1}\Big[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-$$

$$\frac{12}{5}\,f\,\text{AppellF1}\Big[\frac{5}{2},-1,\frac{3}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)-$$

$$4\,(a+b)\,\Bigg(\frac{3\,a\,f\,\text{AppellF1}\Big[\frac{5}{2},-1,\frac{3}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-\frac{1}{8\,a^3}9\,(a+b)^3\,f\,\text{Cot}[e+f x]$$

$$\text{Csc}[e+f x]^4\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}\,\Bigg(-\frac{2\,a\,\text{Sin}[e+f x]^2}{a+b}-\frac{4\,a^2\,\text{Sin}[e+f x]^4}{3\,(a+b)^2}+\frac{2\,\sqrt{a}\,\text{ArcSin}\Big[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\Big]\,\text{Sin}[e+f x]}{\sqrt{a+b}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\,\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+\Bigg(a\,\text{AppellF1}\Big[\frac{3}{2},-2,$$

$$\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-4\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Bigg)\,\text{Sin}[e+f x]^2\Bigg)^2\Bigg)+$$

$$\Bigg(3\,a\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]^4\,\text{Sin}[e+f x]\,\text{Sin}[2\,(e+f x)]\Bigg)\Bigg/$$

$$\Bigg((a+2\,b+a\,\text{Cos}[2\,(e+f x)])^{3/2}$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-2,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+\Bigg(a\,\text{AppellF1}\Big[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-$$

$$4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Sin}[e+f x]^2\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 269: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[e+f x]^6}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 204 leaves, 7 steps):

$$\frac{(a-b)\,\left(5 a^2+2 a b+5 b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{16\,a^{7/2}\,f}+\frac{\left(15 a^2-14 a b+15 b^2\right)\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{48\,a^3\,f}+$$

$$\frac{5\,(a-b)\,\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{24\,a^2\,f}+\frac{\text{Cos}[e+f x]^5\,\text{Sin}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{6\,a\,f}$$

Result (type 6, 1739 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^{12}\,\text{Sin}[e+f x]\right)\Big/$$

$$\Bigg(f\,\sqrt{a+2 b+a\,\text{Cos}[2\,(e+f x)]}\,\sqrt{a+b\,\text{Sec}[e+f x]^2}\,\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+$$

$$\left(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)$$

$$\text{Sin}[e+f x]^2\Bigg)\Bigg(\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^7\Bigg)\Big/$$

$$\Bigg(\sqrt{a+2 b+a\,\text{Cos}[2\,(e+f x)]}\,\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\Bigg(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\right.$$

$$\left.\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\Bigg)\text{Sin}[e+f x]^2\Bigg)\Bigg)-$$

$$\left(18\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^5\,\text{Sin}[e+f x]^2\right)\Big/\Bigg(\sqrt{a+2 b+a\,\text{Cos}[2\,(e+f x)]}$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\Bigg(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-$$

$$6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Sin}[e+f\,x]^2\Bigg)\Bigg)+$$

$$\Bigg(3\,(a+b)\,\text{Cos}[e+f\,x]^6\,\text{Sin}[e+f\,x]\left(\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\left.2\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\Bigg)\Bigg/$$

$$\Bigg(f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\,\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\Bigg(a\,\text{AppellF1}\Big[\frac{3}{2},-3,\frac{3}{2},$$

$$\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\Big]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\Bigg)\text{Sin}[e+f\,x]^2\Bigg)\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^6\,\text{Sin}[e+f\,x]$$

$$\Bigg(2\,f\,\Bigg(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\Bigg)$$

$$\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]+3\,(a+b)\left(\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\left.2\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)+$$

$$\text{Sin}[e+f\,x]^2\,\Bigg(a\left(\frac{9\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-3,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{5\,(a+b)}-\right.$$

$$\left.\frac{18}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{3}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)-$$

$$6\,(a+b)\left(\frac{3\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{3}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{5\,(a+b)}-\right.$$

$$\left.\frac{12}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-1,\frac{1}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(f\sqrt{a+2b+a\,\text{Cos}[2\,(e+f\,x)]}\,\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-3,\right.\right.\right.\right.$$

$$\left.\left.\left.\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\,\text{Sin}[e+f\,x]^2\right)^2\right)+$$

$$\left(3\,a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\,\text{Cos}[e+f\,x]^6\,\text{Sin}[e+f\,x]\,\text{Sin}[2\,(e+f\,x)]\right)\Big/$$

$$\left((a+2b+a\,\text{Cos}[2\,(e+f\,x)])^{3/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{1}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.\left.6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{1}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\,\text{Sin}[e+f\,x]^2\right)\right)\right)\right)$$

- **Problem 270: Unable to integrate problem.**

$$\int\frac{\text{Sec}[e+f\,x]^5}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 4, 289 leaves, 10 steps):

$$\frac{a\,(2\,a+b)\,\text{Sin}[e+f\,x]}{b^2\,(a+b)\,f\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}}-\frac{(2\,a+b)\,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f\,x]],\frac{a}{a+b}\right]\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}{b^2\,(a+b)\,f\,\sqrt{\text{Cos}[e+f\,x]^2}\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}\,\sqrt{1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}}}+$$

$$\frac{\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f\,x]],\frac{a}{a+b}\right]\,\sqrt{1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}}}{b\,f\,\sqrt{\text{Cos}[e+f\,x]^2}\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}}+\frac{\text{Sec}[e+f\,x]\,\text{Tan}[e+f\,x]}{b\,f\,\sqrt{\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)}}$$

Result (type 8, 27 leaves):

$$\int\frac{\text{Sec}[e+f\,x]^5}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

- **Problem 272: Unable to integrate problem.**

$$\int\frac{\text{Sec}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 4, 229 leaves, 9 steps):

$$\frac{\text{Sin}[e+f x]}{(a+b) f \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}} -$$

$$\frac{\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \left(a+b-a \text{Sin}[e+f x]^2\right)}{a (a+b) f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}} + \frac{\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}{a f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Sec}[e+f x]}{\left(a+b \text{Sec}[e+f x]^2\right)^{3/2}} \, dx$$

- **Problem 273: Unable to integrate problem.**

$$\int \frac{\text{Cos}[e+f x]}{\left(a+b \text{Sec}[e+f x]^2\right)^{3/2}} \, dx$$

Optimal (type 4, 240 leaves, 9 steps):

$$-\frac{b \text{Sin}[e+f x]}{a (a+b) f \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}} +$$

$$\frac{(a+2 b) \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \left(a+b-a \text{Sin}[e+f x]^2\right)}{a^2 (a+b) f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}} - \frac{2 b \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}{a^2 f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Cos}[e+f x]}{\left(a+b \text{Sec}[e+f x]^2\right)^{3/2}} \, dx$$

- **Problem 274: Unable to integrate problem.**

$$\int \frac{\text{Cos}[e+f x]^3}{\left(a+b \text{Sec}[e+f x]^2\right)^{3/2}} \, dx$$

Optimal (type 4, 335 leaves, 10 steps):

$$-\frac{b\,\text{Cos}[e+f x]^2\,\text{Sin}[e+f x]}{a\,(a+b)\,f\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+\frac{(a+4 b)\,\text{Sin}[e+f x]\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{3 a^2\,(a+b)\,f\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+$$

$$\frac{\left(2 a^2-3 a b-8 b^2\right)\,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{3 a^3\,(a+b)\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}-$$

$$\frac{(a-8 b)\,b\,\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}{3 a^3\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cos}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Problem 275: Unable to integrate problem.

$$\int \frac{\text{Cos}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 4, 436 leaves, 11 steps) :

$$-\frac{b\,\text{Cos}[e+f x]^4\,\text{Sin}[e+f x]}{a\,(a+b)\,f\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+$$

$$\frac{\left(4 a^2-5 a b-24 b^2\right)\,\text{Sin}[e+f x]\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{15 a^3\,(a+b)\,f\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+\frac{(a+6 b)\,\text{Cos}[e+f x]^2\,\text{Sin}[e+f x]\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{5 a^2\,(a+b)\,f\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}+$$

$$\frac{\left(8 a^3-9 a^2 b+16 a b^2+48 b^3\right)\,\text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}{15 a^4\,(a+b)\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}-$$

$$\frac{4 b\,\left(a^2-2 a b+12 b^2\right)\,\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right]\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}{15 a^4\,f\,\sqrt{\text{Cos}[e+f x]^2}\,\sqrt{\text{Sec}[e+f x]^2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cos}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Problem 276: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 138 leaves, 5 steps):

$$-\frac{(3 a-b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{2 b^{5/2} f}-\frac{a\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{b\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+\frac{(3 a+b)\,\text{Tan}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{2 b^2 (a+b) f}$$

Result (type 3, 375 leaves):

$$\left(e^{i (e+f x)}\sqrt{4 b+a e^{-2 i (e+f x)}\left(1+e^{2 i (e+f x)}\right)^2}\,(a+2 b+a\,\text{Cos}[2 e+2 f x])^{3/2}\right.$$
$$\left(-\frac{i\sqrt{b}\left(-1+e^{2 i (e+f x)}\right)\left(4 b^2 e^{2 i (e+f x)}+3 a^2\left(1+e^{2 i (e+f x)}\right)^2+a b\left(1+6 e^{2 i (e+f x)}+e^{4 i (e+f x)}\right)\right)}{(a+b)\left(1+e^{2 i (e+f x)}\right)^2\left(4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2\right)}+\right.$$
$$\left.\left.\frac{(3 a-b)\,\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2 i (e+f x)}\right) f+4 i\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\,f}{1+e^{2 i (e+f x)}}\right]}{\sqrt{4 b\,e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}}\right)\text{Sec}[e+f x]^3\right)\Bigg/\left(4\sqrt{2}\,b^{5/2} f\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\right)$$

Problem 277: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 77 leaves, 4 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{b^{3/2} f}-\frac{a\,\text{Tan}[e+f x]}{b\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 3, 289 leaves):

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\;(a+2b+a\,\text{Cos}[2e+2fx])^{3/2}\right.$$

$$\left(\frac{i\,a\sqrt{b}\left(-1+e^{2i(e+fx)}\right)}{(a+b)\left(4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)}-\frac{\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f}{1+e^{2i(e+fx)}}\right]}{\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)$$

$$\left.\text{Sec}[e+fx]^3\right)\Big/\left(2\sqrt{2}\,b^{3/2}\,f\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}\right)$$

- **Problem 279: Unable to integrate problem.**

$$\int\frac{1}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 77 leaves, 4 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{a^{3/2}\,f}-\frac{b\,\text{Tan}[e+fx]}{a\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}$$

Result (type 8, 18 leaves):

$$\int\frac{1}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}\,dx$$

- **Problem 280: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[e+fx]^2}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 131 leaves, 6 steps):

$$\frac{(a-3b)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{2\,a^{5/2}\,f}+\frac{\text{Cos}[e+fx]\,\text{Sin}[e+fx]}{2\,a\,f\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}+\frac{b\,(a+3b)\,\text{Tan}[e+fx]}{2\,a^2\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}$$

Result (type 6, 2059 leaves) :

$$\left(3\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^6\,\text{Sin}[e+f x]\right)\Big/$$

$$\Bigg(2\,f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\ \left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}$$

$$\left(a+b-a\,\text{Sin}[e+f x]^2\right)\left(3\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\right.$$

$$\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-4\ (a+b)\ \text{AppellF1}\left[\frac{3}{2},-1,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)$$

$$\left.\text{Sin}[e+f x]^2\right)\left(\left(3\,a\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^5\,\text{Sin}[e+f x]^2\right)\Big/\right.$$

$$\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\ \left(a+b-a\,\text{Sin}[e+f x]^2\right)^2\right.$$

$$\left(3\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\ (a+b)\ \text{AppellF1}\left[\frac{3}{2},-1,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)+$$

$$\left(3\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^5\right)\Big/\left(2\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\ \left(a+b-a\,\text{Sin}[e+f x]^2\right)\right.$$

$$\left(3\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\ (a+b)\ \text{AppellF1}\left[\frac{3}{2},-1,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)-$$

$$\left(6\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^3\,\text{Sin}[e+f x]^2\right)\Big/$$

$$\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f x)]}\ \left(a+b-a\,\text{Sin}[e+f x]^2\right)\left(3\ (a+b)\ \text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-4\ (a+b)\ \text{AppellF1}\left[\frac{3}{2},-1,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)+$$

$$\left(3\ (a+b)\ \text{Cos}[e+f x]^4\,\text{Sin}[e+f x]\left(\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{a+b}-\right.\right.$$

$$\frac{4}{3} f\, \text{AppellF1}\Big[\frac{3}{2}, -1, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]\, \text{Sin}[e+f x]\Big)\Big)\Big/$$

$$\Big(2 f \sqrt{a+2 b+a \text{Cos}[2 (e+f x)]}\, \big(a+b-a\, \text{Sin}[e+f x]^2\big) \Big(3 (a+b)\, \text{AppellF1}\Big[\frac{1}{2}, -2, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] +$$

$$\Big(3 a\, \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] - 4 (a+b)\, \text{AppellF1}\Big[\frac{3}{2}, -1, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big]\Big)$$

$$\text{Sin}[e+f x]^2\Big)\Big) - \Big(3 (a+b)\, \text{AppellF1}\Big[\frac{1}{2}, -2, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]^4\, \text{Sin}[e+f x]$$

$$\Big(2 f \Big(3 a\, \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] - 4 (a+b)\, \text{AppellF1}\Big[\frac{3}{2}, -1, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big]\Big)$$

$$\text{Cos}[e+f x]\, \text{Sin}[e+f x] + 3 (a+b) \Big(\frac{a f\, \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]\, \text{Sin}[e+f x]}{a+b} -$$

$$\frac{4}{3} f\, \text{AppellF1}\Big[\frac{3}{2}, -1, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]\, \text{Sin}[e+f x]\Big) +$$

$$\text{Sin}[e+f x]^2 \Big(3 a \Big(\frac{3 a f\, \text{AppellF1}\Big[\frac{5}{2}, -2, \frac{7}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]\, \text{Sin}[e+f x]}{a+b} -$$

$$\frac{12}{5} f\, \text{AppellF1}\Big[\frac{5}{2}, -1, \frac{5}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]\, \text{Sin}[e+f x]\Big) -$$

$$4 (a+b) \Big(\frac{9 a f\, \text{AppellF1}\Big[\frac{5}{2}, -1, \frac{5}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]\, \text{Sin}[e+f x]}{5 (a+b)} -$$

$$\frac{6}{5} f\, \text{Cos}[e+f x]\, \text{Hypergeometric2F1}\Big[\frac{3}{2}, \frac{5}{2}, \frac{7}{2}, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] \text{Sin}[e+f x]\Big)\Big)\Big)\Big)\Big/ \Big(2 f \sqrt{a+2 b+a \text{Cos}[2 (e+f x)]}$$

$$\big(a+b-a\, \text{Sin}[e+f x]^2\big) \Big(3 (a+b)\, \text{AppellF1}\Big[\frac{1}{2}, -2, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] + \Big(3 a\, \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{5}{2},$$

$$\frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big] - 4 (a+b)\, \text{AppellF1}\Big[\frac{3}{2}, -1, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\, \text{Sin}[e+f x]^2}{a+b}\Big]\Big) \text{Sin}[e+f x]^2\Big)^2\Big) +$$

$$\left(3\,a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\,\text{Sin}[2\,(e+f\,x)]\right)\Big/$$
$$\left(2\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{3/2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\right.$$
$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)$$

Problem 281: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[e+f\,x]^4}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 194 leaves, 7 steps) :

$$\frac{3\left(a^2-2\,a\,b+5\,b^2\right)\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{8\,a^{7/2}\,f}+\frac{(3\,a-5\,b)\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{8\,a^2\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}+$$
$$\frac{\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]}{4\,a\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}+\frac{(a-3\,b)\,b\,(3\,a+5\,b)\,\text{Tan}[e+f\,x]}{8\,a^3\,(a+b)\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 6, 2046 leaves) :

$$\left((a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^{10}\,\text{Sin}[e+f\,x]\right)\Big/$$
$$\left(2\,f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\right.$$
$$\left((a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.\left.2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)$$
$$\left(\left(a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^7\,\text{Sin}[e+f\,x]^2\right)\Big/\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\right.\right.$$
$$\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^2\left((a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\right.\right.\right.$$

$$\text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] - 2 (a+b) \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big]\Big) \text{Sin}[e+f x]^2\Big)\Big) +$$

$$\left((a+b) \text{AppellF1}\Big[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]^7\right) \Big/ \Big(2 \sqrt{a+2 b+a \text{Cos}[2 (e+f x)]} \left(a+b-a \text{Sin}[e+f x]^2\right)$$

$$\Big((a+b) \text{AppellF1}\Big[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] + \Big(a \text{AppellF1}\Big[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] -$$

$$2 (a+b) \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big]\Big) \text{Sin}[e+f x]^2\Big)\Big) -$$

$$\left(3 (a+b) \text{AppellF1}\Big[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]^5 \text{Sin}[e+f x]^2\right) \Big/$$

$$\Big(\sqrt{a+2 b+a \text{Cos}[2 (e+f x)]} \left(a+b-a \text{Sin}[e+f x]^2\right) \Big((a+b) \text{AppellF1}\Big[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] + \Big(a \text{AppellF1}\Big[\frac{3}{2},$$

$$-3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] - 2 (a+b) \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big]\Big) \text{Sin}[e+f x]^2\Big)\Big) +$$

$$\Big((a+b) \text{Cos}[e+f x]^6 \text{Sin}[e+f x] \Big(\frac{a f \text{AppellF1}\Big[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x] \text{Sin}[e+f x]}{a+b} -$$

$$2 f \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x] \text{Sin}[e+f x]\Big)\Big) \Big/$$

$$\Big(2 f \sqrt{a+2 b+a \text{Cos}[2 (e+f x)]} \left(a+b-a \text{Sin}[e+f x]^2\right) \Big((a+b) \text{AppellF1}\Big[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] +$$

$$\Big(a \text{AppellF1}\Big[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] - 2 (a+b) \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big]\Big)$$

$$\text{Sin}[e+f x]^2\Big)\Big) - \Big((a+b) \text{AppellF1}\Big[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x]^6 \text{Sin}[e+f x]$$

$$\Big(2 f \Big(a \text{AppellF1}\Big[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] - 2 (a+b) \text{AppellF1}\Big[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big]\Big)$$

$$\text{Cos}[e+f x] \text{Sin}[e+f x] + (a+b) \Big(\frac{a f \text{AppellF1}\Big[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a \text{Sin}[e+f x]^2}{a+b}\Big] \text{Cos}[e+f x] \text{Sin}[e+f x]}{a+b} -$$

$$2\, f\, \text{AppellF1}\left[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]\, \text{Sin}[e+f x]\Bigg) +$$

$$\text{Sin}[e+f x]^2 \left(a \left(\frac{3\, a\, f\, \text{AppellF1}\left[\frac{5}{2}, -3, \frac{7}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]\, \text{Sin}[e+f x]}{a+b} -\right.\right.$$

$$\left.\frac{18}{5} f\, \text{AppellF1}\left[\frac{5}{2}, -2, \frac{5}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]\, \text{Sin}[e+f x]\right) -$$

$$2\,(a+b) \left(\frac{9\, a\, f\, \text{AppellF1}\left[\frac{5}{2}, -2, \frac{5}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]\, \text{Sin}[e+f x]}{5\,(a+b)} -\right.$$

$$\left.\left.\left.\left.\left.\frac{12}{5} f\, \text{AppellF1}\left[\frac{5}{2}, -1, \frac{3}{2}, \frac{7}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]\, \text{Sin}[e+f x]\right)\right)\right)\right)\right) \Big/ \left(2\, f\, \sqrt{a+2\, b+a\, \text{Cos}[2\,(e+f x)]}\right.$$

$$\left(a+b-a\,\text{Sin}[e+f x]^2\right) \left((a+b)\, \text{AppellF1}\left[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] + \left(a\, \text{AppellF1}\left[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2},\right.\right.\right.$$

$$\left.\left.\left.\text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] - 2\,(a+b)\, \text{AppellF1}\left[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)^2\right) +$$

$$\left(a\,(a+b)\, \text{AppellF1}\left[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^6\, \text{Sin}[e+f x]\, \text{Sin}[2\,(e+f x)]\right) \Big/$$

$$\left(2\,(a+2\, b+a\, \text{Cos}[2\,(e+f x)])^{3/2} \left(a+b-a\,\text{Sin}[e+f x]^2\right)\right.$$

$$\left((a+b)\, \text{AppellF1}\left[\frac{1}{2}, -3, \frac{3}{2}, \frac{3}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] + \left(a\, \text{AppellF1}\left[\frac{3}{2}, -3, \frac{5}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] -\right.\right.$$

$$\left.\left.\left.2\,(a+b)\, \text{AppellF1}\left[\frac{3}{2}, -2, \frac{3}{2}, \frac{5}{2}, \text{Sin}[e+f x]^2, \frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)\right)$$

- **Problem 282: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\, dx$$

Optimal (type 3, 271 leaves, 8 steps) :

$$\frac{\left(5 a^3-9 a^2 b+15 a b^2-35 b^3\right) \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{16 a^{9/2} f}+\frac{\left(15 a^2-22 a b+35 b^2\right) \text{Cos}[e+f x]\ \text{Sin}[e+f x]}{48 a^3 f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+$$

$$\frac{(5 a-7 b) \text{Cos}[e+f x]^3 \text{Sin}[e+f x]}{24 a^2 f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+\frac{\text{Cos}[e+f x]^5 \text{Sin}[e+f x]}{6 a f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+\frac{b \left(15 a^3-17 a^2 b+25 a b^2+105 b^3\right) \text{Tan}[e+f x]}{48 a^4 (a+b) f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 6, 2068 leaves) :

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^{14} \text{Sin}[e+f x]\right)\Big/$$

$$\left(2 f \sqrt{a+2 b+a\,\text{Cos}[2 (e+f x)]}\ \left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\right.$$

$$\left(a+b-a\,\text{Sin}[e+f x]^2\right) \left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\right.$$

$$\left(3 a\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-8 (a+b) \text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)$$

$$\left.\text{Sin}[e+f x]^2\right) \left(\left(3 a (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^9 \text{Sin}[e+f x]^2\right)\Big/\right.$$

$$\left(\sqrt{a+2 b+a\,\text{Cos}[2 (e+f x)]}\ \left(a+b-a\,\text{Sin}[e+f x]^2\right)^2\right.$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(3 a\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.8 (a+b) \text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)\right)+$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^9\right)\Big/\left(2 \sqrt{a+2 b+a\,\text{Cos}[2 (e+f x)]}\ \left(a+b-a\,\text{Sin}[e+f x]^2\right)\right.$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(3 a\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.8 (a+b) \text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)\right)-$$

$$\left(12 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^7 \text{Sin}[e+f x]^2\right)\Big/$$

$$\left(\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\;\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-8\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{Cos}[e+f\,x]^8\,\text{Sin}[e+f\,x]\left(\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{a+b}-\right.\right.$$

$$\left.\left.\frac{8}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\right)\Big/$$

$$\left(2\,f\,\sqrt{a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]}\;\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-8\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)$$

$$\left.\left.\text{Sin}[e+f\,x]^2\right)\right)-\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^8\,\text{Sin}[e+f\,x]\right.$$

$$\left(2\,f\left(3\,a\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-8\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\right.$$

$$\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]+3\,(a+b)\left(\frac{a\,f\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{a+b}-\right.$$

$$\left.\frac{8}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)+$$

$$\text{Sin}[e+f\,x]^2\left(3\,a\left(\frac{3\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-4,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{a+b}-\right.\right.$$

$$\left.\frac{24}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-3,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)-$$

$$8\,(a+b)\left(\frac{9\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-3,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{5\,(a+b)}-\right.$$

$$\left.\left.\left.\left.\left.\frac{18}{5} f \text{AppellF1}\left[\frac{5}{2},-2,\frac{3}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \text{Sin}[e+f x]\right)\right)\right)\right)\right) \Big/ \left(2 f \sqrt{a+2 b+a \text{Cos}[2 (e+f x)]}\right.$$

$$\left(a+b-a \text{Sin}[e+f x]^2\right) \left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+\left(3 a \text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-8 (a+b) \text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)^2\right)+$$

$$\left(3 a (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^8 \text{Sin}[e+f x] \text{Sin}[2 (e+f x)]\right) \Big/$$

$$\left(2 (a+2 b+a \text{Cos}[2 (e+f x)])^{3/2} \left(a+b-a \text{Sin}[e+f x]^2\right)\right.$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-4,\frac{3}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+\left(3 a \text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.\left.8 (a+b) \text{AppellF1}\left[\frac{3}{2},-3,\frac{3}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)\right)\right)$$

Problem 284: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x]^3}{\left(a+b \text{Sec}[e+f x]^2\right)^{5/2}} \, dx$$

Optimal (type 4, 319 leaves, 10 steps):

$$-\frac{(a-b) \text{Sin}[e+f x]}{3 b (a+b)^2 f \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}+\frac{\text{Sin}[e+f x]}{3 (a+b) f \left(a+b-a \text{Sin}[e+f x]^2\right) \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}+$$

$$\frac{(a-b) \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right] \left(a+b-a \text{Sin}[e+f x]^2\right)}{3 a b (a+b)^2 f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}+$$

$$\frac{\text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]],\frac{a}{a+b}\right] \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}{3 a (a+b) f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2 \left(a+b-a \text{Sin}[e+f x]^2\right)}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Sec}[e+f x]^3}{\left(a+b \text{Sec}[e+f x]^2\right)^{5/2}} \, dx$$

Problem 285: Unable to integrate problem.

$$\int \frac{\mathrm{Sec}[e+f x]}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 4, 327 leaves, 10 steps):

$$\frac{2\,(2 a+b)\,\mathrm{Sin}[e+f x]}{3 a\,(a+b)^2 f \sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}}-\frac{b\,\mathrm{Sin}[e+f x]}{3 a\,(a+b)\,f\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)\sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}}-$$

$$\frac{2\,(2 a+b)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}[\mathrm{Sin}[e+f x]],\frac{a}{a+b}\right]\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}{3 a^2\,(a+b)^2 f \sqrt{\mathrm{Cos}[e+f x]^2}\,\sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f x]^2}{a+b}}}+$$

$$\frac{(3 a+2 b)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}[\mathrm{Sin}[e+f x]],\frac{a}{a+b}\right]\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f x]^2}{a+b}}}{3 a^2\,(a+b)\,f \sqrt{\mathrm{Cos}[e+f x]^2}\,\sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}}$$

Result (type 8, 25 leaves):

$$\int \frac{\mathrm{Sec}[e+f x]}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Problem 286: Unable to integrate problem.

$$\int \frac{\mathrm{Cos}[e+f x]}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 4, 349 leaves, 10 steps):

$$-\frac{2 b\,(3 a+2 b)\,\mathrm{Sin}[e+f x]}{3 a^2\,(a+b)^2 f \sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}}-\frac{b\,\mathrm{Cos}[e+f x]^2\,\mathrm{Sin}[e+f x]}{3 a\,(a+b)\,f\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)\sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}}+$$

$$\frac{\left(3 a^2+13 a b+8 b^2\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}[\mathrm{Sin}[e+f x]],\frac{a}{a+b}\right]\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}{3 a^3\,(a+b)^2 f \sqrt{\mathrm{Cos}[e+f x]^2}\,\sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f x]^2}{a+b}}}-$$

$$\frac{b\,(9 a+8 b)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}[\mathrm{Sin}[e+f x]],\frac{a}{a+b}\right]\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f x]^2}{a+b}}}{3 a^3\,(a+b)\,f \sqrt{\mathrm{Cos}[e+f x]^2}\,\sqrt{\mathrm{Sec}[e+f x]^2\,\left(a+b-a\,\mathrm{Sin}[e+f x]^2\right)}}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Cos}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

- **Problem 287: Unable to integrate problem.**

$$\int \frac{\text{Cos}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 4, 441 leaves, 11 steps):

$$-\frac{2 b (4 a+3 b) \text{Cos}[e+f x]^2 \text{Sin}[e+f x]}{3 a^2 (a+b)^2 f \sqrt{\text{Sec}[e+f x]^2} \left(a+b-a \text{Sin}[e+f x]^2\right)}-\frac{b \text{Cos}[e+f x]^4 \text{Sin}[e+f x]}{3 a (a+b) f \left(a+b-a \text{Sin}[e+f x]^2\right) \sqrt{\text{Sec}[e+f x]^2} \left(a+b-a \text{Sin}[e+f x]^2\right)}+\frac{\left(a^2+11 a b+8 b^2\right) \text{Sin}[e+f x] \left(a+b-a \text{Sin}[e+f x]^2\right)}{3 a^3 (a+b)^2 f \sqrt{\text{Sec}[e+f x]^2} \left(a+b-a \text{Sin}[e+f x]^2\right)}+$$

$$\frac{2 (a+2 b) \left(a^2-4 a b-4 b^2\right) \text{EllipticE}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \left(a+b-a \text{Sin}[e+f x]^2\right)}{3 a^4 (a+b)^2 f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2} \left(a+b-a \text{Sin}[e+f x]^2\right) \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}-$$

$$\frac{b \left(a^2-16 a b-16 b^2\right) \text{EllipticF}\left[\text{ArcSin}[\text{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{1-\frac{a \text{Sin}[e+f x]^2}{a+b}}}{3 a^4 (a+b) f \sqrt{\text{Cos}[e+f x]^2} \sqrt{\text{Sec}[e+f x]^2} \left(a+b-a \text{Sin}[e+f x]^2\right)}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cos}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

- **Problem 288: Unable to integrate problem.**

$$\int \frac{\text{Cos}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 4, 559 leaves, 12 steps):

$$-\frac{2 b (5 a+4 b) \operatorname{Cos}[e+f x]^4 \operatorname{Sin}[e+f x]}{3 a^2 (a+b)^2 f \sqrt{\operatorname{Sec}[e+f x]^2 \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}}-\frac{b \operatorname{Cos}[e+f x]^6 \operatorname{Sin}[e+f x]}{3 a (a+b) f \left(a+b-a \operatorname{Sin}[e+f x]^2\right) \sqrt{\operatorname{Sec}[e+f x]^2 \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}}+$$

$$\frac{2 \left(2 a^3-3 a^2 b-42 a b^2-32 b^3\right) \operatorname{Sin}[e+f x] \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}{15 a^4 (a+b)^2 f \sqrt{\operatorname{Sec}[e+f x]^2 \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}}+\frac{\left(3 a^2+61 a b+48 b^2\right) \operatorname{Cos}[e+f x]^2 \operatorname{Sin}[e+f x] \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}{15 a^3 (a+b)^2 f \sqrt{\operatorname{Sec}[e+f x]^2 \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}}+$$

$$\left(\left(8 a^4-11 a^3 b+27 a^2 b^2+184 a b^3+128 b^4\right) \operatorname{EllipticE}\left[\operatorname{ArcSin}[\operatorname{Sin}[e+f x]], \frac{a}{a+b}\right] \left(a+b-a \operatorname{Sin}[e+f x]^2\right)\right) \Big/$$

$$\left(15 a^5 (a+b)^2 f \sqrt{\operatorname{Cos}[e+f x]^2} \sqrt{\operatorname{Sec}[e+f x]^2 \left(a+b-a \operatorname{Sin}[e+f x]^2\right)} \sqrt{1-\frac{a \operatorname{Sin}[e+f x]^2}{a+b}}\right)-$$

$$\frac{b \left(4 a^3-9 a^2 b+120 a b^2+128 b^3\right) \operatorname{EllipticF}\left[\operatorname{ArcSin}[\operatorname{Sin}[e+f x]], \frac{a}{a+b}\right] \sqrt{1-\frac{a \operatorname{Sin}[e+f x]^2}{a+b}}}{15 a^5 (a+b) f \sqrt{\operatorname{Cos}[e+f x]^2} \sqrt{\operatorname{Sec}[e+f x]^2 \left(a+b-a \operatorname{Sin}[e+f x]^2\right)}}$$

Result (type 8, 27 leaves) :

$$\int \frac{\operatorname{Cos}[e+f x]^5}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^{5/2}} \, dx$$

Problem 289: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Sec}[e+f x]^6}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^{5/2}} \, dx$$

Optimal (type 3, 133 leaves, 5 steps) :

$$\frac{\operatorname{ArcTanh}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}\right]}{b^{5/2} f}-\frac{a \operatorname{Sec}[e+f x]^2 \operatorname{Tan}[e+f x]}{3 b (a+b) f \left(a+b+b \operatorname{Tan}[e+f x]^2\right)^{3/2}}-\frac{a (3 a+5 b) \operatorname{Tan}[e+f x]}{3 b^2 (a+b)^2 f \sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}$$

Result (type 3, 357 leaves) :

$$\left(e^{i(e+fx)}\sqrt{4b+a e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,(a+2b+a\,\text{Cos}[2e+2fx])^{5/2}\right.$$

$$\left(\frac{i a\sqrt{b}\left(-1+e^{2i(e+fx)}\right)\left(24b^2 e^{2i(e+fx)}+3a^2\left(1+e^{2i(e+fx)}\right)^2+a b\left(5+26 e^{2i(e+fx)}+5 e^{4i(e+fx)}\right)\right)}{(a+b)^2\left(4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^2}-\right.$$

$$\left.\left.\frac{3\,\text{Log}\left[\frac{-4\sqrt{b}\left(-1+e^{2i(e+fx)}\right)f+4i\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\,f}{1+e^{2i(e+fx)}}\right]}{\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right)\text{Sec}[e+fx]^5\right)\Big/\left(12\sqrt{2}\,b^{5/2}f\left(a+b\,\text{Sec}[e+fx]^2\right)^{5/2}\right)$$

- **Problem 292: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{1}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 125 leaves, 6 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{a^{5/2}f}-\frac{b\,\text{Tan}[e+fx]}{3a(a+b)f\left(a+b+b\,\text{Tan}[e+fx]^2\right)^{3/2}}-\frac{b(5a+3b)\,\text{Tan}[e+fx]}{3a^2(a+b)^2 f\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}$$

Result (type 6, 1927 leaves):

$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+fx]^2,\frac{a\,\text{Sin}[e+fx]^2}{a+b}\right]\text{Cos}[e+fx]^4\,\text{Sin}[e+fx]\right)\Big/$$

$$\left(4\sqrt{2}\,f\left(a+b\,\text{Sec}[e+fx]^2\right)^{5/2}\left(a+b-a\,\text{Sin}[e+fx]^2\right)^{5/2}\right.$$

$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+fx]^2,\frac{a\,\text{Sin}[e+fx]^2}{a+b}\right]+\left(5a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+fx]^2,\frac{a\,\text{Sin}[e+fx]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.4(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+fx]^2,\frac{a\,\text{Sin}[e+fx]^2}{a+b}\right]\right)\text{Sin}[e+fx]^2\right)$$

$$\left(\left(15\,a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\,\text{Sin}[e+f\,x]^2\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{7/2}\right.\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]^2\right)\Big/\left(\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\right)\Big/$$

$$\left(4\sqrt{2}\,f\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^4\,\text{Sin}[e+f x]\right)$$

$$\left(2\,f\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\right.$$

$$\text{Cos}[e+f x]\,\text{Sin}[e+f x]+3\,(a+b)\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)+$$

$$\text{Sin}[e+f x]^2\left(5\,a\left(\frac{21\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{9}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-\right.\right.$$

$$\left.\frac{12}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-1,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)-$$

$$4\,(a+b)\left(\frac{3\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-1,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{a+b}-\right.$$

$$\left(6\,(a+b)^3\,f\,\text{Cot}[e+f x]\,\text{Csc}[e+f x]^4\left(-1+\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right)^2\left(\frac{\sqrt{a}\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[e+f x]}{\sqrt{a+b}}\right]\text{Sin}[e+f x]}{\sqrt{a+b}\,\sqrt{1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}}}+\right.\right.$$

$$\left.\left.\left.\left.\left.\frac{a^2 \text{Sin}[e+f x]^4}{3 (a+b)^2 \left(-1+\frac{a \text{Sin}[e+f x]^2}{a+b}\right)^2}+\frac{a \text{Sin}[e+f x]^2}{(a+b) \left(-1+\frac{a \text{Sin}[e+f x]^2}{a+b}\right)}\right)\right)\middle/\left(a^3 \left(1-\frac{a \text{Sin}[e+f x]^2}{a+b}\right)^{3/2}\right)\right)\right)\right)\Big/$$

$$\left(4 \sqrt{2} f \left(a+b-a \text{Sin}[e+f x]^2\right)^{5/2} \left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+\left(5 a \text{AppellF1}\left[\frac{3}{2},-2,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-4 (a+b) \text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)^2\right)\right)$$

- **Problem 293: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[e+f x]^2}{\left(a+b \text{Sec}[e+f x]^2\right)^{5/2}} \, dx$$

Optimal (type 3, 187 leaves, 7 steps):

$$\frac{(a-5 b) \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{2 a^{7/2} f}+\frac{\text{Cos}[e+f x] \text{Sin}[e+f x]}{2 a f \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}+$$

$$\frac{b (3 a+5 b) \text{Tan}[e+f x]}{6 a^2 (a+b) f \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}+\frac{b \left(3 a^2+22 a b+15 b^2\right) \text{Tan}[e+f x]}{6 a^3 (a+b)^2 f \sqrt{a+b+b \text{Tan}[e+f x]^2}}$$

Result (type 6, 1775 leaves):

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^8 \text{Sin}[e+f x]\right)\Big/$$

$$\left(4 \sqrt{2} f \left(a+b \text{Sec}[e+f x]^2\right)^{5/2} \left(a+b-a \text{Sin}[e+f x]^2\right)^{5/2}\right.$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+\left(5 a \text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.6 (a+b) \text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\right) \text{Sin}[e+f x]^2\right)$$

$$\left(\left(15 a (a+b) \text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^7 \text{Sin}[e+f x]^2\right)\middle/\left(4 \sqrt{2} \left(a+b-a \text{Sin}[e+f x]^2\right)^{7/2}\right.\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\Bigg)+$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^7\right)\Bigg/\left(4\,\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(9\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\,\text{Sin}[e+f\,x]^2\right)\Bigg/$$

$$\left(2\,\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{Cos}[e+f\,x]^6\,\text{Sin}[e+f\,x]\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.2\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\right)\Bigg/$$

$$\left(4\,\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^6\,\text{Sin}[e+f\,x]\right.$$

$$\left(2\,f\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\right.$$

$$\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]+3\,(a+b)\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.$$

$$2\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)+$$

$$\text{Sin}[e+f x]^2\left(5\,a\left(\frac{21\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-3,\frac{9}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-\right.\right.$$

$$\left.\frac{18}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)-$$

$$6\,(a+b)\left(\frac{3\,a\,f\,\text{AppellF1}\left[\frac{5}{2},-2,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{a+b}-\right.$$

$$\left.\left.\left.\left.\left.\frac{12}{5}\,f\,\text{AppellF1}\left[\frac{5}{2},-1,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]\right)\right)\right)\right)\right)\Big/$$

$$\left(4\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)^2\right)\right)$$

- **Problem 294: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cos}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 261 leaves, 8 steps):

$$\frac{\left(3\,a^2-10\,a\,b+35\,b^2\right)\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{8\,a^{9/2}\,f}+\frac{(3\,a-7\,b)\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{8\,a^2\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}+$$

$$\frac{\text{Cos}[e+f x]^3\,\text{Sin}[e+f x]}{4\,a\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}+\frac{b\,\left(9\,a^2-18\,a\,b-35\,b^2\right)\text{Tan}[e+f x]}{24\,a^3\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}+\frac{b\,\left(9\,a^3-15\,a^2\,b-145\,a\,b^2-105\,b^3\right)\text{Tan}[e+f x]}{24\,a^4\,(a+b)^2\,f\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 6, 1777 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]^{12}\,\text{Sin}[e+f x]\right)\Big/$$

$$\left(4\sqrt{2}\ f\ (a+b\,\mathrm{Sec}[e+f\,x]^2)^{5/2}\ (a+b-a\,\mathrm{Sin}[e+f\,x]^2)^{5/2}\right.$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\mathrm{AppellF1}\left[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.8\,(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\right)\mathrm{Sin}[e+f\,x]^2\right)$$

$$\left(\left(15\,a\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]^9\,\mathrm{Sin}[e+f\,x]^2\right)\Big/\left(4\sqrt{2}\ (a+b-a\,\mathrm{Sin}[e+f\,x]^2)^{7/2}\right.\right.$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\mathrm{AppellF1}\left[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.8\,(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\right)\mathrm{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]^9\right)\Big/\left(4\sqrt{2}\ (a+b-a\,\mathrm{Sin}[e+f\,x]^2)^{5/2}\right.$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\mathrm{AppellF1}\left[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.8\,(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\right)\mathrm{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(3\sqrt{2}\ (a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]^7\,\mathrm{Sin}[e+f\,x]^2\right)\Big/$$

$$\left((a+b-a\,\mathrm{Sin}[e+f\,x]^2)^{5/2}\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\mathrm{AppellF1}\left[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\right.\right.\right.\right.$$

$$\left.\left.\left.\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]-8\,(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\right)\mathrm{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\mathrm{Cos}[e+f\,x]^8\,\mathrm{Sin}[e+f\,x]\left(\frac{5\,a\,f\,\mathrm{AppellF1}\left[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{8}{3}\,f\,\mathrm{AppellF1}\left[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]\right)\right)\Big/$$

$$\left(4\sqrt{2}\ f\ (a+b-a\,\mathrm{Sin}[e+f\,x]^2)^{5/2}\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\mathrm{Sin}[e+f\,x]^2,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\mathrm{AppellF1}\left[\frac{3}{2},-4,\right.\right.\right.\right.$$

$$\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-8\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Big)\,\text{Sin}[e+f x]^2\Big)\Big)-$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]^8\,\text{Sin}[e+f x]$$

$$\Big(2\,f\,\Big(5\,a\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-8\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Big)$$

$$\text{Cos}[e+f x]\,\text{Sin}[e+f x]+3\,(a+b)\,\Big(\frac{5\,a\,f\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-$$

$$\frac{8}{3}\,f\,\text{AppellF1}\Big[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)+$$

$$\text{Sin}[e+f x]^2\,\Big(5\,a\,\Big(\frac{21\,a\,f\,\text{AppellF1}\Big[\frac{5}{2},-4,\frac{9}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-$$

$$\frac{24}{5}\,f\,\text{AppellF1}\Big[\frac{5}{2},-3,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)-$$

$$8\,(a+b)\,\Big(\frac{3\,a\,f\,\text{AppellF1}\Big[\frac{5}{2},-3,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{a+b}-$$

$$\frac{18}{5}\,f\,\text{AppellF1}\Big[\frac{5}{2},-2,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(4\,\sqrt{2}\,f\,\big(a+b-a\,\text{Sin}[e+f x]^2\big)^{5/2}\,\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-4,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+\Big(5\,a\,\text{AppellF1}\Big[\frac{3}{2},-4,$$

$$\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-8\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-3,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Big)\,\text{Sin}[e+f x]^2\Big)^2\Big)\Big)\Big)$$

- **Problem 295: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cos}[e+f x]^6}{\big(a+b\,\text{Sec}[e+f x]^2\big)^{5/2}}\,dx$$

Optimal (type 3, 332 leaves, 9 steps):

$$\frac{5 (a-3 b) \left(a^2+7 b^2\right) \text{ArcTan}\left[\frac{\sqrt{a} \text{Tan}[e+f x]}{\sqrt{a+b+b \text{Tan}[e+f x]^2}}\right]}{16 a^{11/2} f}+\frac{\left(5 a^2-10 a b+21 b^2\right) \text{Cos}[e+f x] \text{Sin}[e+f x]}{16 a^3 f \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}+\frac{(5 a-9 b) \text{Cos}[e+f x]^3 \text{Sin}[e+f x]}{24 a^2 f \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}+$$

$$\frac{\text{Cos}[e+f x]^5 \text{Sin}[e+f x]}{6 a f \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}+\frac{b \left(15 a^3-25 a^2 b+49 a b^2+105 b^3\right) \text{Tan}[e+f x]}{48 a^4 (a+b) f \left(a+b+b \text{Tan}[e+f x]^2\right)^{3/2}}+\frac{b \left(15 a^4-20 a^3 b+38 a^2 b^2+420 a b^3+315 b^4\right) \text{Tan}[e+f x]}{48 a^5 (a+b)^2 f \sqrt{a+b+b \text{Tan}[e+f x]^2}}$$

Result (type 6, 1776 leaves) :

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^{16} \text{Sin}[e+f x]\right) \Big/$$

$$\Bigg(4 \sqrt{2} f \left(a+b \text{Sec}[e+f x]^2\right)^{5/2} \left(a+b-a \text{Sin}[e+f x]^2\right)^{5/2}$$

$$\Bigg(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+5 \Bigg(a \text{AppellF1}\left[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-$$

$$2 (a+b) \text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\Bigg) \text{Sin}[e+f x]^2\Bigg)$$

$$\Bigg(\Bigg(15 a (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^{11} \text{Sin}[e+f x]^2\Bigg) \Big/ \Bigg(4 \sqrt{2} \left(a+b-a \text{Sin}[e+f x]^2\right)^{7/2}$$

$$\Bigg(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+5 \Bigg(a \text{AppellF1}\left[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-$$

$$2 (a+b) \text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\Bigg) \text{Sin}[e+f x]^2\Bigg)\Bigg)+$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^{11}\right) \Big/ \Bigg(4 \sqrt{2} \left(a+b-a \text{Sin}[e+f x]^2\right)^{5/2}$$

$$\Bigg(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+5 \Bigg(a \text{AppellF1}\left[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]-$$

$$2 (a+b) \text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]\Bigg) \text{Sin}[e+f x]^2\Bigg)\Bigg)-$$

$$\left(15 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x]^9 \text{Sin}[e+f x]^2\right) \Big/$$

$$\Bigg(2 \sqrt{2} \left(a+b-a \text{Sin}[e+f x]^2\right)^{5/2} \Bigg(3 (a+b) \text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a \text{Sin}[e+f x]^2}{a+b}\right]+5 \Bigg(a \text{AppellF1}\Bigg[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},$$

$$\text{Sin}[e+f x]^2,\ \frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-2\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Big)\,\text{Sin}[e+f x]^2\Big)\Big)+$$

$$\Big(3\,(a+b)\,\text{Cos}[e+f x]^{10}\,\text{Sin}[e+f x]\,\Big(\frac{5\,a\,f\,\text{AppellF1}\big[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-$$

$$\frac{10}{3}\,f\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)\Big)\Big/$$

$$\Big(4\sqrt{2}\,f\,\big(a+b-a\,\text{Sin}[e+f x]^2\big)^{5/2}\,\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+5\,\Big(a\,\text{AppellF1}\Big[\frac{3}{2},-5,$$

$$\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-2\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Big)\,\text{Sin}[e+f x]^2\Big)-$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]^{10}\,\text{Sin}[e+f x]$$

$$\Big(10\,f\,\Big(a\,\text{AppellF1}\Big[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]-2\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Big)$$

$$\text{Cos}[e+f x]\,\text{Sin}[e+f x]+3\,(a+b)\,\Big(\frac{5\,a\,f\,\text{AppellF1}\big[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{3\,(a+b)}-$$

$$\frac{10}{3}\,f\,\text{AppellF1}\Big[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)+$$

$$5\,\text{Sin}[e+f x]^2\,\Big(a\,\Big(\frac{21\,a\,f\,\text{AppellF1}\big[\frac{5}{2},-5,\frac{9}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{5\,(a+b)}-$$

$$6\,f\,\text{AppellF1}\Big[\frac{5}{2},-4,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)-$$

$$2\,(a+b)\,\Big(\frac{3\,a\,f\,\text{AppellF1}\big[\frac{5}{2},-4,\frac{7}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{a+b}-$$

$$\frac{24}{5}\,f\,\text{AppellF1}\Big[\frac{5}{2},-3,\frac{5}{2},\frac{7}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\left(4\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-5,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+5\left(a\,\text{AppellF1}\left[\frac{3}{2},-5,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-4,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)\right)\right)$$

- **Problem 296: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\left(a+b\,\text{Sec}[c+d\,x]^2\right)^{7/2}}\,dx$$

Optimal (type 3, 179 leaves, 7 steps) :

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[c+d\,x]}{\sqrt{a+b+b\,\text{Tan}[c+d\,x]^2}}\right]}{a^{7/2}\,d}-\frac{b\,\text{Tan}[c+d\,x]}{5\,a\,(a+b)\,d\,\left(a+b+b\,\text{Tan}[c+d\,x]^2\right)^{5/2}}-\frac{b\,(9\,a+5\,b)\,\text{Tan}[c+d\,x]}{15\,a^2\,(a+b)^2\,d\,\left(a+b+b\,\text{Tan}[c+d\,x]^2\right)^{3/2}}-\frac{b\,\left(33\,a^2+40\,a\,b+15\,b^2\right)\,\text{Tan}[c+d\,x]}{15\,a^3\,(a+b)^3\,d\,\sqrt{a+b+b\,\text{Tan}[c+d\,x]^2}}$$

Result (type 6, 1777 leaves) :

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{7}{2},\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]\text{Cos}[c+d\,x]^6\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(8\sqrt{2}\,d\,\left(a+b\,\text{Sec}[c+d\,x]^2\right)^{7/2}\left(a+b-a\,\text{Sin}[c+d\,x]^2\right)^{7/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{7}{2},\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]+\left(7\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{9}{2},\frac{5}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]\right)\text{Sin}[c+d\,x]^2\right)$$

$$\left(\left(21\,a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{7}{2},\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]\text{Cos}[c+d\,x]^7\,\text{Sin}[c+d\,x]^2\right)\Big/\left(8\sqrt{2}\,\left(a+b-a\,\text{Sin}[c+d\,x]^2\right)^{9/2}\right.\right.$$

$$\left.\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{7}{2},\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]+\left(7\,a\,\text{AppellF1}\left[\frac{3}{2},-3,\frac{9}{2},\frac{5}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]-6\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]\right)\text{Sin}[c+d\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-3,\frac{7}{2},\frac{3}{2},\text{Sin}[c+d\,x]^2,\frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\right]\text{Cos}[c+d\,x]^7\right)\Big/\left(8\sqrt{2}\,\left(a+b-a\,\text{Sin}[c+d\,x]^2\right)^{7/2}\right.$$

$$\bigg(3\ (a+b)\ \text{AppellF1}\Big[\frac{1}{2},\ -3,\ \frac{7}{2},\ \frac{3}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]+\bigg(7\,a\,\text{AppellF1}\Big[\frac{3}{2},\ -3,\ \frac{9}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]-$$

$$6\ (a+b)\ \text{AppellF1}\Big[\frac{3}{2},\ -2,\ \frac{7}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\bigg)\ \text{Sin}[c+d\,x]^2\bigg)\bigg)-$$

$$\bigg(9\ (a+b)\ \text{AppellF1}\Big[\frac{1}{2},\ -3,\ \frac{7}{2},\ \frac{3}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]^5\ \text{Sin}[c+d\,x]^2\bigg)\Big/$$

$$\bigg(4\sqrt{2}\ \big(a+b-a\,\text{Sin}[c+d\,x]^2\big)^{7/2}\ \bigg(3\ (a+b)\ \text{AppellF1}\Big[\frac{1}{2},\ -3,\ \frac{7}{2},\ \frac{3}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]+\bigg(7\,a\,\text{AppellF1}\Big[\frac{3}{2},\ -3,\ \frac{9}{2},\ \frac{5}{2},$$

$$\text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]-6\ (a+b)\ \text{AppellF1}\Big[\frac{3}{2},\ -2,\ \frac{7}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\bigg)\ \text{Sin}[c+d\,x]^2\bigg)\bigg)+$$

$$\bigg(3\ (a+b)\ \text{Cos}[c+d\,x]^6\ \text{Sin}[c+d\,x]\ \bigg(\frac{7\,a\,d\,\text{AppellF1}\Big[\frac{3}{2},\ -3,\ \frac{9}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]}{3\ (a+b)}-$$

$$2\,d\,\text{AppellF1}\Big[\frac{3}{2},\ -2,\ \frac{7}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]\bigg)\bigg)\Big/$$

$$\bigg(8\sqrt{2}\ d\ \big(a+b-a\,\text{Sin}[c+d\,x]^2\big)^{7/2}\ \bigg(3\ (a+b)\ \text{AppellF1}\Big[\frac{1}{2},\ -3,\ \frac{7}{2},\ \frac{3}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]+\bigg(7\,a\,\text{AppellF1}\Big[\frac{3}{2},\ -3,$$

$$\frac{9}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]-6\ (a+b)\ \text{AppellF1}\Big[\frac{3}{2},\ -2,\ \frac{7}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\bigg)\ \text{Sin}[c+d\,x]^2\bigg)\bigg)-$$

$$\bigg(3\ (a+b)\ \text{AppellF1}\Big[\frac{1}{2},\ -3,\ \frac{7}{2},\ \frac{3}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]^6\ \text{Sin}[c+d\,x]$$

$$\bigg(2\,d\ \bigg(7\,a\,\text{AppellF1}\Big[\frac{3}{2},\ -3,\ \frac{9}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]-6\ (a+b)\ \text{AppellF1}\Big[\frac{3}{2},\ -2,\ \frac{7}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\bigg)$$

$$\text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]+3\ (a+b)\ \bigg(\frac{7\,a\,d\,\text{AppellF1}\Big[\frac{3}{2},\ -3,\ \frac{9}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]}{3\ (a+b)}-$$

$$2\,d\,\text{AppellF1}\Big[\frac{3}{2},\ -2,\ \frac{7}{2},\ \frac{5}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]\bigg)+$$

$$\text{Sin}[c+d\,x]^2\ \bigg(7\,a\ \bigg(\frac{27\,a\,d\,\text{AppellF1}\Big[\frac{5}{2},\ -3,\ \frac{11}{2},\ \frac{7}{2},\ \text{Sin}[c+d\,x]^2,\ \frac{a\,\text{Sin}[c+d\,x]^2}{a+b}\Big]\ \text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]}{5\ (a+b)}-$$

$$\frac{18}{5} d\,\text{AppellF1}\left[\frac{5}{2}, -2, \frac{9}{2}, \frac{7}{2}, \text{Sin}[c+d x]^2, \frac{a\,\text{Sin}[c+d x]^2}{a+b}\right] \text{Cos}[c+d x]\,\text{Sin}[c+d x]\Bigg) -$$

$$6 (a+b) \left(\frac{21\,a\,d\,\text{AppellF1}\left[\frac{5}{2}, -2, \frac{9}{2}, \frac{7}{2}, \text{Sin}[c+d x]^2, \frac{a\,\text{Sin}[c+d x]^2}{a+b}\right] \text{Cos}[c+d x]\,\text{Sin}[c+d x]}{5 (a+b)} -\right.$$

$$\left.\frac{12}{5} d\,\text{AppellF1}\left[\frac{5}{2}, -1, \frac{7}{2}, \frac{7}{2}, \text{Sin}[c+d x]^2, \frac{a\,\text{Sin}[c+d x]^2}{a+b}\right] \text{Cos}[c+d x]\,\text{Sin}[c+d x]\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/$$

$$\Bigg(8 \sqrt{2}\, d \left(a+b-a\,\text{Sin}[c+d x]^2\right)^{7/2} \Bigg(3 (a+b)\,\text{AppellF1}\left[\frac{1}{2}, -3, \frac{7}{2}, \frac{3}{2}, \text{Sin}[c+d x]^2, \frac{a\,\text{Sin}[c+d x]^2}{a+b}\right] + \Bigg(7\,a\,\text{AppellF1}\left[\frac{3}{2}, -3,\right.$$

$$\left.\frac{9}{2}, \frac{5}{2}, \text{Sin}[c+d x]^2, \frac{a\,\text{Sin}[c+d x]^2}{a+b}\right] - 6 (a+b)\,\text{AppellF1}\left[\frac{3}{2}, -2, \frac{7}{2}, \frac{5}{2}, \text{Sin}[c+d x]^2, \frac{a\,\text{Sin}[c+d x]^2}{a+b}\right]\Bigg) \text{Sin}[c+d x]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 297: Result more than twice size of optimal antiderivative.**

$$\int \frac{1}{\sqrt{1+\text{Sec}[x]^2}}\,dx$$

Optimal (type 3, 14 leaves, 3 steps):

$$\text{ArcTan}\left[\frac{\text{Tan}[x]}{\sqrt{2+\text{Tan}[x]^2}}\right]$$

Result (type 3, 47 leaves):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{2}\,\text{Sin}[x]}{\sqrt{3+\text{Cos}[2 x]}}\right] \sqrt{3+\text{Cos}[2 x]}\,\text{Sec}[x]}{\sqrt{2}\,\sqrt{1+\text{Sec}[x]^2}}$$

- **Problem 298: Result more than twice size of optimal antiderivative.**

$$\int (d\,\text{Sec}[e+f x])^m \left(a+b\,\text{Sec}[e+f x]^2\right)^p dx$$

Optimal (type 6, 111 leaves, ? steps):

$$\frac{1}{f m}\text{AppellF1}\left[\frac{m}{2}, \frac{1}{2}, -p, \frac{2+m}{2}, \text{Sec}[e+f x]^2, -\frac{b\,\text{Sec}[e+f x]^2}{a}\right]$$

$$\text{Cot}[e+f x]\,(d\,\text{Sec}[e+f x])^m \left(a+b\,\text{Sec}[e+f x]^2\right)^p \left(1+\frac{b\,\text{Sec}[e+f x]^2}{a}\right)^{-p} \sqrt{-\text{Tan}[e+f x]^2}$$

Result (type 6, 2195 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right.$$

$$\left.(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,(d\,\text{Sec}[e+f\,x])^m\,\left(\text{Sec}[e+f\,x]^2\right)^{-1+\frac{m}{2}+p}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]\right)\Big/$$

$$\left(f\,\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+(a+b)\,(-2+m)\,\text{AppellF1}\left[\frac{3}{2},2-\frac{m}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)$$

$$\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^{\frac{m}{2}+p}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+(a+b)\,(-2+m)\,\text{AppellF1}\left[\frac{3}{2},2-\frac{m}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)-$$

$$\left(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-1+\frac{m}{2}+p}\right.$$

$$\left.\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\right)\Big/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)\,(-2+m)\,\text{AppellF1}\left[\frac{3}{2},2-\frac{m}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)+$$

$$\left(6\,(a+b)\,\left(-1+\frac{m}{2}+p\right)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left.\left(\text{Sec}[e+f\,x]^2\right)^{-1+\frac{m}{2}+p}\,\text{Tan}[e+f\,x]^2\right)\Big/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},1-\frac{m}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+(a+b)\,(-2+m)\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},2-\frac{m}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)+\left(3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left(\text{Sec}[e+f x]^2\right)^{-1+\frac{m}{2}+p} \text{Tan}[e+f x] \left(\frac{2 b p \,\text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x]}{3 (a+b)} -\right.$$

$$\left.\left.\frac{2}{3} \left(1-\frac{m}{2}\right) \text{AppellF1}\left[\frac{3}{2}, 2-\frac{m}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x]\right)\right) \Big/$$

$$\left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2}, 1-\frac{m}{2}, -p, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] + \left(2 b p \,\text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] + (a+b) (-2+m) \,\text{AppellF1}\left[\frac{3}{2}, 2-\frac{m}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right) \text{Tan}[e+f x]^2\right) -$$

$$\left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2}, 1-\frac{m}{2}, -p, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] (a+2 b+a \,\text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{-1+\frac{m}{2}+p}\right.$$

$$\text{Tan}[e+f x] \left(2 \left(2 b p \,\text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] +\right.\right.$$

$$\left.(a+b) (-2+m) \,\text{AppellF1}\left[\frac{3}{2}, 2-\frac{m}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right) \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x] +$$

$$3 (a+b) \left(\frac{2 b p \,\text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x]}{3 (a+b)} -\right.$$

$$\left.\frac{2}{3} \left(1-\frac{m}{2}\right) \text{AppellF1}\left[\frac{3}{2}, 2-\frac{m}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x]\right) +$$

$$\text{Tan}[e+f x]^2 \left(2 b p \left(-\frac{1}{5 (a+b)} 6 b (1-p) \,\text{AppellF1}\left[\frac{5}{2}, 1-\frac{m}{2}, 2-p, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x] -\right.\right.$$

$$\left.\frac{6}{5} \left(1-\frac{m}{2}\right) \text{AppellF1}\left[\frac{5}{2}, 2-\frac{m}{2}, 1-p, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x]\right) +$$

$$(a+b) (-2+m) \left(\frac{1}{5 (a+b)} 6 b p \,\text{AppellF1}\left[\frac{5}{2}, 2-\frac{m}{2}, 1-p, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x] -\right.$$

$$\left.\left.\left.\left.\frac{6}{5} \left(2-\frac{m}{2}\right) \text{AppellF1}\left[\frac{5}{2}, 3-\frac{m}{2}, -p, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \,\text{Tan}[e+f x]\right)\right)\right)\right) \Big/$$

$$\left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2}, 1-\frac{m}{2}, -p, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] + \left(2 b p \,\text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2,\right.\right.\right.$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big] + (a+b)\,(-2+m)\,\text{AppellF1}\Big[\frac{3}{2},\,2-\frac{m}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)^2\Big)\Big)$$

- **Problem 299: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f\,x]^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 103 leaves, 5 steps):

$$\frac{1}{f}\text{AppellF1}\Big[\frac{1}{2},\,2+p,\,-p,\,\frac{3}{2},\,\text{Sin}[e+f\,x]^2,\,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\Big]$$
$$\left(\text{Cos}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\,\left(\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\right)^p\,\left(1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1989 leaves):

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]$$
$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Sec}[e+f\,x]^3\,\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]\Big)\Big/$$
$$\Big(f\,\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+\Big(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,-\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+$$
$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)$$
$$\Big(\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^{\frac{3}{2}+p}\Big)\Big/$$
$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+\Big(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,-\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,$$
$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)-$$
$$\Big(6\,a\,(a+b)\,p\,\text{AppellF1}\Big[\frac{1}{2},\,-\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}$$
$$\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\Big)\Big/\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,-\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+\Big(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,-\frac{1}{2},\,1-p,$$
$$\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)+$$

$$\left(6\,(a+b)\left(\frac{1}{2}+p\right)\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left.\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}\text{Tan}[e+f\,x]^2\right)\bigg/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)+\left(3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}\text{Tan}[e+f\,x]\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}+\right.$$

$$\left.\left.\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\bigg/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^{\frac{1}{2}+p}\right.$$

$$\text{Tan}[e+f\,x]\left(2\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+$$

$$3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}+\right.$$

$$\left.\frac{1}{3}\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\text{Tan}[e+f\,x]^2\left(2\,b\,p\left(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},-\frac{1}{2},2-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+\right.\right.$$

$$\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{1}{2},1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$(a+b)\left(\frac{6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2},1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{5\,(a+b)}-\right.$$

$$\left.\left.\left.\left.\frac{3}{5}\text{AppellF1}\left[\frac{5}{2},\frac{3}{2},-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)^2\Bigg)\Bigg)$$

- **Problem 300: Result more than twice size of optimal antiderivative.**

$$\int \text{Sec}[e+f x]\,\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,dx$$

Optimal (type 6, 103 leaves, 5 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},1+p,-p,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]$$

$$\left(\text{Cos}[e+f x]^2\right)^p\,\text{Sin}[e+f x]\,\left(\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)\right)^p\left(1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1995 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right.$$

$$\left.(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\text{Sec}[e+f x]\,\left(\text{Sec}[e+f x]^2\right)^{-\frac{1}{2}+p}\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Tan}[e+f x]\right)\Big/$$

$$\left(f\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\left(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.\right.$$

$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)$$

$$\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{\frac{1}{2}+p}\right)\Big/\right.$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+\Bigg(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{3}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)-$$

$$\Bigg(6\,a\,(a+b)\,p\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{1}{2}+p}$$

$$\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\Bigg)\Bigg/\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+$$

$$\Bigg(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{3}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Bigg)$$

$$\text{Tan}[e+f\,x]^2\Bigg)+\Bigg(6\,(a+b)\,\left(-\frac{1}{2}+p\right)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{1}{2}+p}\,\text{Tan}[e+f\,x]^2\Bigg)\Bigg/\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+$$

$$\Bigg(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{3}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Bigg)$$

$$\text{Tan}[e+f\,x]^2\Bigg)+\Bigg(3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{1}{2}+p}$$

$$\text{Tan}[e+f\,x]\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-$$

$$\frac{1}{3}\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{3}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+\Bigg(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{3}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{1}{2}+p}$$

$$\text{Tan}[e+f\,x]\,\Bigg(2\,\Bigg(2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Big)\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+$$

$$3\,(a+b)\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-$$

$$\frac{1}{3}\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$\text{Tan}[e+f x]^2\,\Bigg(2\,b\,p\,\Bigg(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2},2-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{3}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{3}{2},1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)-$$

$$(a+b)\,\Bigg(\frac{6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},\frac{3}{2},1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{5\,(a+b)}-$$

$$\frac{9}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{2},-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\Bigg(2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)^2\Bigg)\Bigg)$$

- **Problem 301: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f x]\,\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,dx$$

Optimal (type 6, 101 leaves, 5 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},p,-p,\frac{3}{2},\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]$$

$$\left(\text{Cos}[e+f x]^2\right)^p\,\text{Sin}[e+f x]\,\left(\text{Sec}[e+f x]^2\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)\right)^p\,\left(1-\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1983 leaves):

$$-\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{3}{2}+p}\right.\right.$$

$$\left.(a+b\,\text{Sec}[e+f\,x]^2)^p\,\text{Sin}[e+f\,x]\right)\Big/\left(f\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left.\left.3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)$$

$$\left(-\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{1}{2}+p}\right)\Big/\right.$$

$$\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\left(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{3}{2}+p}\right.$$

$$\left.\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\right)\Big/\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-\right.\right.\right.$$

$$\left.\left.\left.p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)-$$

$$\left(6\,(a+b)\left(-\frac{3}{2}+p\right)\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left.\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{3}{2}+p}\text{Tan}[e+f\,x]^2\right)\Big/\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left.\left.3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)-\left(3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{3}{2}+p}\text{Tan}[e+f\,x]\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg/$$

$$\Bigg(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\Bigg(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)+$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^{-\frac{3}{2}+p}$$

$$\text{Tan}[e+f x]\,\Bigg(2\,\Bigg(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+3\,(a+b)$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$3\,(a+b)\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$\text{Tan}[e+f x]^2\,\Bigg(-2\,b\,p\,\Bigg(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},\frac{3}{2},2-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{9}{5}\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{2},1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+3\,(a+b)$$

$$\Bigg(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},\frac{5}{2},1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$3\,\text{AppellF1}\left[\frac{5}{2},\frac{7}{2},-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\Bigg(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{3}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

Problem 302: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f\,x]^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 103 leaves, 5 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},\,-1+p,\,-p,\,\frac{3}{2},\,\text{Sin}[e+f\,x]^2,\,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]$$

$$\left(\text{Cos}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\,\left(\text{Sec}[e+f\,x]^2\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\right)^p\,\left(1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1987 leaves):

$$-\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{7}{2}+p}\right.\right.$$

$$\left.\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\right)\Big/\left(f\,\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$

$$\left.\left.5\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)$$

$$\left(-\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{3}{2}+p}\right)\Big/\right.$$

$$\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2},\,1-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+5\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)+$$

$$\left(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{5}{2}+p}\right.$$

$$\left.\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\right)\Big/\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\,\frac{5}{2},\,1-\right.\right.\right.$$

$$\left.\left.\left.p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+5\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{7}{2},\,-p,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\,\text{Tan}[e+f\,x]^2\right)-$$

$$\left(6\,(a+b)\,\left(-\frac{5}{2}+p\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{5}{2},\,-p,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\right.$$

$$\left(\text{Sec}[e+f x]^2\right)^{-\frac{5}{2}+p} \text{Tan}[e+f x]^2\Bigg) \Bigg/ \Bigg(-3 (a+b) \text{AppellF1}\left[\frac{1}{2}, \frac{5}{2}, -p, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] +$$

$$\Bigg(-2 b p \text{AppellF1}\left[\frac{3}{2}, \frac{5}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] +$$

$$5 (a+b) \text{AppellF1}\left[\frac{3}{2}, \frac{7}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right]\Bigg) \text{Tan}[e+f x]^2\Bigg) - \Bigg(3 (a+b) (a+2 b+a \text{Cos}[2 (e+f x)])^p$$

$$\left(\text{Sec}[e+f x]^2\right)^{-\frac{5}{2}+p} \text{Tan}[e+f x] \Bigg(\frac{2 b p \text{AppellF1}\left[\frac{3}{2}, \frac{5}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 (a+b)} -$$

$$\frac{5}{3} \text{AppellF1}\left[\frac{3}{2}, \frac{7}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Bigg)\Bigg) \Bigg/$$

$$\Bigg(-3 (a+b) \text{AppellF1}\left[\frac{1}{2}, \frac{5}{2}, -p, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] + \Bigg(-2 b p \text{AppellF1}\left[\frac{3}{2}, \frac{5}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2,\right.$$

$$\left. -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] + 5 (a+b) \text{AppellF1}\left[\frac{3}{2}, \frac{7}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right]\Bigg) \text{Tan}[e+f x]^2\Bigg) +$$

$$\Bigg(3 (a+b) \text{AppellF1}\left[\frac{1}{2}, \frac{5}{2}, -p, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] (a+2 b+a \text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{-\frac{5}{2}+p}$$

$$\text{Tan}[e+f x] \Bigg(2 \Bigg(-2 b p \text{AppellF1}\left[\frac{3}{2}, \frac{5}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] + 5 (a+b)$$

$$\text{AppellF1}\left[\frac{3}{2}, \frac{7}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right]\Bigg) \text{Sec}[e+f x]^2 \text{Tan}[e+f x] -$$

$$3 (a+b) \Bigg(\frac{2 b p \text{AppellF1}\left[\frac{3}{2}, \frac{5}{2}, 1-p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 (a+b)} - \frac{5}{3}$$

$$\text{AppellF1}\left[\frac{3}{2}, \frac{7}{2}, -p, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Bigg) +$$

$$\text{Tan}[e+f x]^2 \Bigg(-2 b p \Bigg(-\frac{1}{5 (a+b)} 6 b (1-p) \text{AppellF1}\left[\frac{5}{2}, \frac{5}{2}, 2-p, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x] -$$

$$3 \text{AppellF1}\left[\frac{5}{2}, \frac{7}{2}, 1-p, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Bigg) + 5 (a+b)$$

$$\left(\frac{1}{5(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},\frac{7}{2},1-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.$$

$$\left.\left.\left.\left.\frac{21}{5}\text{AppellF1}\left[\frac{5}{2},\frac{9}{2},-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\Big/$$

$$\left(-3(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{5}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{5}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+5(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)^2\right)\right)\right)$$

Problem 303: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f\,x]^5\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 103 leaves, 5 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},-2+p,-p,\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]$$

$$\left(\text{Cos}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\left(\text{Sec}[e+f\,x]^2\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)\right)^p\left(1-\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1997 leaves):

$$-\left(\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right.\right.$$

$$\left.\text{Cos}[e+f\,x]^4\,(a+2\,b+a\,\text{Cos}[2(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{7}{2}+p}\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\right)\Big/$$

$$\left(f\left(-3(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.\right.$$

$$\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+7(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)$$

$$\left(-\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^{-\frac{5}{2}+p}\right)\Big/\right.$$

$$\left(-3(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+7\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f x]^2\Big)+$$

$$\Big(6\,a\,(a+b)\,p\,\text{AppellF1}\Big[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^{-1+p}\,\left(\text{Sec}[e+f x]^2\right)^{-\frac{7}{2}+p}$$

$$\text{Sin}[2\,(e+f x)]\,\text{Tan}[e+f x]\Big)\Big/\Big(-3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\frac{7}{2},1-$$

$$p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+7\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f x]^2\Big)-$$

$$\Big(6\,(a+b)\,\left(-\frac{7}{2}+p\right)\,\text{AppellF1}\Big[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p$$

$$\left(\text{Sec}[e+f x]^2\right)^{-\frac{7}{2}+p}\,\text{Tan}[e+f x]^2\Big)\Big/\Big(-3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+$$

$$\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+$$

$$7\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f x]^2\Big)-\Big(3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p$$

$$\left(\text{Sec}[e+f x]^2\right)^{-\frac{7}{2}+p}\,\text{Tan}[e+f x]\,\left(\frac{2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\frac{7}{3}\,\text{AppellF1}\Big[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\Big)\Big/$$

$$\Big(-3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,$$

$$-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+7\,(a+b)\,\text{AppellF1}\Big[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Big)\,\text{Tan}[e+f x]^2\Big)+$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^{-\frac{7}{2}+p}$$

$$\text{Tan}[e+f x]\,\Big(2\,\Big(-2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+7\,(a+b)$$

$$\text{AppellF1}\Big[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\Big)\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\frac{7}{3}\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\text{Tan}[e+f\,x]^2\left(-2\,b\,p\left(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},\frac{7}{2},2-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.\right.$$

$$\left.\frac{21}{5}\text{AppellF1}\left[\frac{5}{2},\frac{9}{2},1-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+7\,(a+b)$$

$$\left(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},\frac{9}{2},1-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.$$

$$\left.\left.\left.\left.\frac{27}{5}\text{AppellF1}\left[\frac{5}{2},\frac{11}{2},-p,\frac{7}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\Big/$$

$$\left(-3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\frac{7}{2},-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(-2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\frac{7}{2},1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+7\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},\frac{9}{2},-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)^2\right)\right)\right)$$

Problem 307: Result more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 83 leaves, 3 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},1,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2137 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right.$$

$$\left.\text{Cos}[e+f\,x]\,\left(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]\right)^p\left(\text{Sec}[e+f\,x]^2\right)^p\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\right)\Big/$$

$$\left(f\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.\right.$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\Big)\,\text{Tan}[e+f\,x]^2\Big)$$

$$\Bigg(\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^{-1+p}\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]^2\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)+$$

$$\Bigg(6\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]^2\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)-$$

$$\Bigg(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\,\text{Cos}[e+f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}$$

$$\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\,\text{Sin}[2\,(e+f\,x)]\Bigg)\Big/\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+$$

$$2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\Bigg)$$

$$\text{Tan}[e+f\,x]^2\Bigg)+\Bigg(3\,(a+b)\,\text{Cos}[e+f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p$$

$$\text{Sin}[e+f\,x]\,\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\frac{2}{3}\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Cos}[e+f x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]$$

$$\Bigg(4\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+3\,(a+b)\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-$$

$$\frac{2}{3}\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$2\,\text{Tan}[e+f x]^2\,\Bigg(b\,p\,\Bigg(-\frac{6}{5}\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},2-p,1,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)-$$

$$(a+b)\,\Bigg(\frac{6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{5\,(a+b)}-$$

$$\frac{12}{5}\text{AppellF1}\left[\frac{5}{2},-p,3,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\,\text{Tan}[e+f x]^2\Bigg)^2\Bigg)\Bigg)$$

- **Problem 308: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f x]^2 \left(a+b \,\text{Sec}[e+f x]^2\right)^p \, dx$$

Optimal (type 6, 83 leaves, 3 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] \text{Tan}[e+f x] \left(a+b+b \,\text{Tan}[e+f x]^2\right)^p \left(1+\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1914 leaves):

$$\left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right.$$
$$\left.\text{Cos}[e+f x] \,(a+2 b+a \,\text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{-2+p} \left(a+b \,\text{Sec}[e+f x]^2\right)^p \text{Sin}[e+f x]\right) \Big/$$
$$\left(f \left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]+2 \left(b p \,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.\right.$$
$$\left.\left.2 (a+b) \,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right) \text{Tan}[e+f x]^2\right)$$
$$\left(\left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] (a+2 b+a \,\text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{-1+p}\right) \Big/\right.$$
$$\left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]+2 \left(b p \,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.2 (a+b) \,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right) \text{Tan}[e+f x]^2\right)-$$
$$\left(6 a (a+b) p \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] (a+2 b+a \,\text{Cos}[2 (e+f x)])^{-1+p} \left(\text{Sec}[e+f x]^2\right)^{-2+p}\right.$$
$$\left.\text{Sin}[2 (e+f x)] \,\text{Tan}[e+f x]\right) \Big/ \left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]+\right.$$
$$2 \left(b p \,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]-2 (a+b) \,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right)$$
$$\left.\text{Tan}[e+f x]^2\right)+\left(6 (a+b) (-2+p) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right] (a+2 b+a \,\text{Cos}[2 (e+f x)])^p\right.$$
$$\left.\left(\text{Sec}[e+f x]^2\right)^{-2+p} \text{Tan}[e+f x]^2\right) \Big/ \left(3 (a+b) \,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]+\right.$$
$$2 \left(b p \,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]-2 (a+b) \,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \,\text{Tan}[e+f x]^2}{a+b}\right]\right)$$

$$\text{Tan}[e+f x]^2\Big)+\Big(3 (a+b) (a+2 b+a \text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{-2+p}$$

$$\text{Tan}[e+f x] \left(\frac{2 b p \text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 (a+b)}-\right.$$

$$\left.\left.\frac{4}{3} \text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right)\right)\Big/$$

$$\left(3 (a+b) \text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right]+2 \left(b p \text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.2 (a+b) \text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right]\right) \text{Tan}[e+f x]^2\right)-$$

$$\Big(3 (a+b) \text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] (a+2 b+a \text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{-2+p}$$

$$\text{Tan}[e+f x] \left(4 \left(b p \text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.2 (a+b) \text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right]\right) \text{Sec}[e+f x]^2 \text{Tan}[e+f x]+$$

$$3 (a+b) \left(\frac{2 b p \text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{3 (a+b)}-\right.$$

$$\left.\frac{4}{3} \text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right)+$$

$$2 \text{Tan}[e+f x]^2 \left(b p \left(-\frac{1}{5 (a+b)}6 b (1-p) \text{AppellF1}\left[\frac{5}{2},2,2-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]-\right.\right.$$

$$\left.\frac{12}{5} \text{AppellF1}\left[\frac{5}{2},3,1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right)-$$

$$2 (a+b) \left(\frac{6 b p \text{AppellF1}\left[\frac{5}{2},3,1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b \text{Tan}[e+f x]^2}{a+b}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{5 (a+b)}-\right.$$

$$\left.\left.\left.\left.\frac{18}{5}\,\text{AppellF1}\left[\frac{5}{2},4,-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},2,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},2,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.2\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},3,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)^2\right)\right)$$

- **Problem 309: Result more than twice size of optimal antiderivative.**

$$\int \text{Cos}[e+f x]^4\,\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,dx$$

Optimal (type 6, 83 leaves, 3 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1912 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right.$$

$$\left.\text{Cos}[e+f x]^3\,(a+2b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^{-3+p}\,\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]\right)\Big/$$

$$\left(f\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.\right.$$

$$\left.\left.3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)$$

$$\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\,(a+2b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^{-2+p}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)-$$

$$\left(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\,(a+2b+a\,\text{Cos}[2\,(e+f x)])^{-1+p}\,\left(\text{Sec}[e+f x]^2\right)^{-3+p}\right.$$

$$\left.\text{Sin}[2\,(e+f x)]\,\text{Tan}[e+f x]\right)\Big/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\right.$$

$$2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-3(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)$$

$$\left.\text{Tan}[e+f x]^2\right)+\left(6(a+b)(-3+p)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right](a+2b+a\,\text{Cos}[2(e+f x)])^p\right.$$

$$\left.\left(\text{Sec}[e+f x]^2\right)^{-3+p}\text{Tan}[e+f x]^2\right)\Big/\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\right.$$

$$2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-3(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)$$

$$\left.\text{Tan}[e+f x]^2\right)+\left(3(a+b)(a+2b+a\,\text{Cos}[2(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{-3+p}\right.$$

$$\text{Tan}[e+f x]\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3(a+b)}-\right.$$

$$\left.\left.2\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\Big/$$

$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.3(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)-$$

$$\left(3(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right](a+2b+a\,\text{Cos}[2(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{-3+p}\right.$$

$$\text{Tan}[e+f x]\left(4\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.3(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+$$

$$3(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3(a+b)}-\right.$$

$$\left.2\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)+$$

$$2\,\text{Tan}[e+f x]^2 \left(b\,p \left(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},3,2-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\right.\right.$$

$$\left.\frac{18}{5}\text{AppellF1}\left[\frac{5}{2},4,1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)-$$

$$3\,(a+b)\left(\frac{6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},4,1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{5\,(a+b)}-\right.$$

$$\left.\left.\left.\left.\frac{24}{5}\text{AppellF1}\left[\frac{5}{2},5,-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},3,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},3,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.3\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},4,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)^2\right)\right)$$

Problem 310: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[e+f x]^6\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,dx$$

Optimal (type 6, 83 leaves, 3 steps):

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]\left(a+b+b\,\text{Tan}[e+f x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 1914 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right.$$

$$\left.\text{Cos}[e+f x]^5\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{-4+p}\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]\right)\Big/$$

$$\left(f\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.\right.$$

$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)$$

$$\left(\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right](a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{-3+p}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)-$$
$$\left(6\,a\,(a+b)\,p\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-4+p}\right.$$
$$\left.\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\right)\Big/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$
$$2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)$$
$$\left.\text{Tan}[e+f\,x]^2\right)+\left(6\,(a+b)\,(-4+p)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\right.$$
$$\left.\left(\text{Sec}[e+f\,x]^2\right)^{-4+p}\,\text{Tan}[e+f\,x]^2\right)\Big/\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\right.$$
$$2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)$$
$$\left.\text{Tan}[e+f\,x]^2\right)+\left(3\,(a+b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-4+p}\right.$$
$$\text{Tan}[e+f\,x]\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$
$$\left.\left.\frac{8}{3}\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\Big/$$
$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.\right.$$
$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right)\text{Tan}[e+f\,x]^2\right)-$$
$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\,\left(\text{Sec}[e+f\,x]^2\right)^{-4+p}\right.$$
$$\text{Tan}[e+f\,x]\left(4\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\Bigg)\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+$$

$$3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\frac{8}{3}\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)+$$

$$2\,\text{Tan}[e+f x]^2\left(b\,p\left(-\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},4,2-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\right.\right.$$

$$\left.\frac{24}{5}\,\text{AppellF1}\left[\frac{5}{2},5,1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)-$$

$$4\,(a+b)\left(\frac{6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},5,1-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{5\,(a+b)}-\right.$$

$$\left.\left.\left.\left.6\,\text{AppellF1}\left[\frac{5}{2},6,-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},4,-p,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},4,1-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},5,-p,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\right)\text{Tan}[e+f x]^2\right)^2\Bigg)\Bigg)$$

- **Problem 327: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f x]\,\left(a+b\,\text{Sec}[e+f x]^2\right)^2\,dx$$

Optimal (type 3, 53 leaves, 4 steps):

$$-\frac{b\,(2\,a+b)\,\text{Log}[\text{Cos}[e+f x]]}{f}+\frac{(a+b)^2\,\text{Log}[\text{Sin}[e+f x]]}{f}+\frac{b^2\,\text{Sec}[e+f x]^2}{2\,f}$$

Result (type 3, 180 leaves):

$$\frac{1}{4\,f}\left(2\,b^2+2\,i\,a^2\,f x+4\,i\,a\,b\,f x+2\,i\,b^2\,f x-4\,i\,(a+b)^2\,\text{ArcTan}[\text{Tan}[e+f x]]\,\text{Cos}[e+f x]^2-\right.$$

$$4\,a\,b\,\text{Log}[\text{Cos}[e+f x]]-2\,b^2\,\text{Log}[\text{Cos}[e+f x]]+a^2\,\text{Log}\left[\text{Sin}[e+f x]^2\right]+2\,a\,b\,\text{Log}\left[\text{Sin}[e+f x]^2\right]+b^2\,\text{Log}\left[\text{Sin}[e+f x]^2\right]+$$

$$\left.\text{Cos}[2\,(e+f x)]\left(-2\,b\,(2\,a+b)\,\text{Log}[\text{Cos}[e+f x]]+(a+b)^2\left(2\,i\,f x+\text{Log}\left[\text{Sin}[e+f x]^2\right]\right)\right)\right)\text{Sec}[e+f x]^2$$

Problem 328: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Cot}[e+f x]^3 \left(a+b\,\text{Sec}[e+f x]^2\right)^2 dx$$

Optimal (type 3, 57 leaves, 4 steps):

$$-\frac{(a+b)^2\,\text{Csc}[e+f x]^2}{2 f}-\frac{b^2\,\text{Log}[\text{Cos}[e+f x]]}{f}-\frac{\left(a^2-b^2\right)\text{Log}[\text{Sin}[e+f x]]}{f}$$

Result (type 3, 163 leaves):

$$\frac{1}{4 f}\text{Csc}[e+f x]^2 \left(-2 a^2-4 a b-2 b^2-2 i a^2 f x+2 i b^2 f x-2 b^2 \text{Log}[\text{Cos}[e+f x]]-a^2 \text{Log}\left[\text{Sin}[e+f x]^2\right]+b^2 \text{Log}\left[\text{Sin}[e+f x]^2\right]+\text{Cos}[2 (e+f x)] \left(2 b^2 \text{Log}[\text{Cos}[e+f x]]+\left(a^2-b^2\right) \left(2 i f x+\text{Log}\left[\text{Sin}[e+f x]^2\right]\right)\right)+4 i \left(a^2-b^2\right) \text{ArcTan}[\text{Tan}[e+f x]]\,\text{Sin}[e+f x]^2\right)$$

Problem 329: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Cot}[e+f x]^5 \left(a+b\,\text{Sec}[e+f x]^2\right)^2 dx$$

Optimal (type 3, 51 leaves, 4 steps):

$$\frac{a (a+b)\,\text{Csc}[e+f x]^2}{f}-\frac{(a+b)^2\,\text{Csc}[e+f x]^4}{4 f}+\frac{a^2\,\text{Log}[\text{Sin}[e+f x]]}{f}$$

Result (type 3, 132 leaves):

$$\left(\left(b+a\,\text{Cos}[e+f x]^2\right)^2 \left(-4 i a^2\,\text{ArcTan}[\text{Tan}[e+f x]]\,\text{Cos}[e+f x]^4+4 a (a+b)\,\text{Cos}[e+f x]^2\,\text{Cot}[e+f x]^2-(a+b)^2\,\text{Cot}[e+f x]^4+2 a^2\,\text{Cos}[e+f x]^4 \left(2 i f x+\text{Log}\left[\text{Sin}[e+f x]^2\right]\right)\right) \text{Sec}[e+f x]^4\right) \Big/ \left(f (a+2 b+a\,\text{Cos}[2 (e+f x)])^2\right)$$

Problem 330: Result more than twice size of optimal antiderivative.

$$\int \left(a+b\,\text{Sec}[e+f x]^2\right)^2 \text{Tan}[e+f x]^6\, dx$$

Optimal (type 3, 95 leaves, 4 steps):

$$-a^2 x+\frac{a^2\,\text{Tan}[e+f x]}{f}-\frac{a^2\,\text{Tan}[e+f x]^3}{3 f}+\frac{a^2\,\text{Tan}[e+f x]^5}{5 f}+\frac{b (2 a+b)\,\text{Tan}[e+f x]^7}{7 f}+\frac{b^2\,\text{Tan}[e+f x]^9}{9 f}$$

Result (type 3, 275 leaves):

$$-\frac{1}{315 f (a+2 b+a\,\text{Cos}[2 (e+f x)])^2} 4 \left(b+a\,\text{Cos}[e+f x]^2\right)^2 \text{Sec}[e+f x]^9 \left(315 a^2 f x\,\text{Cos}[e+f x]^9-35 b^2\,\text{Sec}[e]\,\text{Sin}[f x]-5 (18 a-19 b)\, b\,\text{Cos}[e+f x]^2\,\text{Sec}[e]\,\text{Sin}[f x]-3 \left(21 a^2-90 a b+25 b^2\right) \text{Cos}[e+f x]^4\,\text{Sec}[e]\,\text{Sin}[f x]+\left(231 a^2-270 a b+5 b^2\right) \text{Cos}[e+f x]^6\,\text{Sec}[e]\,\text{Sin}[f x]-\left(483 a^2-90 a b-10 b^2\right) \text{Cos}[e+f x]^8\,\text{Sec}[e]\,\text{Sin}[f x]-35 b^2\,\text{Cos}[e+f x]\,\text{Tan}[e]-5 (18 a-19 b)\, b\,\text{Cos}[e+f x]^3\,\text{Tan}[e]-3 \left(21 a^2-90 a b+25 b^2\right) \text{Cos}[e+f x]^5\,\text{Tan}[e]+\left(231 a^2-270 a b+5 b^2\right) \text{Cos}[e+f x]^7\,\text{Tan}[e]\right)$$

Problem 331: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^2 \operatorname{Tan}[e+f x]^4 \, dx$$

Optimal (type 3, 77 leaves, 4 steps):

$$a^2 x-\frac{a^2 \operatorname{Tan}[e+f x]}{f}+\frac{a^2 \operatorname{Tan}[e+f x]^3}{3 f}+\frac{b (2 a+b) \operatorname{Tan}[e+f x]^5}{5 f}+\frac{b^2 \operatorname{Tan}[e+f x]^7}{7 f}$$

Result (type 3, 395 leaves):

$$\frac{1}{13440 f} \operatorname{Sec}[e] \operatorname{Sec}[e+f x]^7 \left(3675 a^2 f x \operatorname{Cos}[f x]+3675 a^2 f x \operatorname{Cos}[2 e+f x]+2205 a^2 f x \operatorname{Cos}[2 e+3 f x]+2205 a^2 f x \operatorname{Cos}[4 e+3 f x]+735 a^2 f x \operatorname{Cos}[4 e+5 f x]+735 a^2 f x \operatorname{Cos}[6 e+5 f x]+105 a^2 f x \operatorname{Cos}[6 e+7 f x]+105 a^2 f x \operatorname{Cos}[8 e+7 f x]-5320 a^2 \operatorname{Sin}[f x]+1680 a b \operatorname{Sin}[f x]+840 b^2 \operatorname{Sin}[f x]+4480 a^2 \operatorname{Sin}[2 e+f x]-1260 a b \operatorname{Sin}[2 e+f x]+420 b^2 \operatorname{Sin}[2 e+f x]-3780 a^2 \operatorname{Sin}[2 e+3 f x]+924 a b \operatorname{Sin}[2 e+3 f x]-168 b^2 \operatorname{Sin}[2 e+3 f x]+2100 a^2 \operatorname{Sin}[4 e+3 f x]-840 a b \operatorname{Sin}[4 e+3 f x]-420 b^2 \operatorname{Sin}[4 e+3 f x]-1540 a^2 \operatorname{Sin}[4 e+5 f x]+168 a b \operatorname{Sin}[4 e+5 f x]+84 b^2 \operatorname{Sin}[4 e+5 f x]+420 a^2 \operatorname{Sin}[6 e+5 f x]-420 a b \operatorname{Sin}[6 e+5 f x]-280 a^2 \operatorname{Sin}[6 e+7 f x]+84 a b \operatorname{Sin}[6 e+7 f x]+12 b^2 \operatorname{Sin}[6 e+7 f x]\right)$$

Problem 332: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^2 \operatorname{Tan}[e+f x]^2 \, dx$$

Optimal (type 3, 59 leaves, 4 steps):

$$-a^2 x+\frac{a^2 \operatorname{Tan}[e+f x]}{f}+\frac{b (2 a+b) \operatorname{Tan}[e+f x]^3}{3 f}+\frac{b^2 \operatorname{Tan}[e+f x]^5}{5 f}$$

Result (type 3, 281 leaves):

$$-\frac{1}{480 f} \operatorname{Sec}[e] \operatorname{Sec}[e+f x]^5 \left(150 a^2 f x \operatorname{Cos}[f x]+150 a^2 f x \operatorname{Cos}[2 e+f x]+75 a^2 f x \operatorname{Cos}[2 e+3 f x]+75 a^2 f x \operatorname{Cos}[4 e+3 f x]+15 a^2 f x \operatorname{Cos}[4 e+5 f x]+15 a^2 f x \operatorname{Cos}[6 e+5 f x]-180 a^2 \operatorname{Sin}[f x]+80 a b \operatorname{Sin}[f x]-20 b^2 \operatorname{Sin}[f x]+120 a^2 \operatorname{Sin}[2 e+f x]-120 a b \operatorname{Sin}[2 e+f x]-60 b^2 \operatorname{Sin}[2 e+f x]-120 a^2 \operatorname{Sin}[2 e+3 f x]+40 a b \operatorname{Sin}[2 e+3 f x]+20 b^2 \operatorname{Sin}[2 e+3 f x]+30 a^2 \operatorname{Sin}[4 e+3 f x]-60 a b \operatorname{Sin}[4 e+3 f x]-30 a^2 \operatorname{Sin}[4 e+5 f x]+20 a b \operatorname{Sin}[4 e+5 f x]+4 b^2 \operatorname{Sin}[4 e+5 f x]\right)$$

Problem 333: Result more than twice size of optimal antiderivative.

$$\int \left(a+b \operatorname{Sec}[e+f x]^2\right)^2 \, dx$$

Optimal (type 3, 40 leaves, 4 steps):

$$a^2 x+\frac{b (2 a+b) \operatorname{Tan}[e+f x]}{f}+\frac{b^2 \operatorname{Tan}[e+f x]^3}{3 f}$$

Result (type 3, 106 leaves):

$(4 (b + a \operatorname{Cos}[e + f x]^2)^2 \operatorname{Sec}[e + f x]^3 (3 a^2 f x \operatorname{Cos}[e + f x]^3 + b^2 \operatorname{Sec}[e] \operatorname{Sin}[f x] + 2 b (3 a + b) \operatorname{Cos}[e + f x]^2 \operatorname{Sec}[e] \operatorname{Sin}[f x] + b^2 \operatorname{Cos}[e + f x] \operatorname{Tan}[e])) / (3 f (a + 2 b + a \operatorname{Cos}[2 (e + f x)])^2)$

Problem 334: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Cot}[e + f x]^2 (a + b \operatorname{Sec}[e + f x]^2)^2 \, dx$$

Optimal (type 3, 36 leaves, 4 steps):

$$-a^2 x - \frac{(a + b)^2 \operatorname{Cot}[e + f x]}{f} + \frac{b^2 \operatorname{Tan}[e + f x]}{f}$$

Result (type 3, 82 leaves):

$$-(4 (b + a \operatorname{Cos}[e + f x]^2)^2 \operatorname{Sec}[e + f x] (a^2 f x \operatorname{Cos}[e + f x] - ((a + b)^2 \operatorname{Cot}[e + f x] \operatorname{Csc}[e] + b^2 \operatorname{Sec}[e]) \operatorname{Sin}[f x])) / (f (a + 2 b + a \operatorname{Cos}[2 (e + f x)])^2)$$

Problem 335: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Cot}[e + f x]^4 (a + b \operatorname{Sec}[e + f x]^2)^2 \, dx$$

Optimal (type 3, 45 leaves, 4 steps):

$$a^2 x + \frac{(a^2 - b^2) \operatorname{Cot}[e + f x]}{f} - \frac{(a + b)^2 \operatorname{Cot}[e + f x]^3}{3 f}$$

Result (type 3, 160 leaves):

$$\frac{1}{24 f} \operatorname{Csc}[e] \operatorname{Csc}[e + f x]^3 (9 a^2 f x \operatorname{Cos}[f x] - 9 a^2 f x \operatorname{Cos}[2 e + f x] - 3 a^2 f x \operatorname{Cos}[2 e + 3 f x] + 3 a^2 f x \operatorname{Cos}[4 e + 3 f x] - 12 a^2 \operatorname{Sin}[f x] + 12 b^2 \operatorname{Sin}[f x] - 12 a^2 \operatorname{Sin}[2 e + f x] - 12 a b \operatorname{Sin}[2 e + f x] + 8 a^2 \operatorname{Sin}[2 e + 3 f x] + 4 a b \operatorname{Sin}[2 e + 3 f x] - 4 b^2 \operatorname{Sin}[2 e + 3 f x])$$

Problem 336: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Cot}[e + f x]^6 (a + b \operatorname{Sec}[e + f x]^2)^2 \, dx$$

Optimal (type 3, 65 leaves, 4 steps):

$$-a^2 x - \frac{a^2 \operatorname{Cot}[e + f x]}{f} + \frac{(a^2 - b^2) \operatorname{Cot}[e + f x]^3}{3 f} - \frac{(a + b)^2 \operatorname{Cot}[e + f x]^5}{5 f}$$

Result (type 3, 256 leaves):

$$\frac{1}{480\,f}\mathrm{Csc}[e]\,\mathrm{Csc}[e+f x]^5 \left(-150 a^2 f x \mathrm{Cos}[f x]+150 a^2 f x \mathrm{Cos}[2 e+f x]+75 a^2 f x \mathrm{Cos}[2 e+3 f x]-75 a^2 f x \mathrm{Cos}[4 e+3 f x]-15 a^2 f x \mathrm{Cos}[4 e+5 f x]+15 a^2 f x \mathrm{Cos}[6 e+5 f x]+280 a^2 \mathrm{Sin}[f x]+120 a b \mathrm{Sin}[f x]+20 b^2 \mathrm{Sin}[f x]+180 a^2 \mathrm{Sin}[2 e+f x]-60 b^2 \mathrm{Sin}[2 e+f x]-140 a^2 \mathrm{Sin}[2 e+3 f x]+20 b^2 \mathrm{Sin}[2 e+3 f x]-90 a^2 \mathrm{Sin}[4 e+3 f x]-60 a b \mathrm{Sin}[4 e+3 f x]+46 a^2 \mathrm{Sin}[4 e+5 f x]+12 a b \mathrm{Sin}[4 e+5 f x]-4 b^2 \mathrm{Sin}[4 e+5 f x]\right)$$

Problem 337: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Tan}[e+f x]^5}{a+b\,\mathrm{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 69 leaves, 4 steps):

$$\frac{(a+2 b)\,\mathrm{Log}[\mathrm{Cos}[e+f x]]}{b^2 f}-\frac{(a+b)^2\,\mathrm{Log}\left[b+a\,\mathrm{Cos}[e+f x]^2\right]}{2 a b^2 f}+\frac{\mathrm{Sec}[e+f x]^2}{2 b f}$$

Result (type 3, 180 leaves):

$$\frac{1}{8 a b^2 f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)}(a+2 b+a\,\mathrm{Cos}[2 (e+f x)])\left(2 a b+2 a (a+2 b)\,\mathrm{Log}[\mathrm{Cos}[e+f x]]-a^2\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]-2 a b\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]-b^2\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]+\mathrm{Cos}[2 (e+f x)]\left(2 a (a+2 b)\,\mathrm{Log}[\mathrm{Cos}[e+f x]]-(a+b)^2\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]\right)\right)\mathrm{Sec}[e+f x]^4$$

Problem 342: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Cot}[e+f x]^5}{a+b\,\mathrm{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 108 leaves, 4 steps):

$$\frac{(2 a+3 b)\,\mathrm{Csc}[e+f x]^2}{2 (a+b)^2 f}-\frac{\mathrm{Csc}[e+f x]^4}{4 (a+b) f}+\frac{b^3\,\mathrm{Log}\left[b+a\,\mathrm{Cos}[e+f x]^2\right]}{2 a (a+b)^3 f}+\frac{\left(a^2+3 a b+3 b^2\right)\mathrm{Log}[\mathrm{Sin}[e+f x]]}{(a+b)^3 f}$$

Result (type 3, 464 leaves):

$$\frac{1}{32 a (a+b)^3 f\left(-1+\mathrm{Cot}[e]^2\right)\left(a+b\,\mathrm{Sec}[e+f x]^2\right)}\mathrm{Cos}[2 e]\,(a+2 b+a\,\mathrm{Cos}[2 (e+f x)])\,\mathrm{Csc}[e]^2\,\mathrm{Csc}[e+f x]^4\,\mathrm{Sec}[e+f x]^2\left(4 a^3+12 a^2 b+8 a b^2+6 i a^3 f x+18 i a^2 b f x+18 i a b^2 f x+2 i a^3 f x\,\mathrm{Cos}[4 (e+f x)]+6 i a^2 b f x\,\mathrm{Cos}[4 (e+f x)]+6 i a b^2 f x\,\mathrm{Cos}[4 (e+f x)]+3 b^3\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]+b^3\,\mathrm{Cos}[4 (e+f x)]\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]+3 a^3\,\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]+9 a^2 b\,\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]+9 a b^2\,\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]+a^3\,\mathrm{Cos}[4 (e+f x)]\,\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]+3 a^2 b\,\mathrm{Cos}[4 (e+f x)]\,\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]+3 a b^2\,\mathrm{Cos}[4 (e+f x)]\,\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]+4\,\mathrm{Cos}[2 (e+f x)]\left(-b^3\,\mathrm{Log}[a+2 b+a\,\mathrm{Cos}[2 (e+f x)]]+a\left(a^2 (-2-2 i f x)+3 b^2 (-1-2 i f x)+a b (-5-6 i f x)-\left(a^2+3 a b+3 b^2\right)\mathrm{Log}\left[\mathrm{Sin}[e+f x]^2\right]\right)\right)-16 i a\left(a^2+3 a b+3 b^2\right)\mathrm{ArcTan}[\mathrm{Tan}[e+f x]]\,\mathrm{Sin}[e+f x]^4\right)$$

Problem 343: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[e+f x]^6}{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 83 leaves, 7 steps):

$$-\frac{x}{a}+\frac{(a+b)^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a\,b^{5/2}\,f}-\frac{(a+2 b)\,\text{Tan}[e+f x]}{b^2 f}+\frac{\text{Tan}[e+f x]^3}{3 b f}$$

Result (type 3, 229 leaves):

$$\frac{1}{6\left(a+b\,\text{Sec}[e+f x]^2\right)}(a+2 b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]^2\left(-\frac{3 x}{a}-\frac{3(a+b)^{5/2}\,\text{ArcTan}\left[\frac{\text{Sec}[f x](\text{Cos}[2 e]-i\,\text{Sin}[2 e])(-(a+2 b)\,\text{Sin}[f x]+a\,\text{Sin}[2 e+f x])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](\text{Cos}[2 e]-i\,\text{Sin}[2 e])}{a\,b^2 f\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}-\frac{(3 a+7 b)\,\text{Sec}[e]\,\text{Sec}[e+f x]\,\text{Sin}[f x]}{b^2 f}+\frac{\text{Sec}[e]\,\text{Sec}[e+f x]^3\,\text{Sin}[f x]}{b f}+\frac{\text{Sec}[e+f x]^2\,\text{Tan}[e]}{b f}\right)$$

Problem 344: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[e+f x]^4}{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 59 leaves, 6 steps):

$$\frac{x}{a}-\frac{(a+b)^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a\,b^{3/2}\,f}+\frac{\text{Tan}[e+f x]}{b f}$$

Result (type 3, 206 leaves):

$$\left((a+2 b+a\,\text{Cos}[2(e+f x)])\,\text{Sec}[e+f x]^2\left((a+b)^2\,\text{ArcTan}\left[\frac{\text{Sec}[f x](\text{Cos}[2 e]-i\,\text{Sin}[2 e])(-(a+2 b)\,\text{Sin}[f x]+a\,\text{Sin}[2 e+f x])}{2\sqrt{a+b}\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](\text{Cos}[2 e]-i\,\text{Sin}[2 e])+\sqrt{a+b}\sqrt{b(i\,\text{Cos}[e]+\text{Sin}[e])^4}\,(b f x+a\,\text{Sec}[e]\,\text{Sec}[e+f x]\,\text{Sin}[f x])\right)\right)\Big/\left(2 a b\sqrt{a+b}\,f\left(a+b\,\text{Sec}[e+f x]^2\right)\sqrt{b(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)$$

- **Problem 345: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\tan[e+f x]^2}{a+b \sec[e+f x]^2} \, dx$$

Optimal (type 3, 46 leaves, 5 steps):

$$-\frac{x}{a}+\frac{\sqrt{a+b}\ \text{ArcTan}\left[\frac{\sqrt{b}\ \tan[e+f x]}{\sqrt{a+b}}\right]}{a \sqrt{b}\ f}$$

Result (type 3, 184 leaves):

$$-\left((a+2 b+a \cos[2 (e+f x)]) \sec[e+f x]^2 \left(\sqrt{a+b}\ f x \sqrt{b (\cos[e]-i \sin[e])^4}+(a+b) \text{ArcTan}\left[\frac{\sec[f x] (\cos[2 e]-i \sin[2 e]) (-(a+2 b) \sin[f x]+a \sin[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\cos[e]-i \sin[e])^4}}\right] (\cos[2 e]-i \sin[2 e])\right)\right) \Big/ \left(2 a \sqrt{a+b}\ f \left(a+b \sec[e+f x]^2\right) \sqrt{b (\cos[e]-i \sin[e])^4}\right)$$

- **Problem 346: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{1}{a+b \sec[e+f x]^2} \, dx$$

Optimal (type 3, 45 leaves, 3 steps):

$$\frac{x}{a}+\frac{\sqrt{b}\ \text{ArcTan}\left[\frac{\sqrt{a+b}\ \cot[e+f x]}{\sqrt{b}}\right]}{a \sqrt{a+b}\ f}$$

Result (type 3, 182 leaves):

$$\left((a+2 b+a \cos[2 (e+f x)]) \sec[e+f x]^2 \left(\sqrt{a+b}\ f x \sqrt{b (\cos[e]-i \sin[e])^4}+b\, \text{ArcTan}\left[\frac{\sec[f x] (\cos[2 e]-i \sin[2 e]) (-(a+2 b) \sin[f x]+a \sin[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\cos[e]-i \sin[e])^4}}\right] (\cos[2 e]-i \sin[2 e])\right)\right) \Big/ \left(2 a \sqrt{a+b}\ f \left(a+b \sec[e+f x]^2\right) \sqrt{b (\cos[e]-i \sin[e])^4}\right)$$

Problem 347: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[e+f x]^2}{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 62 leaves, 6 steps):

$$-\frac{x}{a}+\frac{b^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a\,(a+b)^{3/2}\,f}-\frac{\text{Cot}[e+f x]}{(a+b)\,f}$$

Result (type 3, 204 leaves):

$$-\left((a+2 b+a\,\text{Cos}[2 (e+f x)])\,\text{Sec}[e+f x]^2\left(b^2\,\text{ArcTan}\left[\frac{\text{Sec}[f x]\,(\text{Cos}[2 e]-i\,\text{Sin}[2 e])\,(-(a+2 b)\,\text{Sin}[f x]+a\,\text{Sin}[2 e+f x])}{2\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](\text{Cos}[2 e]-i\,\text{Sin}[2 e])+\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\,((a+b)\,f x-a\,\text{Csc}[e]\,\text{Csc}[e+f x]\,\text{Sin}[f x])\right)\right)\Big/\left(2 a\,(a+b)^{3/2}\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)$$

Problem 348: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[e+f x]^4}{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 86 leaves, 7 steps):

$$\frac{x}{a}-\frac{b^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{a\,(a+b)^{5/2}\,f}+\frac{(a+2 b)\,\text{Cot}[e+f x]}{(a+b)^2\,f}-\frac{\text{Cot}[e+f x]^3}{3\,(a+b)\,f}$$

Result (type 3, 587 leaves):

$$\frac{x\,(a+2b+a\,\mathrm{Cos}[2e+2fx])\,\mathrm{Sec}[e+fx]^2}{2a\,(a+b\,\mathrm{Sec}[e+fx]^2)}-\frac{(a+2b+a\,\mathrm{Cos}[2e+2fx])\,\mathrm{Cot}[e]\,\mathrm{Csc}[e+fx]^2\,\mathrm{Sec}[e+fx]^2}{6\,(a+b)\,f\,(a+b\,\mathrm{Sec}[e+fx]^2)}+$$

$$\Bigg((a+2b+a\,\mathrm{Cos}[2e+2fx])\,\mathrm{Sec}[e+fx]^2\Bigg(\Bigg(b^3\,\mathrm{ArcTan}\Big[\mathrm{Sec}[fx]\Big(\frac{\mathrm{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}-\frac{i\,\mathrm{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}\Big)$$

$$(-a\,\mathrm{Sin}[fx]-2b\,\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])\Big]\,\mathrm{Cos}[2e]\Bigg)\Big/\Big(2a\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}\Big)-$$

$$\Bigg(i\,b^3\,\mathrm{ArcTan}\Big[\mathrm{Sec}[fx]\Big(\frac{\mathrm{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}-\frac{i\,\mathrm{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}}\Big)$$

$$(-a\,\mathrm{Sin}[fx]-2b\,\mathrm{Sin}[fx]+a\,\mathrm{Sin}[2e+fx])\Big]\,\mathrm{Sin}[2e]\Bigg)\Big/\Big(2a\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4e]-i\,b\,\mathrm{Sin}[4e]}\Big)\Bigg)\Bigg)\Big/$$

$$\Big((a+b)^2\,(a+b\,\mathrm{Sec}[e+fx]^2)\Big)+\frac{(a+2b+a\,\mathrm{Cos}[2e+2fx])\,\mathrm{Csc}[e]\,\mathrm{Csc}[e+fx]^3\,\mathrm{Sec}[e+fx]^2\,\mathrm{Sin}[fx]}{6\,(a+b)\,f\,(a+b\,\mathrm{Sec}[e+fx]^2)}+$$

$$\frac{(a+2b+a\,\mathrm{Cos}[2e+2fx])\,\mathrm{Csc}[e]\,\mathrm{Csc}[e+fx]\,\mathrm{Sec}[e+fx]^2\,(-4a\,\mathrm{Sin}[fx]-7b\,\mathrm{Sin}[fx])}{6\,(a+b)^2\,f\,(a+b\,\mathrm{Sec}[e+fx]^2)}$$

- **Problem 349: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\mathrm{Cot}[e+fx]^6}{a+b\,\mathrm{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 120 leaves, 8 steps):

$$-\frac{x}{a}+\frac{b^{7/2}\,\mathrm{ArcTan}\Big[\frac{\sqrt{b}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b}}\Big]}{a\,(a+b)^{7/2}\,f}-\frac{(a^2+3ab+3b^2)\,\mathrm{Cot}[e+fx]}{(a+b)^3\,f}+\frac{(a+2b)\,\mathrm{Cot}[e+fx]^3}{3\,(a+b)^2\,f}-\frac{\mathrm{Cot}[e+fx]^5}{5\,(a+b)\,f}$$

Result (type 3, 671 leaves):

$$\frac{1}{960\,a\,(a+b)^3\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)}\,(a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])\,\mathrm{Sec}[e+f\,x]^2\left(-\frac{480\,b^4\,\mathrm{ArcTan}\left[\frac{\mathrm{Sec}[f\,x]\,(\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e])\,(-(a+2\,b)\,\mathrm{Sin}[f\,x]+a\,\mathrm{Sin}[2\,e+f\,x])}{2\,\sqrt{a+b}\,\sqrt{b\,(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}}\right]\,(\mathrm{Cos}[2\,e]-i\,\mathrm{Sin}[2\,e])}{\sqrt{a+b}\,\sqrt{b\,(\mathrm{Cos}[e]-i\,\mathrm{Sin}[e])^4}}+\right.$$

$$\mathrm{Csc}[e]\,\mathrm{Csc}[e+f\,x]^5\,\left(-150\,(a+b)^3\,f\,x\,\mathrm{Cos}[f\,x]+150\,(a+b)^3\,f\,x\,\mathrm{Cos}[2\,e+f\,x]+75\,a^3\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+225\,a^2\,b\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+\right.$$
$$225\,a\,b^2\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+75\,b^3\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]-75\,a^3\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-225\,a^2\,b\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-$$
$$225\,a\,b^2\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-75\,b^3\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-15\,a^3\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]-45\,a^2\,b\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]-$$
$$45\,a\,b^2\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]-15\,b^3\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]+15\,a^3\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]+45\,a^2\,b\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]+45\,a\,b^2\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]+$$
$$15\,b^3\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]+280\,a^3\,\mathrm{Sin}[f\,x]+780\,a^2\,b\,\mathrm{Sin}[f\,x]+680\,a\,b^2\,\mathrm{Sin}[f\,x]+180\,a^3\,\mathrm{Sin}[2\,e+f\,x]+540\,a^2\,b\,\mathrm{Sin}[2\,e+f\,x]+$$
$$480\,a\,b^2\,\mathrm{Sin}[2\,e+f\,x]-140\,a^3\,\mathrm{Sin}[2\,e+3\,f\,x]-420\,a^2\,b\,\mathrm{Sin}[2\,e+3\,f\,x]-400\,a\,b^2\,\mathrm{Sin}[2\,e+3\,f\,x]-90\,a^3\,\mathrm{Sin}[4\,e+3\,f\,x]-$$
$$\left.\left.240\,a^2\,b\,\mathrm{Sin}[4\,e+3\,f\,x]-180\,a\,b^2\,\mathrm{Sin}[4\,e+3\,f\,x]+46\,a^3\,\mathrm{Sin}[4\,e+5\,f\,x]+132\,a^2\,b\,\mathrm{Sin}[4\,e+5\,f\,x]+116\,a\,b^2\,\mathrm{Sin}[4\,e+5\,f\,x]\right)\right)$$

Problem 354: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cot}[e+f\,x]^3}{\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^2}\,dx$$

Optimal (type 3, 111 leaves, 4 steps):

$$-\frac{b^3}{2\,a^2\,(a+b)^2\,f\,\left(b+a\,\mathrm{Cos}[e+f\,x]^2\right)}-\frac{\mathrm{Csc}[e+f\,x]^2}{2\,(a+b)^2\,f}-\frac{b^2\,(3\,a+b)\,\mathrm{Log}\left[b+a\,\mathrm{Cos}[e+f\,x]^2\right]}{2\,a^2\,(a+b)^3\,f}-\frac{(a+3\,b)\,\mathrm{Log}[\mathrm{Sin}[e+f\,x]]}{(a+b)^3\,f}$$

Result (type 3, 306 leaves):

$$-\frac{1}{8\,a^2\,(a+b)^3\,f\,(a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)])}$$
$$\mathrm{Csc}[e+f\,x]^2\,\left(4\,a^4+12\,a^3\,b+8\,a^2\,b^2+4\,a\,b^3+4\,b^4+3\,a^2\,b^2\,\mathrm{Log}[a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)]]+13\,a\,b^3\,\mathrm{Log}[a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)]]+\right.$$
$$4\,b^4\,\mathrm{Log}[a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)]]+2\,a^4\,\mathrm{Log}[\mathrm{Sin}[e+f\,x]]+14\,a^3\,b\,\mathrm{Log}[\mathrm{Sin}[e+f\,x]]+24\,a^2\,b^2\,\mathrm{Log}[\mathrm{Sin}[e+f\,x]]-$$
$$a\,\mathrm{Cos}[4\,(e+f\,x)]\,\left(b^2\,(3\,a+b)\,\mathrm{Log}[a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)]]+2\,a^2\,(a+3\,b)\,\mathrm{Log}[\mathrm{Sin}[e+f\,x]]\right)+$$
$$\left.4\,\mathrm{Cos}[2\,(e+f\,x)]\,\left(a^4+a^3\,b-a\,b^3-b^4-b^3\,(3\,a+b)\,\mathrm{Log}[a+2\,b+a\,\mathrm{Cos}[2\,(e+f\,x)]]-2\,a^2\,b\,(a+3\,b)\,\mathrm{Log}[\mathrm{Sin}[e+f\,x]]\right)\right)$$

Problem 355: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cot}[e+f\,x]^5}{\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^2}\,dx$$

Optimal (type 3, 140 leaves, 4 steps):

$$\frac{b^4}{2 a^2 (a+b)^3 f \left(b+a \operatorname{Cos}[e+f x]^2\right)}+\frac{(a+2 b) \operatorname{Csc}[e+f x]^2}{(a+b)^3 f}-$$
$$\frac{\operatorname{Csc}[e+f x]^4}{4 (a+b)^2 f}+\frac{b^3 (4 a+b) \operatorname{Log}\left[b+a \operatorname{Cos}[e+f x]^2\right]}{2 a^2 (a+b)^4 f}+\frac{\left(a^2+4 a b+6 b^2\right) \operatorname{Log}[\operatorname{Sin}[e+f x]]}{(a+b)^4 f}$$

Result (type 3, 292 leaves) :

$$\frac{1}{16 a^2 (a+b)^4 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2} (a+2 b+a \operatorname{Cos}[2 (e+f x)])$$
$$\left(4 b^4 (a+b)+4 i a^2 \left(a^2+4 a b+6 b^2\right) f x (a+2 b+a \operatorname{Cos}[2 (e+f x)])-4 i a^2 \left(a^2+4 a b+6 b^2\right) \operatorname{ArcTan}[\operatorname{Tan}[e+f x]] (a+2 b+a \operatorname{Cos}[2 (e+f x)])+\right.$$
$$4 a^2 (a+b) (a+2 b) (a+2 b+a \operatorname{Cos}[2 (e+f x)]) \operatorname{Csc}[e+f x]^2-a^2 (a+b)^2 (a+2 b+a \operatorname{Cos}[2 (e+f x)]) \operatorname{Csc}[e+f x]^4+$$
$$2 b^3 (4 a+b) (a+2 b+a \operatorname{Cos}[2 (e+f x)]) \operatorname{Log}[a+2 b+a \operatorname{Cos}[2 (e+f x)]]+$$
$$\left.2 a^2 \left(a^2+4 a b+6 b^2\right) (a+2 b+a \operatorname{Cos}[2 (e+f x)]) \operatorname{Log}\left[\operatorname{Sin}[e+f x]^2\right]\right) \operatorname{Sec}[e+f x]^4$$

- **Problem 356: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Tan}[e+f x]^6}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^2} \, dx$$

Optimal (type 3, 119 leaves, 7 steps) :

$$-\frac{x}{a^2}-\frac{(3 a-2 b) (a+b)^{3/2} \operatorname{ArcTan}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2 a^2 b^{5/2} f}+\frac{(3 a+b) \operatorname{Tan}[e+f x]}{2 a b^2 f}-\frac{(a+b) \operatorname{Tan}[e+f x]^3}{2 a b f \left(a+b+b \operatorname{Tan}[e+f x]^2\right)}$$

Result (type 3, 593 leaves) :

$$-\frac{x\,(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^4}{4a^2\,(a+b\,\text{Sec}[e+fx]^2)^2}+\frac{1}{(a+b\,\text{Sec}[e+fx]^2)^2}(3a-2b)\,(a+b)^2\,(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^4$$

$$\left(\left(\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\right.\right.$$

$$\left.\text{Cos}[2e]\right)\Big/\left(8a^2\,b^2\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)-$$

$$\left(i\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}-\frac{i\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Sin}[2e]\right)\Big/\left(8a^2\,b^2\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4e]-i\,b\,\text{Sin}[4e]}\right)\right)+$$

$$\frac{(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e]\,\text{Sec}[e+fx]^5\,\text{Sin}[fx]}{4b^2\,f\,(a+b\,\text{Sec}[e+fx]^2)^2}+\Big((a+2b+a\,\text{Cos}[2e+2fx])\,\text{Sec}[e+fx]^4$$

$$\left(-a^3\,\text{Sin}[2e]-4a^2\,b\,\text{Sin}[2e]-5a\,b^2\,\text{Sin}[2e]-2b^3\,\text{Sin}[2e]+a^3\,\text{Sin}[2fx]+2a^2\,b\,\text{Sin}[2fx]+a\,b^2\,\text{Sin}[2fx]\right)\Big)\Big/$$

$$\left(8a^2\,b^2\,f\,(a+b\,\text{Sec}[e+fx]^2)^2\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])\right)$$

- **Problem 357: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[e+fx]^4}{(a+b\,\text{Sec}[e+fx]^2)^2}\,dx$$

Optimal (type 3, 90 leaves, 6 steps):

$$\frac{x}{a^2}+\frac{(a-2b)\,\sqrt{a+b}\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b}}\right]}{2a^2\,b^{3/2}\,f}-\frac{(a+b)\,\text{Tan}[e+fx]}{2a\,b\,f\,(a+b+b\,\text{Tan}[e+fx]^2)}$$

Result (type 3, 249 leaves):

$$\frac{1}{8a^2\,(a+b\,\text{Sec}[e+fx]^2)^2}(a+2b+a\,\text{Cos}[2(e+fx)])\,\text{Sec}[e+fx]^4$$

$$\left(2x\,(a+2b+a\,\text{Cos}[2(e+fx)])+\left(\left(-a^2+a\,b+2b^2\right)\text{ArcTan}\left[\frac{\text{Sec}[fx]\,(\text{Cos}[2e]-i\,\text{Sin}[2e])\,(-(a+2b)\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])}{2\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right]\right.\right.$$

$$\left.\left.(a+2b+a\,\text{Cos}[2(e+fx)])\,(\text{Cos}[2e]-i\,\text{Sin}[2e])\right)\Big/\left(b\,\sqrt{a+b}\,f\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)+\frac{(a+b)\,((a+2b)\,\text{Sin}[2e]-a\,\text{Sin}[2fx])}{b\,f\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}\right)$$

- **Problem 358: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 85 leaves, 6 steps):

$$-\frac{x}{a^2}+\frac{(a+2 b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2 a^2 \sqrt{b}\,\sqrt{a+b}\,f}+\frac{\text{Tan}[e+f x]}{2 a f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 388 leaves):

$$-\left((a+2 b+a\,\text{Cos}[2 e+2 f x])^2\,\text{Sec}[e+f x]^4\left(16 x+\left(\left(-a^3+6 a^2 b+24 a b^2+16 b^3\right)\text{ArcTan}\left[\frac{\text{Sec}[f x]\,(\text{Cos}[2 e]-i\,\text{Sin}[2 e])\,(-(a+2 b)\,\text{Sin}[f x]+a\,\text{Sin}[2 e+f x])}{2\sqrt{a+b}\,\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}}\right](\text{Cos}[2 e]-i\,\text{Sin}[2 e])\right)\Big/\left(b\,(a+b)^{3/2} f\sqrt{b\,(\text{Cos}[e]-i\,\text{Sin}[e])^4}\right)+\frac{\left(a^2+8 a b+8 b^2\right)((a+2 b)\,\text{Sin}[2 e]-a\,\text{Sin}[2 f x])}{b\,(a+b)\,f\,(a+2 b+a\,\text{Cos}[2\,(e+f x)])\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}\right)\right)\Big/$$
$$\left(64 a^2\left(a+b\,\text{Sec}[e+f x]^2\right)^2\right)+\frac{(a+2 b+a\,\text{Cos}[2 e+2 f x])^2\,\text{Sec}[e+f x]^4\left(\frac{(a+2 b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a+b)^{3/2}}-\frac{a\sqrt{b}\,\text{Sin}[2\,(e+f x)]}{(a+b)\,(a+2 b+a\,\text{Cos}[2\,(e+f x)])}\right)}{64 b^{3/2} f\left(a+b\,\text{Sec}[e+f x]^2\right)^2}$$

- **Problem 359: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 92 leaves, 5 steps):

$$\frac{x}{a^2}-\frac{\sqrt{b}\,(3 a+2 b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2 a^2 (a+b)^{3/2} f}-\frac{b\,\text{Tan}[e+f x]}{2 a\,(a+b)\,f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 240 leaves):

$$\frac{1}{8 a^2 \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}(a+2 b+a \operatorname{Cos}[2(e+f x)]) \operatorname{Sec}[e+f x]^4 \left(2 x (a+2 b+a \operatorname{Cos}[2(e+f x)])+\left(b (3 a+2 b) \operatorname{ArcTan}\left[\frac{\operatorname{Sec}[f x] (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e]) (-(a+2 b) \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}}\right] (a+2 b+a \operatorname{Cos}[2(e+f x)]) (\operatorname{Cos}[2 e]-i \operatorname{Sin}[2 e])\right) \Big/ \left((a+b)^{3/2} f \sqrt{b (\operatorname{Cos}[e]-i \operatorname{Sin}[e])^4}\right)+\frac{b ((a+2 b) \operatorname{Sin}[2 e]-a \operatorname{Sin}[2 f x])}{(a+b) f (\operatorname{Cos}[e]-\operatorname{Sin}[e]) (\operatorname{Cos}[e]+\operatorname{Sin}[e])}\right)$$

- **Problem 360: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cot}[e+f x]^2}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^2} \, dx$$

Optimal (type 3, 121 leaves, 7 steps):

$$-\frac{x}{a^2}+\frac{b^{3/2} (5 a+2 b) \operatorname{ArcTan}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2 a^2 (a+b)^{5/2} f}-\frac{(2 a-b) \operatorname{Cot}[e+f x]}{2 a (a+b)^2 f}-\frac{b \operatorname{Cot}[e+f x]}{2 a (a+b) f \left(a+b+b \operatorname{Tan}[e+f x]^2\right)}$$

Result (type 3, 564 leaves):

$$-\frac{x (a+2 b+a \operatorname{Cos}[2 e+2 f x])^2 \operatorname{Sec}[e+f x]^4}{4 a^2 \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+\left((5 a+2 b) (a+2 b+a \operatorname{Cos}[2 e+2 f x])^2 \operatorname{Sec}[e+f x]^4 \left(-\left(b^2 \operatorname{ArcTan}\left[\operatorname{Sec}[f x] \left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}-\frac{i \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}\right) (-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\right] \operatorname{Cos}[2 e]\right) \Big/ \left(8 a^2 \sqrt{a+b} f \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}\right)+\left(i b^2 \operatorname{ArcTan}\left[\operatorname{Sec}[f x] \left(\frac{\operatorname{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}-\frac{i \operatorname{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}}\right) (-a \operatorname{Sin}[f x]-2 b \operatorname{Sin}[f x]+a \operatorname{Sin}[2 e+f x])\right] \operatorname{Sin}[2 e]\right) \Big/ \left(8 a^2 \sqrt{a+b} f \sqrt{b \operatorname{Cos}[4 e]-i b \operatorname{Sin}[4 e]}\right)\right)\right) \Big/ \left((a+b)^2 \left(a+b \operatorname{Sec}[e+f x]^2\right)^2\right)+\frac{(a+2 b+a \operatorname{Cos}[2 e+2 f x])^2 \operatorname{Csc}[e] \operatorname{Csc}[e+f x] \operatorname{Sec}[e+f x]^4 \operatorname{Sin}[f x]}{4 (a+b)^2 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2}+$$

$$\frac{(a+2 b+a \operatorname{Cos}[2 e+2 f x]) \operatorname{Sec}[e+f x]^4 \left(-a b^2 \operatorname{Sin}[2 e]-2 b^3 \operatorname{Sin}[2 e]+a b^2 \operatorname{Sin}[2 f x]\right)}{8 a^2 (a+b)^2 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^2 (\operatorname{Cos}[e]-\operatorname{Sin}[e]) (\operatorname{Cos}[e]+\operatorname{Sin}[e])}$$

Problem 361: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^2}\,dx$$

Optimal (type 3, 160 leaves, 8 steps):

$$\frac{x}{a^2}-\frac{b^{5/2}\,(7 a+2 b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{2 a^2\,(a+b)^{7/2}\,f}+\frac{\left(2 a^2+6 a b-b^2\right)\,\text{Cot}[e+f x]}{2 a\,(a+b)^3\,f}-\frac{(2 a-3 b)\,\text{Cot}[e+f x]^3}{6 a\,(a+b)^2\,f}-\frac{b\,\text{Cot}[e+f x]^3}{2 a\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 1896 leaves):

$$\left((7a+2b)\,(a+2b+a\,\text{Cos}[2e+2fx])^2\,\text{Sec}[e+fx]^4\right.$$

$$\left(\left(\left(b^3\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathrm{i}\,b\,\text{Sin}[4e]}}-\frac{\mathrm{i}\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathrm{i}\,b\,\text{Sin}[4e]}}\right)\right.\right.\right.\right.$$

$$\left.\left.(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Cos}[2e]\right)\Big/\left(8a^2\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4e]-\mathrm{i}\,b\,\text{Sin}[4e]}\right)-$$

$$\left(\mathrm{i}\,b^3\,\text{ArcTan}\left[\text{Sec}[fx]\left(\frac{\text{Cos}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathrm{i}\,b\,\text{Sin}[4e]}}-\frac{\mathrm{i}\,\text{Sin}[2e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4e]-\mathrm{i}\,b\,\text{Sin}[4e]}}\right)\right.\right.$$

$$\left.\left.\left.\left.(-a\,\text{Sin}[fx]-2b\,\text{Sin}[fx]+a\,\text{Sin}[2e+fx])\right]\text{Sin}[2e]\right)\Big/\left(8a^2\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4e]-\mathrm{i}\,b\,\text{Sin}[4e]}\right)\right)\right)\Big/$$

$$\left((a+b)^3\left(a+b\,\text{Sec}[e+fx]^2\right)^2\right)+\frac{1}{384a^2(a+b)^3 f\left(a+b\,\text{Sec}[e+fx]^2\right)^2}(a+2b+a\,\text{Cos}[2e+2fx])$$

$$\text{Csc}[e]$$
$$\text{Csc}[e+fx]^3$$
$$\text{Sec}[2e]$$
$$\text{Sec}[e+fx]^4$$

$$\left(-6a^4fx\,\text{Cos}[fx]-54a^3bfx\,\text{Cos}[fx]-126a^2b^2fx\,\text{Cos}[fx]-114ab^3fx\,\text{Cos}[fx]-36b^4fx\,\text{Cos}[fx]+3a^4fx\,\text{Cos}[3fx]-\right.$$
$$3a^3bfx\,\text{Cos}[3fx]-27a^2b^2fx\,\text{Cos}[3fx]-33ab^3fx\,\text{Cos}[3fx]-12b^4fx\,\text{Cos}[3fx]+6a^4fx\,\text{Cos}[2e-fx]+$$
$$54a^3bfx\,\text{Cos}[2e-fx]+126a^2b^2fx\,\text{Cos}[2e-fx]+114ab^3fx\,\text{Cos}[2e-fx]+36b^4fx\,\text{Cos}[2e-fx]+6a^4fx\,\text{Cos}[2e+fx]+$$
$$54a^3bfx\,\text{Cos}[2e+fx]+126a^2b^2fx\,\text{Cos}[2e+fx]+114ab^3fx\,\text{Cos}[2e+fx]+36b^4fx\,\text{Cos}[2e+fx]-6a^4fx\,\text{Cos}[4e+fx]-$$
$$54a^3bfx\,\text{Cos}[4e+fx]-126a^2b^2fx\,\text{Cos}[4e+fx]-114ab^3fx\,\text{Cos}[4e+fx]-36b^4fx\,\text{Cos}[4e+fx]-3a^4fx\,\text{Cos}[2e+3fx]+$$
$$3a^3bfx\,\text{Cos}[2e+3fx]+27a^2b^2fx\,\text{Cos}[2e+3fx]+33ab^3fx\,\text{Cos}[2e+3fx]+12b^4fx\,\text{Cos}[2e+3fx]+3a^4fx\,\text{Cos}[4e+3fx]-$$
$$3a^3bfx\,\text{Cos}[4e+3fx]-27a^2b^2fx\,\text{Cos}[4e+3fx]-33ab^3fx\,\text{Cos}[4e+3fx]-12b^4fx\,\text{Cos}[4e+3fx]-3a^4fx\,\text{Cos}[6e+3fx]+$$
$$3a^3bfx\,\text{Cos}[6e+3fx]+27a^2b^2fx\,\text{Cos}[6e+3fx]+33ab^3fx\,\text{Cos}[6e+3fx]+12b^4fx\,\text{Cos}[6e+3fx]-3a^4fx\,\text{Cos}[2e+5fx]-$$
$$9a^3bfx\,\text{Cos}[2e+5fx]-9a^2b^2fx\,\text{Cos}[2e+5fx]-3ab^3fx\,\text{Cos}[2e+5fx]+3a^4fx\,\text{Cos}[4e+5fx]+9a^3bfx\,\text{Cos}[4e+5fx]+$$
$$9a^2b^2fx\,\text{Cos}[4e+5fx]+3ab^3fx\,\text{Cos}[4e+5fx]-3a^4fx\,\text{Cos}[6e+5fx]-9a^3bfx\,\text{Cos}[6e+5fx]-9a^2b^2fx\,\text{Cos}[6e+5fx]-$$
$$3ab^3fx\,\text{Cos}[6e+5fx]+3a^4fx\,\text{Cos}[8e+5fx]+9a^3bfx\,\text{Cos}[8e+5fx]+9a^2b^2fx\,\text{Cos}[8e+5fx]+3ab^3fx\,\text{Cos}[8e+5fx]-$$
$$12a^4\,\text{Sin}[fx]-60a^3b\,\text{Sin}[fx]-96a^2b^2\,\text{Sin}[fx]+18b^4\,\text{Sin}[fx]+4a^4\,\text{Sin}[3fx]+36a^3b\,\text{Sin}[3fx]+80a^2b^2\,\text{Sin}[3fx]-$$
$$6ab^3\,\text{Sin}[3fx]+6b^4\,\text{Sin}[3fx]+4a^4\,\text{Sin}[2e-fx]+76a^3b\,\text{Sin}[2e-fx]+144a^2b^2\,\text{Sin}[2e-fx]+18b^4\,\text{Sin}[2e-fx]-$$
$$4a^4\,\text{Sin}[2e+fx]-76a^3b\,\text{Sin}[2e+fx]-144a^2b^2\,\text{Sin}[2e+fx]+6ab^3\,\text{Sin}[2e+fx]+18b^4\,\text{Sin}[2e+fx]-12a^4\,\text{Sin}[4e+fx]-$$
$$60a^3b\,\text{Sin}[4e+fx]-96a^2b^2\,\text{Sin}[4e+fx]-6ab^3\,\text{Sin}[4e+fx]-18b^4\,\text{Sin}[4e+fx]-12a^4\,\text{Sin}[2e+3fx]-24a^3b\,\text{Sin}[2e+3fx]+$$
$$6ab^3\,\text{Sin}[2e+3fx]-6b^4\,\text{Sin}[2e+3fx]+4a^4\,\text{Sin}[4e+3fx]+36a^3b\,\text{Sin}[4e+3fx]+80a^2b^2\,\text{Sin}[4e+3fx]-3ab^3\,\text{Sin}[4e+3fx]-$$
$$6b^4\,\text{Sin}[4e+3fx]-12a^4\,\text{Sin}[6e+3fx]-24a^3b\,\text{Sin}[6e+3fx]+3ab^3\,\text{Sin}[6e+3fx]+6b^4\,\text{Sin}[6e+3fx]+8a^4\,\text{Sin}[2e+5fx]+$$
$$\left.20a^3b\,\text{Sin}[2e+5fx]+3ab^3\,\text{Sin}[2e+5fx]-3ab^3\,\text{Sin}[4e+5fx]+8a^4\,\text{Sin}[6e+5fx]+20a^3b\,\text{Sin}[6e+5fx]\right)$$

- **Problem 362: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Cot}[e+fx]^6}{\left(a+b\,\text{Sec}[e+fx]^2\right)^2}\,dx$$

Optimal (type 3, 207 leaves, 9 steps) :

$$-\frac{x}{a^2}+\frac{b^{7/2}\,(9\,a+2\,b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{2\,a^2\,(a+b)^{9/2}\,f}-\frac{\left(2\,a^3+8\,a^2\,b+12\,a\,b^2-b^3\right)\,\text{Cot}[e+f\,x]}{2\,a\,(a+b)^4\,f}+$$
$$\frac{\left(2\,a^2+6\,a\,b-3\,b^2\right)\,\text{Cot}[e+f\,x]^3}{6\,a\,(a+b)^3\,f}-\frac{(2\,a-5\,b)\,\text{Cot}[e+f\,x]^5}{10\,a\,(a+b)^2\,f}-\frac{b\,\text{Cot}[e+f\,x]^5}{2\,a\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 3028 leaves) :

$$\Bigg((9\,a+2\,b)\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Sec}[e+f\,x]^4$$
$$\Bigg(-\Bigg(b^4\,\text{ArcTan}\Bigg[\text{Sec}[f\,x]\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)$$
$$(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\Bigg]\,\text{Cos}[2\,e]\Bigg)\Bigg/\left(8\,a^2\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)+$$
$$\Bigg(i\,b^4\,\text{ArcTan}\Bigg[\text{Sec}[f\,x]\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)$$
$$(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\Bigg]\,\text{Sin}[2\,e]\Bigg)\Bigg/\left(8\,a^2\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)\Bigg)\Bigg)\Bigg/$$
$$\left((a+b)^4\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2\right)+\frac{1}{7680\,a^2\,(a+b)^4\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^2}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])$$
$$\text{Csc}[e]$$
$$\text{Csc}[e+f\,x]^5$$
$$\text{Sec}[2\,e]$$
$$\text{Sec}[e+f\,x]^4$$
$$\Big(75\,a^5\,f\,x\,\text{Cos}[f\,x]+900\,a^4\,b\,f\,x\,\text{Cos}[f\,x]+2850\,a^3\,b^2\,f\,x\,\text{Cos}[f\,x]+3900\,a^2\,b^3\,f\,x\,\text{Cos}[f\,x]+2475\,a\,b^4\,f\,x\,\text{Cos}[f\,x]+$$
$$600\,b^5\,f\,x\,\text{Cos}[f\,x]-15\,a^5\,f\,x\,\text{Cos}[3\,f\,x]+240\,a^4\,b\,f\,x\,\text{Cos}[3\,f\,x]+1110\,a^3\,b^2\,f\,x\,\text{Cos}[3\,f\,x]+1740\,a^2\,b^3\,f\,x\,\text{Cos}[3\,f\,x]+$$
$$1185\,a\,b^4\,f\,x\,\text{Cos}[3\,f\,x]+300\,b^5\,f\,x\,\text{Cos}[3\,f\,x]-75\,a^5\,f\,x\,\text{Cos}[2\,e-f\,x]-900\,a^4\,b\,f\,x\,\text{Cos}[2\,e-f\,x]-2850\,a^3\,b^2\,f\,x\,\text{Cos}[2\,e-f\,x]-$$
$$3900\,a^2\,b^3\,f\,x\,\text{Cos}[2\,e-f\,x]-2475\,a\,b^4\,f\,x\,\text{Cos}[2\,e-f\,x]-600\,b^5\,f\,x\,\text{Cos}[2\,e-f\,x]-75\,a^5\,f\,x\,\text{Cos}[2\,e+f\,x]-900\,a^4\,b\,f\,x\,\text{Cos}[2\,e+f\,x]-$$
$$2850\,a^3\,b^2\,f\,x\,\text{Cos}[2\,e+f\,x]-3900\,a^2\,b^3\,f\,x\,\text{Cos}[2\,e+f\,x]-2475\,a\,b^4\,f\,x\,\text{Cos}[2\,e+f\,x]-600\,b^5\,f\,x\,\text{Cos}[2\,e+f\,x]+75\,a^5\,f\,x\,\text{Cos}[4\,e+f\,x]+$$
$$900\,a^4\,b\,f\,x\,\text{Cos}[4\,e+f\,x]+2850\,a^3\,b^2\,f\,x\,\text{Cos}[4\,e+f\,x]+3900\,a^2\,b^3\,f\,x\,\text{Cos}[4\,e+f\,x]+2475\,a\,b^4\,f\,x\,\text{Cos}[4\,e+f\,x]+$$
$$600\,b^5\,f\,x\,\text{Cos}[4\,e+f\,x]+15\,a^5\,f\,x\,\text{Cos}[2\,e+3\,f\,x]-240\,a^4\,b\,f\,x\,\text{Cos}[2\,e+3\,f\,x]-1110\,a^3\,b^2\,f\,x\,\text{Cos}[2\,e+3\,f\,x]-$$
$$1740\,a^2\,b^3\,f\,x\,\text{Cos}[2\,e+3\,f\,x]-1185\,a\,b^4\,f\,x\,\text{Cos}[2\,e+3\,f\,x]-300\,b^5\,f\,x\,\text{Cos}[2\,e+3\,f\,x]-15\,a^5\,f\,x\,\text{Cos}[4\,e+3\,f\,x]+$$
$$240\,a^4\,b\,f\,x\,\text{Cos}[4\,e+3\,f\,x]+1110\,a^3\,b^2\,f\,x\,\text{Cos}[4\,e+3\,f\,x]+1740\,a^2\,b^3\,f\,x\,\text{Cos}[4\,e+3\,f\,x]+1185\,a\,b^4\,f\,x\,\text{Cos}[4\,e+3\,f\,x]+$$
$$300\,b^5\,f\,x\,\text{Cos}[4\,e+3\,f\,x]+15\,a^5\,f\,x\,\text{Cos}[6\,e+3\,f\,x]-240\,a^4\,b\,f\,x\,\text{Cos}[6\,e+3\,f\,x]-1110\,a^3\,b^2\,f\,x\,\text{Cos}[6\,e+3\,f\,x]-$$
$$1740\,a^2\,b^3\,f\,x\,\text{Cos}[6\,e+3\,f\,x]-1185\,a\,b^4\,f\,x\,\text{Cos}[6\,e+3\,f\,x]-300\,b^5\,f\,x\,\text{Cos}[6\,e+3\,f\,x]+45\,a^5\,f\,x\,\text{Cos}[2\,e+5\,f\,x]+$$
$$120\,a^4\,b\,f\,x\,\text{Cos}[2\,e+5\,f\,x]+30\,a^3\,b^2\,f\,x\,\text{Cos}[2\,e+5\,f\,x]-180\,a^2\,b^3\,f\,x\,\text{Cos}[2\,e+5\,f\,x]-195\,a\,b^4\,f\,x\,\text{Cos}[2\,e+5\,f\,x]-$$
$$60\,b^5\,f\,x\,\text{Cos}[2\,e+5\,f\,x]-45\,a^5\,f\,x\,\text{Cos}[4\,e+5\,f\,x]-120\,a^4\,b\,f\,x\,\text{Cos}[4\,e+5\,f\,x]-30\,a^3\,b^2\,f\,x\,\text{Cos}[4\,e+5\,f\,x]+180\,a^2\,b^3\,f\,x\,\text{Cos}[4\,e+5\,f\,x]+$$

$195\,a\,b^4\,f\,x\,\text{Cos}[4\,e+5\,f\,x]+60\,b^5\,f\,x\,\text{Cos}[4\,e+5\,f\,x]+45\,a^5\,f\,x\,\text{Cos}[6\,e+5\,f\,x]+120\,a^4\,b\,f\,x\,\text{Cos}[6\,e+5\,f\,x]+$
$30\,a^3\,b^2\,f\,x\,\text{Cos}[6\,e+5\,f\,x]-180\,a^2\,b^3\,f\,x\,\text{Cos}[6\,e+5\,f\,x]-195\,a\,b^4\,f\,x\,\text{Cos}[6\,e+5\,f\,x]-60\,b^5\,f\,x\,\text{Cos}[6\,e+5\,f\,x]-$
$45\,a^5\,f\,x\,\text{Cos}[8\,e+5\,f\,x]-120\,a^4\,b\,f\,x\,\text{Cos}[8\,e+5\,f\,x]-30\,a^3\,b^2\,f\,x\,\text{Cos}[8\,e+5\,f\,x]+180\,a^2\,b^3\,f\,x\,\text{Cos}[8\,e+5\,f\,x]+$
$195\,a\,b^4\,f\,x\,\text{Cos}[8\,e+5\,f\,x]+60\,b^5\,f\,x\,\text{Cos}[8\,e+5\,f\,x]-15\,a^5\,f\,x\,\text{Cos}[4\,e+7\,f\,x]-60\,a^4\,b\,f\,x\,\text{Cos}[4\,e+7\,f\,x]-90\,a^3\,b^2\,f\,x\,\text{Cos}[4\,e+7\,f\,x]-$
$60\,a^2\,b^3\,f\,x\,\text{Cos}[4\,e+7\,f\,x]-15\,a\,b^4\,f\,x\,\text{Cos}[4\,e+7\,f\,x]+15\,a^5\,f\,x\,\text{Cos}[6\,e+7\,f\,x]+60\,a^4\,b\,f\,x\,\text{Cos}[6\,e+7\,f\,x]+$
$90\,a^3\,b^2\,f\,x\,\text{Cos}[6\,e+7\,f\,x]+60\,a^2\,b^3\,f\,x\,\text{Cos}[6\,e+7\,f\,x]+15\,a\,b^4\,f\,x\,\text{Cos}[6\,e+7\,f\,x]-15\,a^5\,f\,x\,\text{Cos}[8\,e+7\,f\,x]-60\,a^4\,b\,f\,x\,\text{Cos}[8\,e+7\,f\,x]-$
$90\,a^3\,b^2\,f\,x\,\text{Cos}[8\,e+7\,f\,x]-60\,a^2\,b^3\,f\,x\,\text{Cos}[8\,e+7\,f\,x]-15\,a\,b^4\,f\,x\,\text{Cos}[8\,e+7\,f\,x]+15\,a^5\,f\,x\,\text{Cos}[10\,e+7\,f\,x]+$
$60\,a^4\,b\,f\,x\,\text{Cos}[10\,e+7\,f\,x]+90\,a^3\,b^2\,f\,x\,\text{Cos}[10\,e+7\,f\,x]+60\,a^2\,b^3\,f\,x\,\text{Cos}[10\,e+7\,f\,x]+15\,a\,b^4\,f\,x\,\text{Cos}[10\,e+7\,f\,x]-$
$10\,a^5\,\text{Sin}[f\,x]+860\,a^4\,b\,\text{Sin}[f\,x]+3120\,a^3\,b^2\,\text{Sin}[f\,x]+3600\,a^2\,b^3\,\text{Sin}[f\,x]-300\,b^5\,\text{Sin}[f\,x]+46\,a^5\,\text{Sin}[3\,f\,x]-508\,a^4\,b\,\text{Sin}[3\,f\,x]-$
$2324\,a^3\,b^2\,\text{Sin}[3\,f\,x]-3120\,a^2\,b^3\,\text{Sin}[3\,f\,x]+75\,a\,b^4\,\text{Sin}[3\,f\,x]-150\,b^5\,\text{Sin}[3\,f\,x]-240\,a^5\,\text{Sin}[2\,e-f\,x]-1840\,a^4\,b\,\text{Sin}[2\,e-f\,x]-$
$4840\,a^3\,b^2\,\text{Sin}[2\,e-f\,x]-5040\,a^2\,b^3\,\text{Sin}[2\,e-f\,x]-300\,b^5\,\text{Sin}[2\,e-f\,x]+240\,a^5\,\text{Sin}[2\,e+f\,x]+1840\,a^4\,b\,\text{Sin}[2\,e+f\,x]+$
$4840\,a^3\,b^2\,\text{Sin}[2\,e+f\,x]+5040\,a^2\,b^3\,\text{Sin}[2\,e+f\,x]-75\,a\,b^4\,\text{Sin}[2\,e+f\,x]-300\,b^5\,\text{Sin}[2\,e+f\,x]-10\,a^5\,\text{Sin}[4\,e+f\,x]+860\,a^4\,b\,\text{Sin}[4\,e+f\,x]+$
$3120\,a^3\,b^2\,\text{Sin}[4\,e+f\,x]+3600\,a^2\,b^3\,\text{Sin}[4\,e+f\,x]+75\,a\,b^4\,\text{Sin}[4\,e+f\,x]+300\,b^5\,\text{Sin}[4\,e+f\,x]-240\,a^4\,b\,\text{Sin}[2\,e+3\,f\,x]-$
$900\,a^3\,b^2\,\text{Sin}[2\,e+3\,f\,x]-1200\,a^2\,b^3\,\text{Sin}[2\,e+3\,f\,x]-75\,a\,b^4\,\text{Sin}[2\,e+3\,f\,x]+150\,b^5\,\text{Sin}[2\,e+3\,f\,x]+46\,a^5\,\text{Sin}[4\,e+3\,f\,x]-$
$508\,a^4\,b\,\text{Sin}[4\,e+3\,f\,x]-2324\,a^3\,b^2\,\text{Sin}[4\,e+3\,f\,x]-3120\,a^2\,b^3\,\text{Sin}[4\,e+3\,f\,x]+60\,a\,b^4\,\text{Sin}[4\,e+3\,f\,x]+150\,b^5\,\text{Sin}[4\,e+3\,f\,x]-$
$240\,a^4\,b\,\text{Sin}[6\,e+3\,f\,x]-900\,a^3\,b^2\,\text{Sin}[6\,e+3\,f\,x]-1200\,a^2\,b^3\,\text{Sin}[6\,e+3\,f\,x]-60\,a\,b^4\,\text{Sin}[6\,e+3\,f\,x]-150\,b^5\,\text{Sin}[6\,e+3\,f\,x]-$
$48\,a^5\,\text{Sin}[2\,e+5\,f\,x]-32\,a^4\,b\,\text{Sin}[2\,e+5\,f\,x]+340\,a^3\,b^2\,\text{Sin}[2\,e+5\,f\,x]+864\,a^2\,b^3\,\text{Sin}[2\,e+5\,f\,x]-60\,a\,b^4\,\text{Sin}[2\,e+5\,f\,x]+$
$30\,b^5\,\text{Sin}[2\,e+5\,f\,x]-90\,a^5\,\text{Sin}[4\,e+5\,f\,x]-300\,a^4\,b\,\text{Sin}[4\,e+5\,f\,x]-300\,a^3\,b^2\,\text{Sin}[4\,e+5\,f\,x]+60\,a\,b^4\,\text{Sin}[4\,e+5\,f\,x]-$
$30\,b^5\,\text{Sin}[4\,e+5\,f\,x]-48\,a^5\,\text{Sin}[6\,e+5\,f\,x]-32\,a^4\,b\,\text{Sin}[6\,e+5\,f\,x]+340\,a^3\,b^2\,\text{Sin}[6\,e+5\,f\,x]+864\,a^2\,b^3\,\text{Sin}[6\,e+5\,f\,x]-$
$15\,a\,b^4\,\text{Sin}[6\,e+5\,f\,x]-30\,b^5\,\text{Sin}[6\,e+5\,f\,x]-90\,a^5\,\text{Sin}[8\,e+5\,f\,x]-300\,a^4\,b\,\text{Sin}[8\,e+5\,f\,x]-300\,a^3\,b^2\,\text{Sin}[8\,e+5\,f\,x]+$
$15\,a\,b^4\,\text{Sin}[8\,e+5\,f\,x]+30\,b^5\,\text{Sin}[8\,e+5\,f\,x]+46\,a^5\,\text{Sin}[4\,e+7\,f\,x]+172\,a^4\,b\,\text{Sin}[4\,e+7\,f\,x]+216\,a^3\,b^2\,\text{Sin}[4\,e+7\,f\,x]+$
$15\,a\,b^4\,\text{Sin}[4\,e+7\,f\,x]-15\,a\,b^4\,\text{Sin}[6\,e+7\,f\,x]+46\,a^5\,\text{Sin}[8\,e+7\,f\,x]+172\,a^4\,b\,\text{Sin}[8\,e+7\,f\,x]+216\,a^3\,b^2\,\text{Sin}[8\,e+7\,f\,x])$

- **Problem 366: Result unnecessarily involves imaginary or complex numbers.**

$$\int \frac{\text{Cot}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 130 leaves, 4 steps):

$$-\frac{b^3}{4\,a^3\,(a+b)\,f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)^2}+\frac{b^2\,(3\,a+2\,b)}{2\,a^3\,(a+b)^2\,f\,\left(b+a\,\text{Cos}[e+f\,x]^2\right)}+\frac{b\,\left(3\,a^2+3\,a\,b+b^2\right)\,\text{Log}\left[b+a\,\text{Cos}[e+f\,x]^2\right]}{2\,a^3\,(a+b)^3\,f}+\frac{\text{Log}[\text{Sin}[e+f\,x]]}{(a+b)^3\,f}$$

Result (type 3, 253 leaves):

$$\frac{1}{32\,a^3\,(a+b)^3\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])$$
$$\Big(-4\,b^3\,(a+b)^2+4\,b^2\,(a+b)\,(3\,a+2\,b)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])+4\,i\,b\,\left(3\,a^2+3\,a\,b+b^2\right)\,f\,x\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2-$$
$$2\,i\,b\,\left(3\,a^2+3\,a\,b+b^2\right)\,\text{ArcTan}[\text{Tan}[2\,(e+f\,x)]]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2+b\,\left(3\,a^2+3\,a\,b+b^2\right)\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2$$
$$\text{Log}\left[(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\right]+4\,a^3\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2\,\text{Log}[\text{Sin}[e+f\,x]]\Big)\,\text{Sec}[e+f\,x]^6$$

- **Problem 367: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cot}[e+f\,x]^3}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 154 leaves, 4 steps):

$$\frac{b^4}{4 a^3 (a+b)^2 f \left(b+a \operatorname{Cos}[e+f x]^2\right)^2}-\frac{b^3 (2 a+b)}{a^3 (a+b)^3 f \left(b+a \operatorname{Cos}[e+f x]^2\right)}-\frac{\operatorname{Csc}[e+f x]^2}{2 (a+b)^3 f}-\frac{b^2 \left(6 a^2+4 a b+b^2\right) \operatorname{Log}\left[b+a \operatorname{Cos}[e+f x]^2\right]}{2 a^3 (a+b)^4 f}-\frac{(a+4 b) \operatorname{Log}[\operatorname{Sin}[e+f x]]}{(a+b)^4 f}$$

Result (type 3, 1045 leaves):

$$\frac{b^4 (a+2 b+a \operatorname{Cos}[2 e+2 f x]) \operatorname{Sec}[e+f x]^6}{8 a^3 (a+b)^2 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}-\frac{b^3 (2 a+b) (a+2 b+a \operatorname{Cos}[2 e+2 f x])^2 \operatorname{Sec}[e+f x]^6}{4 a^3 (a+b)^3 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}-$$
$$\frac{i \left(-6 a^2 b^2-4 a b^3-b^4\right) \operatorname{ArcTan}[\operatorname{Tan}[2 e+2 f x]] (a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Sec}[e+f x]^6}{16 a^3 (a+b)^4 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}-$$
$$\frac{(a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Csc}[e+f x]^2 \operatorname{Sec}[e+f x]^6}{16 (a+b)^3 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}+$$
$$\frac{\left(-6 a^2 b^2-4 a b^3-b^4\right) (a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Log}\left[(a+2 b+a \operatorname{Cos}[2 e+2 f x])^2\right] \operatorname{Sec}[e+f x]^6}{32 a^3 (a+b)^4 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}+$$
$$\frac{(-a-4 b) (a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Log}[\operatorname{Sin}[e+f x]] \operatorname{Sec}[e+f x]^6}{8 (a+b)^4 f \left(a+b \operatorname{Sec}[e+f x]^2\right)^3}+$$
$$\frac{1}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^3} x (a+2 b+a \operatorname{Cos}[2 e+2 f x])^3 \operatorname{Sec}[e+f x]^6 \left(\frac{a \operatorname{Cot}[e]}{8 (a+b)^4}+\frac{b \operatorname{Cot}[e]}{2 (a+b)^4}-\frac{3 i b^2 \operatorname{Cos}[e]^2}{4 a (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}-\right.$$
$$\frac{i b^3 \operatorname{Cos}[e]^2}{2 a^2 (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}-\frac{i b^4 \operatorname{Cos}[e]^2}{8 a^3 (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}-\frac{3 b^2 \operatorname{Cos}[e] \operatorname{Sin}[e]}{2 a (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}-\frac{b^3 \operatorname{Cos}[e] \operatorname{Sin}[e]}{a^2 (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}-$$
$$\frac{b^4 \operatorname{Cos}[e] \operatorname{Sin}[e]}{4 a^3 (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}+\frac{3 i b^2 \operatorname{Sin}[e]^2}{4 a (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}+\frac{i b^3 \operatorname{Sin}[e]^2}{2 a^2 (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}+$$
$$\frac{i b^4 \operatorname{Sin}[e]^2}{8 a^3 (a+b)^4 \left(\operatorname{Cos}[e]^2-\operatorname{Sin}[e]^2\right)}-\frac{i (a+a \operatorname{Cos}[2 e]+i a \operatorname{Sin}[2 e])}{8 (a+b)^4 (-1+\operatorname{Cos}[2 e]+i \operatorname{Sin}[2 e])}-\frac{i (b+b \operatorname{Cos}[2 e]+i b \operatorname{Sin}[2 e])}{2 (a+b)^4 (-1+\operatorname{Cos}[2 e]+i \operatorname{Sin}[2 e])}-$$
$$\left.\frac{3 i \left(-b^2+b^2 \operatorname{Cos}[4 e]+i b^2 \operatorname{Sin}[4 e]\right)}{4 a (a+b)^4 (1+\operatorname{Cos}[4 e]+i \operatorname{Sin}[4 e])}-\frac{i \left(-b^3+b^3 \operatorname{Cos}[4 e]+i b^3 \operatorname{Sin}[4 e]\right)}{2 a^2 (a+b)^4 (1+\operatorname{Cos}[4 e]+i \operatorname{Sin}[4 e])}-\frac{i \left(-b^4+b^4 \operatorname{Cos}[4 e]+i b^4 \operatorname{Sin}[4 e]\right)}{8 a^3 (a+b)^4 (1+\operatorname{Cos}[4 e]+i \operatorname{Sin}[4 e])}\right)$$

- **Problem 368: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\operatorname{Cot}[e+f x]^5}{\left(a+b \operatorname{Sec}[e+f x]^2\right)^3} \, dx$$

Optimal (type 3, 192 leaves, 4 steps):

$$-\frac{b^5}{4 a^3 (a+b)^3 f \left(b+a \cos[e+f x]^2\right)^2}+\frac{b^4 (5 a+2 b)}{2 a^3 (a+b)^4 f \left(b+a \cos[e+f x]^2\right)}+\frac{(2 a+5 b) \csc[e+f x]^2}{2 (a+b)^4 f}-\frac{\csc[e+f x]^4}{4 (a+b)^3 f}+\frac{b^3 \left(10 a^2+5 a b+b^2\right) \text{Log}\left[b+a \cos[e+f x]^2\right]}{2 a^3 (a+b)^5 f}+\frac{\left(a^2+5 a b+10 b^2\right) \text{Log}[\sin[e+f x]]}{(a+b)^5 f}$$

Result (type 3, 1286 leaves):

$$-\frac{b^5 (a+2 b+a \cos[2 e+2 f x]) \sec[e+f x]^6}{8 a^3 (a+b)^3 f \left(a+b \sec[e+f x]^2\right)^3}+\frac{b^4 (5 a+2 b) (a+2 b+a \cos[2 e+2 f x])^2 \sec[e+f x]^6}{8 a^3 (a+b)^4 f \left(a+b \sec[e+f x]^2\right)^3}-\frac{i \left(a^2+5 a b+10 b^2\right) \text{ArcTan}[\tan[e+f x]] (a+2 b+a \cos[2 e+2 f x])^3 \sec[e+f x]^6}{8 (a+b)^5 f \left(a+b \sec[e+f x]^2\right)^3}-\frac{i \left(10 a^2 b^3+5 a b^4+b^5\right) \text{ArcTan}[\tan[2 e+2 f x]] (a+2 b+a \cos[2 e+2 f x])^3 \sec[e+f x]^6}{16 a^3 (a+b)^5 f \left(a+b \sec[e+f x]^2\right)^3}+\frac{(2 a+5 b) (a+2 b+a \cos[2 e+2 f x])^3 \csc[e+f x]^2 \sec[e+f x]^6}{16 (a+b)^4 f \left(a+b \sec[e+f x]^2\right)^3}-\frac{(a+2 b+a \cos[2 e+2 f x])^3 \csc[e+f x]^4 \sec[e+f x]^6}{32 (a+b)^3 f \left(a+b \sec[e+f x]^2\right)^3}+\frac{\left(10 a^2 b^3+5 a b^4+b^5\right) (a+2 b+a \cos[2 e+2 f x])^3 \text{Log}\left[(a+2 b+a \cos[2 e+2 f x])^2\right] \sec[e+f x]^6}{32 a^3 (a+b)^5 f \left(a+b \sec[e+f x]^2\right)^3}+\frac{\left(a^2+5 a b+10 b^2\right) (a+2 b+a \cos[2 e+2 f x])^3 \text{Log}\left[\sin[e+f x]^2\right] \sec[e+f x]^6}{16 (a+b)^5 f \left(a+b \sec[e+f x]^2\right)^3}+\frac{1}{\left(a+b \sec[e+f x]^2\right)^3} x (a+2 b+a \cos[2 e+2 f x])^3 \sec[e+f x]^6 \left(\frac{i a^2}{8 (a+b)^5}+\frac{5 i a b}{8 (a+b)^5}+\frac{5 i b^2}{4 (a+b)^5}-\frac{a^2 \cot[e]}{8 (a+b)^5}-\frac{5 a b \cot[e]}{8 (a+b)^5}-\frac{5 b^2 \cot[e]}{4 (a+b)^5}+\frac{5 i b^3 \cos[e]^2}{4 a (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}+\frac{5 i b^4 \cos[e]^2}{8 a^2 (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}+\frac{i b^5 \cos[e]^2}{8 a^3 (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}+\frac{5 b^3 \cos[e] \sin[e]}{2 a (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}+\frac{5 b^4 \cos[e] \sin[e]}{4 a^2 (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}+\frac{b^5 \cos[e] \sin[e]}{4 a^3 (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}-\frac{5 i b^3 \sin[e]^2}{4 a (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}-\frac{5 i b^4 \sin[e]^2}{8 a^2 (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}-\frac{i b^5 \sin[e]^2}{8 a^3 (a+b)^5 \left(\cos[e]^2-\sin[e]^2\right)}+\frac{i \left(a^2+5 a b+a^2 \cos[2 e]+5 a b \cos[2 e]+i a^2 \sin[2 e]+5 i a b \sin[2 e]\right)}{8 (a+b)^5 (-1+\cos[2 e]+i \sin[2 e])}+\frac{5 i \left(b^2+b^2 \cos[2 e]+i b^2 \sin[2 e]\right)}{4 (a+b)^5 (-1+\cos[2 e]+i \sin[2 e])}+\frac{5 i \left(-b^3+b^3 \cos[4 e]+i b^3 \sin[4 e]\right)}{4 a (a+b)^5 (1+\cos[4 e]+i \sin[4 e])}+\frac{5 i \left(-b^4+b^4 \cos[4 e]+i b^4 \sin[4 e]\right)}{8 a^2 (a+b)^5 (1+\cos[4 e]+i \sin[4 e])}+\frac{i \left(-b^5+b^5 \cos[4 e]+i b^5 \sin[4 e]\right)}{8 a^3 (a+b)^5 (1+\cos[4 e]+i \sin[4 e])}\right)$$

- **Problem 369: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Tan}[e+f x]^6}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 147 leaves, 7 steps):

$$-\frac{x}{a^3}+\frac{\sqrt{a+b}\,\left(3 a^2-4 a b+8 b^2\right) \mathrm{ArcTan}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^3 b^{5/2} f}-\frac{(a+b)\,\mathrm{Tan}[e+f x]^3}{4 a b f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^2}-\frac{(3 a-4 b)\,(a+b)\,\mathrm{Tan}[e+f x]}{8 a^2 b^2 f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)}$$

Result (type 3, 760 leaves):

$$\frac{1}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3}\left(-3 a^3+a^2 b-4 a b^2-8 b^3\right)\,(a+2 b+a\,\mathrm{Cos}[2 e+2 f x])^3\,\mathrm{Sec}[e+f x]^6$$
$$\left(\left(\mathrm{ArcTan}\left[\mathrm{Sec}[f x]\left(\frac{\mathrm{Cos}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4 e]-i\,b\,\mathrm{Sin}[4 e]}}-\frac{i\,\mathrm{Sin}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4 e]-i\,b\,\mathrm{Sin}[4 e]}}\right)(-a\,\mathrm{Sin}[f x]-2 b\,\mathrm{Sin}[f x]+a\,\mathrm{Sin}[2 e+f x])\right]\right.\right.$$
$$\left.\mathrm{Cos}[2 e]\right)\Big/\left(64 a^3 b^2\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4 e]-i\,b\,\mathrm{Sin}[4 e]}\right)-$$
$$\left(i\,\mathrm{ArcTan}\left[\mathrm{Sec}[f x]\left(\frac{\mathrm{Cos}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4 e]-i\,b\,\mathrm{Sin}[4 e]}}-\frac{i\,\mathrm{Sin}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\mathrm{Cos}[4 e]-i\,b\,\mathrm{Sin}[4 e]}}\right)\right.\right.$$
$$\left.\left.\left.(-a\,\mathrm{Sin}[f x]-2 b\,\mathrm{Sin}[f x]+a\,\mathrm{Sin}[2 e+f x])\right]\mathrm{Sin}[2 e]\right)\Big/\left(64 a^3 b^2\sqrt{a+b}\,f\sqrt{b\,\mathrm{Cos}[4 e]-i\,b\,\mathrm{Sin}[4 e]}\right)\right)+$$
$$\frac{1}{128 a^3 b^2 f\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3}\,(a+2 b+a\,\mathrm{Cos}[2 e+2 f x])\,\mathrm{Sec}[2 e]\,\mathrm{Sec}[e+f x]^6$$
$$\left(-24 a^2 b^2 f x\,\mathrm{Cos}[2 e]-64 a b^3 f x\,\mathrm{Cos}[2 e]-64 b^4 f x\,\mathrm{Cos}[2 e]-16 a^2 b^2 f x\,\mathrm{Cos}[2 f x]-32 a b^3 f x\,\mathrm{Cos}[2 f x]-16 a^2 b^2 f x\,\mathrm{Cos}[4 e+2 f x]-\right.$$
$$32 a b^3 f x\,\mathrm{Cos}[4 e+2 f x]-4 a^2 b^2 f x\,\mathrm{Cos}[2 e+4 f x]-4 a^2 b^2 f x\,\mathrm{Cos}[6 e+4 f x]+9 a^4\,\mathrm{Sin}[2 e]+15 a^3 b\,\mathrm{Sin}[2 e]-18 a^2 b^2\,\mathrm{Sin}[2 e]-$$
$$72 a b^3\,\mathrm{Sin}[2 e]-48 b^4\,\mathrm{Sin}[2 e]-9 a^4\,\mathrm{Sin}[2 f x]-13 a^3 b\,\mathrm{Sin}[2 f x]+28 a^2 b^2\,\mathrm{Sin}[2 f x]+32 a b^3\,\mathrm{Sin}[2 f x]+3 a^4\,\mathrm{Sin}[4 e+2 f x]-$$
$$\left.a^3 b\,\mathrm{Sin}[4 e+2 f x]-20 a^2 b^2\,\mathrm{Sin}[4 e+2 f x]-16 a b^3\,\mathrm{Sin}[4 e+2 f x]-3 a^4\,\mathrm{Sin}[2 e+4 f x]+3 a^3 b\,\mathrm{Sin}[2 e+4 f x]+6 a^2 b^2\,\mathrm{Sin}[2 e+4 f x]\right)$$

- **Problem 370: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Tan}[e+f x]^4}{\left(a+b\,\mathrm{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 137 leaves, 7 steps):

$$\frac{x}{a^3}+\frac{\left(a^2-4 a b-8 b^2\right) \mathrm{ArcTan}\left[\frac{\sqrt{b}\,\mathrm{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^3 b^{3/2}\sqrt{a+b}\,f}-\frac{(a+b)\,\mathrm{Tan}[e+f x]}{4 a b f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)^2}+\frac{(a-4 b)\,\mathrm{Tan}[e+f x]}{8 a^2 b f\left(a+b+b\,\mathrm{Tan}[e+f x]^2\right)}$$

Result (type 3, 1744 leaves):

$$\left((a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6\right.$$

$$\left.\left(\frac{\left(3\,a^2+8\,a\,b+8\,b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}}-\frac{a\,\sqrt{b}\,\left(3\,a^2+16\,a\,b+16\,b^2+3\,a\,(a+2\,b)\,\text{Cos}[2\,(e+f\,x)]\right)\,\text{Sin}[2\,(e+f\,x)]}{(a+b)^2\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2}\right)\right)\Big/$$

$$\left(1024\,b^{5/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\right)-\left((a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6\right.$$

$$\left.\left(-\frac{3\,a\,(a+2\,b)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{(a+b)^{5/2}}+\frac{\sqrt{b}\,\left(3\,a^3+14\,a^2\,b+24\,a\,b^2+16\,b^3+a\,\left(3\,a^2+4\,a\,b+4\,b^2\right)\,\text{Cos}[2\,(e+f\,x)]\right)\,\text{Sin}[2\,(e+f\,x)]}{(a+b)^2\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^2}\right)\right)\Big/$$

$$\left(2048\,b^{5/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\right)+\frac{1}{32\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6$$

$$\left(\frac{1}{(a+b)^2}\left(3\,a^5-10\,a^4\,b+80\,a^3\,b^2+480\,a^2\,b^3+640\,a\,b^4+256\,b^5\right)\right.$$

$$\left(\left(\text{ArcTan}\left[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-\mathbb{i}\,b\,\text{Sin}[4\,e]}}-\frac{\mathbb{i}\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-\mathbb{i}\,b\,\text{Sin}[4\,e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\right]\,\text{Cos}[2\,e]\right)\Big/\left(64\,a^3\,b^2\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-\mathbb{i}\,b\,\text{Sin}[4\,e]}\right)-$$

$$\left(\mathbb{i}\,\text{ArcTan}\left[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-\mathbb{i}\,b\,\text{Sin}[4\,e]}}-\frac{\mathbb{i}\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-\mathbb{i}\,b\,\text{Sin}[4\,e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\right]\,\text{Sin}[2\,e]\right)\Big/\left(64\,a^3\,b^2\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-\mathbb{i}\,b\,\text{Sin}[4\,e]}\right)\right)+$$

$$\frac{1}{128\,a^3\,b^2\,(a+b)^2\,f\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^2}\,\text{Sec}[2\,e]\,\left(768\,a^4\,b^2\,f\,x\,\text{Cos}[2\,e]+3584\,a^3\,b^3\,f\,x\,\text{Cos}[2\,e]+6912\,a^2\,b^4\,f\,x\,\text{Cos}[2\,e]+\right.$$

$$6144\,a\,b^5\,f\,x\,\text{Cos}[2\,e]+2048\,b^6\,f\,x\,\text{Cos}[2\,e]+512\,a^4\,b^2\,f\,x\,\text{Cos}[2\,f\,x]+2048\,a^3\,b^3\,f\,x\,\text{Cos}[2\,f\,x]+2560\,a^2\,b^4\,f\,x\,\text{Cos}[2\,f\,x]+$$

$$1024\,a\,b^5\,f\,x\,\text{Cos}[2\,f\,x]+512\,a^4\,b^2\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+2048\,a^3\,b^3\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+2560\,a^2\,b^4\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+$$

$$1024\,a\,b^5\,f\,x\,\text{Cos}[4\,e+2\,f\,x]+128\,a^4\,b^2\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+256\,a^3\,b^3\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+128\,a^2\,b^4\,f\,x\,\text{Cos}[2\,e+4\,f\,x]+$$

$$128\,a^4\,b^2\,f\,x\,\text{Cos}[6\,e+4\,f\,x]+256\,a^3\,b^3\,f\,x\,\text{Cos}[6\,e+4\,f\,x]+128\,a^2\,b^4\,f\,x\,\text{Cos}[6\,e+4\,f\,x]-9\,a^6\,\text{Sin}[2\,e]+12\,a^5\,b\,\text{Sin}[2\,e]+$$

$$684\,a^4\,b^2\,\text{Sin}[2\,e]+2880\,a^3\,b^3\,\text{Sin}[2\,e]+5280\,a^2\,b^4\,\text{Sin}[2\,e]+4608\,a\,b^5\,\text{Sin}[2\,e]+1536\,b^6\,\text{Sin}[2\,e]+9\,a^6\,\text{Sin}[2\,f\,x]-$$

$$14\,a^5\,b\,\text{Sin}[2\,f\,x]-608\,a^4\,b^2\,\text{Sin}[2\,f\,x]-2112\,a^3\,b^3\,\text{Sin}[2\,f\,x]-2560\,a^2\,b^4\,\text{Sin}[2\,f\,x]-1024\,a\,b^5\,\text{Sin}[2\,f\,x]-3\,a^6\,\text{Sin}[4\,e+2\,f\,x]+$$

$$10\,a^5\,b\,\text{Sin}[4\,e+2\,f\,x]+304\,a^4\,b^2\,\text{Sin}[4\,e+2\,f\,x]+1056\,a^3\,b^3\,\text{Sin}[4\,e+2\,f\,x]+1280\,a^2\,b^4\,\text{Sin}[4\,e+2\,f\,x]+512\,a\,b^5\,\text{Sin}[4\,e+2\,f\,x]+$$

$$3 a^6 \mathrm{Sin}[2 e + 4 f x] - 12 a^5 b \mathrm{Sin}[2 e + 4 f x] - 204 a^4 b^2 \mathrm{Sin}[2 e + 4 f x] - 384 a^3 b^3 \mathrm{Sin}[2 e + 4 f x] - 192 a^2 b^4 \mathrm{Sin}[2 e + 4 f x]\Big)\Bigg) -$$

$$\Bigg((a + 2 b + a \mathrm{Cos}[2 e + 2 f x])^3 \mathrm{Sec}[e + f x]^6 \Bigg(-\frac{6 a^2 \mathrm{ArcTan}\left[\frac{\mathrm{Sec}[f x] (\mathrm{Cos}[2 e] - i \mathrm{Sin}[2 e]) (-(a+2 b) \mathrm{Sin}[f x] + a \mathrm{Sin}[2 e + f x])}{2 \sqrt{a+b} \sqrt{b (\mathrm{Cos}[e] - i \mathrm{Sin}[e])^4}}\right] (\mathrm{Cos}[2 e] - i \mathrm{Sin}[2 e])}{\sqrt{a+b} \sqrt{b (\mathrm{Cos}[e] - i \mathrm{Sin}[e])^4}} +$$

$$\Big(a \mathrm{Sec}[2 e] \Big(\big(-9 a^4 - 16 a^3 b + 48 a^2 b^2 + 128 a b^3 + 64 b^4\big) \mathrm{Sin}[2 f x] + a \big(-3 a^3 + 2 a^2 b + 24 a b^2 + 16 b^3\big) \mathrm{Sin}[2 (e + 2 f x)] +$$
$$\big(3 a^4 - 64 a^2 b^2 - 128 a b^3 - 64 b^4\big) \mathrm{Sin}[4 e + 2 f x]\Big) + \big(9 a^5 + 18 a^4 b - 64 a^3 b^2 - 256 a^2 b^3 - 320 a b^4 - 128 b^5\big) \mathrm{Tan}[2 e]\Big) \Big/$$
$$\big(a^2 (a + 2 b + a \mathrm{Cos}[2 (e + f x)])^2\big)\Bigg)\Bigg) \Big/ \Big(2048 b^2 (a + b)^2 f \big(a + b \mathrm{Sec}[e + f x]^2\big)^3\Big)$$

- **Problem 371: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\mathrm{Tan}[e + f x]^2}{\big(a + b \mathrm{Sec}[e + f x]^2\big)^3} \, dx$$

Optimal (type 3, 138 leaves, 7 steps):

$$-\frac{x}{a^3} + \frac{\big(3 a^2 + 12 a b + 8 b^2\big) \mathrm{ArcTan}\left[\frac{\sqrt{b} \mathrm{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^3 \sqrt{b} (a + b)^{3/2} f} + \frac{\mathrm{Tan}[e + f x]}{4 a f \big(a + b + b \mathrm{Tan}[e + f x]^2\big)^2} + \frac{(3 a + 4 b) \mathrm{Tan}[e + f x]}{8 a^2 (a + b) f \big(a + b + b \mathrm{Tan}[e + f x]^2\big)}$$

Result (type 3, 1745 leaves):

$$\Bigg((a + 2 b + a \mathrm{Cos}[2 e + 2 f x])^3 \mathrm{Sec}[e + f x]^6$$
$$\Bigg(\frac{\big(3 a^2 + 8 a b + 8 b^2\big) \mathrm{ArcTan}\left[\frac{\sqrt{b} \mathrm{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a + b)^{5/2}} - \frac{a \sqrt{b} \big(3 a^2 + 16 a b + 16 b^2 + 3 a (a + 2 b) \mathrm{Cos}[2 (e + f x)]\big) \mathrm{Sin}[2 (e + f x)]}{(a + b)^2 (a + 2 b + a \mathrm{Cos}[2 (e + f x)])^2}\Bigg)\Bigg) \Big/$$

$$\Big(1024 b^{5/2} f \big(a + b \mathrm{Sec}[e + f x]^2\big)^3\Big) + \Bigg((a + 2 b + a \mathrm{Cos}[2 e + 2 f x])^3 \mathrm{Sec}[e + f x]^6$$
$$\Bigg(-\frac{3 a (a + 2 b) \mathrm{ArcTan}\left[\frac{\sqrt{b} \mathrm{Tan}[e+f x]}{\sqrt{a+b}}\right]}{(a + b)^{5/2}} + \frac{\sqrt{b} \big(3 a^3 + 14 a^2 b + 24 a b^2 + 16 b^3 + a \big(3 a^2 + 4 a b + 4 b^2\big) \mathrm{Cos}[2 (e + f x)]\big) \mathrm{Sin}[2 (e + f x)]}{(a + b)^2 (a + 2 b + a \mathrm{Cos}[2 (e + f x)])^2}\Bigg)\Bigg) \Big/$$

$$\left(2048\, b^{5/2} f \left(a+b\, \text{Sec}[e+f x]^2\right)^3\right)+\frac{1}{32 \left(a+b\, \text{Sec}[e+f x]^2\right)^3} (a+2 b+a\, \text{Cos}[2 e+2 f x])^3\, \text{Sec}[e+f x]^6$$

$$\left(-\frac{1}{(a+b)^2}\left(3 a^5-10 a^4 b+80 a^3 b^2+480 a^2 b^3+640 a b^4+256 b^5\right)\right.$$

$$\left(\left(\text{ArcTan}\left[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b\, \text{Cos}[4 e]-i\, b\, \text{Sin}[4 e]}}-\frac{i\, \text{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b\, \text{Cos}[4 e]-i\, b\, \text{Sin}[4 e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\, \text{Sin}[f x]-2 b\, \text{Sin}[f x]+a\, \text{Sin}[2 e+f x])\right] \text{Cos}[2 e]\right) \Big/ \left(64 a^3 b^2 \sqrt{a+b}\, f \sqrt{b\, \text{Cos}[4 e]-i\, b\, \text{Sin}[4 e]}\right)-$$

$$\left(i\, \text{ArcTan}\left[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b\, \text{Cos}[4 e]-i\, b\, \text{Sin}[4 e]}}-\frac{i\, \text{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b\, \text{Cos}[4 e]-i\, b\, \text{Sin}[4 e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\, \text{Sin}[f x]-2 b\, \text{Sin}[f x]+a\, \text{Sin}[2 e+f x])\right] \text{Sin}[2 e]\right) \Big/ \left(64 a^3 b^2 \sqrt{a+b}\, f \sqrt{b\, \text{Cos}[4 e]-i\, b\, \text{Sin}[4 e]}\right)\right)-$$

$$\frac{1}{128 a^3 b^2 (a+b)^2 f (a+2 b+a\, \text{Cos}[2 e+2 f x])^2} \text{Sec}[2 e] \left(768 a^4 b^2 f x\, \text{Cos}[2 e]+3584 a^3 b^3 f x\, \text{Cos}[2 e]+6912 a^2 b^4 f x\, \text{Cos}[2 e]+\right.$$
$$6144 a b^5 f x\, \text{Cos}[2 e]+2048 b^6 f x\, \text{Cos}[2 e]+512 a^4 b^2 f x\, \text{Cos}[2 f x]+2048 a^3 b^3 f x\, \text{Cos}[2 f x]+2560 a^2 b^4 f x\, \text{Cos}[2 f x]+$$
$$1024 a b^5 f x\, \text{Cos}[2 f x]+512 a^4 b^2 f x\, \text{Cos}[4 e+2 f x]+2048 a^3 b^3 f x\, \text{Cos}[4 e+2 f x]+2560 a^2 b^4 f x\, \text{Cos}[4 e+2 f x]+$$
$$1024 a b^5 f x\, \text{Cos}[4 e+2 f x]+128 a^4 b^2 f x\, \text{Cos}[2 e+4 f x]+256 a^3 b^3 f x\, \text{Cos}[2 e+4 f x]+128 a^2 b^4 f x\, \text{Cos}[2 e+4 f x]+$$
$$128 a^4 b^2 f x\, \text{Cos}[6 e+4 f x]+256 a^3 b^3 f x\, \text{Cos}[6 e+4 f x]+128 a^2 b^4 f x\, \text{Cos}[6 e+4 f x]-9 a^6\, \text{Sin}[2 e]+12 a^5 b\, \text{Sin}[2 e]+$$
$$684 a^4 b^2\, \text{Sin}[2 e]+2880 a^3 b^3\, \text{Sin}[2 e]+5280 a^2 b^4\, \text{Sin}[2 e]+4608 a b^5\, \text{Sin}[2 e]+1536 b^6\, \text{Sin}[2 e]+9 a^6\, \text{Sin}[2 f x]-$$
$$14 a^5 b\, \text{Sin}[2 f x]-608 a^4 b^2\, \text{Sin}[2 f x]-2112 a^3 b^3\, \text{Sin}[2 f x]-2560 a^2 b^4\, \text{Sin}[2 f x]-1024 a b^5\, \text{Sin}[2 f x]-3 a^6\, \text{Sin}[4 e+2 f x]+$$
$$10 a^5 b\, \text{Sin}[4 e+2 f x]+304 a^4 b^2\, \text{Sin}[4 e+2 f x]+1056 a^3 b^3\, \text{Sin}[4 e+2 f x]+1280 a^2 b^4\, \text{Sin}[4 e+2 f x]+512 a b^5\, \text{Sin}[4 e+2 f x]+$$
$$\left.\left.3 a^6\, \text{Sin}[2 e+4 f x]-12 a^5 b\, \text{Sin}[2 e+4 f x]-204 a^4 b^2\, \text{Sin}[2 e+4 f x]-384 a^3 b^3\, \text{Sin}[2 e+4 f x]-192 a^2 b^4\, \text{Sin}[2 e+4 f x]\right)\right)-$$

$$\left((a+2 b+a\, \text{Cos}[2 e+2 f x])^3\, \text{Sec}[e+f x]^6 \left(-\frac{6 a^2\, \text{ArcTan}\left[\frac{\text{Sec}[f x] (\text{Cos}[2 e]-i\, \text{Sin}[2 e]) (-(a+2 b)\, \text{Sin}[f x]+a\, \text{Sin}[2 e+f x])}{2 \sqrt{a+b} \sqrt{b (\text{Cos}[e]-i\, \text{Sin}[e])^4}}\right] (\text{Cos}[2 e]-i\, \text{Sin}[2 e])}{\sqrt{a+b} \sqrt{b (\text{Cos}[e]-i\, \text{Sin}[e])^4}}+\right.\right.$$

$$\left(a\, \text{Sec}[2 e] \left(\left(-9 a^4-16 a^3 b+48 a^2 b^2+128 a b^3+64 b^4\right) \text{Sin}[2 f x]+a \left(-3 a^3+2 a^2 b+24 a b^2+16 b^3\right) \text{Sin}[2 (e+2 f x)]+\right.\right.$$
$$\left.\left(3 a^4-64 a^2 b^2-128 a b^3-64 b^4\right) \text{Sin}[4 e+2 f x]\right)+\left(9 a^5+18 a^4 b-64 a^3 b^2-256 a^2 b^3-320 a b^4-128 b^5\right) \text{Tan}[2 e]\Big) \Big/$$

$$\left.\left.\left(a^2 (a+2 b+a\, \text{Cos}[2 (e+f x)])^2\right)\right)\right) \Big/ \left(2048 b^2 (a+b)^2 f \left(a+b\, \text{Sec}[e+f x]^2\right)^3\right)$$

- **Problem 372: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 144 leaves, 6 steps):

$$\frac{x}{a^3}-\frac{\sqrt{b}\,\left(15\,a^2+20\,a\,b+8\,b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{8\,a^3\,(a+b)^{5/2}\,f}-\frac{b\,\text{Tan}[e+f\,x]}{4\,a\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}-\frac{b\,(7\,a+4\,b)\,\text{Tan}[e+f\,x]}{8\,a^2\,(a+b)^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 627 leaves):

$$\frac{x\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3\,\text{Sec}[e+f\,x]^6}{8\,a^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}+\Bigg(\left(15\,a^2+20\,a\,b+8\,b^2\right)\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^3$$
$$\text{Sec}[e+f\,x]^6\,\Bigg(\Bigg(\text{b ArcTan}\Big[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)$$
$$(-a\,\text{Sin}[f\,x]-2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\Big]\,\text{Cos}[2\,e]\Bigg)\Big/\left(64\,a^3\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)-$$
$$\Bigg(i\,b\,\text{ArcTan}\Big[\text{Sec}[f\,x]\,\left(\frac{\text{Cos}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}-\frac{i\,\text{Sin}[2\,e]}{2\,\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}}\right)\,(-a\,\text{Sin}[f\,x]-$$
$$2\,b\,\text{Sin}[f\,x]+a\,\text{Sin}[2\,e+f\,x])\Big]\,\text{Sin}[2\,e]\Bigg)\Big/\left(64\,a^3\,\sqrt{a+b}\,f\,\sqrt{b\,\text{Cos}[4\,e]-i\,b\,\text{Sin}[4\,e]}\right)\Bigg)\Bigg)\Big/\left((a+b)^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\right)+$$
$$\left((a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^2\,\text{Sec}[e+f\,x]^6\,\left(9\,a^2\,b\,\text{Sin}[2\,e]+28\,a\,b^2\,\text{Sin}[2\,e]+16\,b^3\,\text{Sin}[2\,e]-9\,a^2\,b\,\text{Sin}[2\,f\,x]-6\,a\,b^2\,\text{Sin}[2\,f\,x]\right)\right)\Big/$$
$$\left(64\,a^3\,(a+b)^2\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])\right)+$$
$$\frac{(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])\,\text{Sec}[e+f\,x]^6\,\left(-a\,b^2\,\text{Sin}[2\,e]-2\,b^3\,\text{Sin}[2\,e]+a\,b^2\,\text{Sin}[2\,f\,x]\right)}{16\,a^3\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3\,(\text{Cos}[e]-\text{Sin}[e])\,(\text{Cos}[e]+\text{Sin}[e])}$$

- **Problem 373: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cot}[e+f\,x]^2}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^3}\,dx$$

Optimal (type 3, 181 leaves, 8 steps):

$$-\frac{x}{a^3}+\frac{b^{3/2}\,\left(35\,a^2+28\,a\,b+8\,b^2\right)\,\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b}}\right]}{8\,a^3\,(a+b)^{7/2}\,f}-\frac{\left(8\,a^2-11\,a\,b-4\,b^2\right)\,\text{Cot}[e+f\,x]}{8\,a^2\,(a+b)^3\,f}-$$
$$\frac{b\,\text{Cot}[e+f\,x]}{4\,a\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^2}-\frac{b\,(9\,a+4\,b)\,\text{Cot}[e+f\,x]}{8\,a^2\,(a+b)^2\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)}$$

Result (type 3, 2089 leaves):

$$\Big(\left(35\,a^2+28\,a\,b+8\,b^2\right)\ (a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])^3\,\mathrm{Sec}[e+f\,x]^6$$

$$\left(-\left(b^2\,\mathrm{ArcTan}\left[\mathrm{Sec}[f\,x]\ \left(\frac{\mathrm{Cos}[2\,e]}{2\,\sqrt{a+b}\ \sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}-\frac{i\,\mathrm{Sin}[2\,e]}{2\,\sqrt{a+b}\ \sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}\right)\right.\right.\right.$$

$$\left.\left.(-a\,\mathrm{Sin}[f\,x]-2\,b\,\mathrm{Sin}[f\,x]+a\,\mathrm{Sin}[2\,e+f\,x])\right]\,\mathrm{Cos}[2\,e]\right)\Big/\left(64\,a^3\,\sqrt{a+b}\ f\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}\right)+$$

$$\left(i\,b^2\,\mathrm{ArcTan}\left[\mathrm{Sec}[f\,x]\ \left(\frac{\mathrm{Cos}[2\,e]}{2\,\sqrt{a+b}\ \sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}-\frac{i\,\mathrm{Sin}[2\,e]}{2\,\sqrt{a+b}\ \sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}}\right)\right.\right.$$

$$\left.\left.\left.(-a\,\mathrm{Sin}[f\,x]-2\,b\,\mathrm{Sin}[f\,x]+a\,\mathrm{Sin}[2\,e+f\,x])\right]\,\mathrm{Sin}[2\,e]\right)\Big/\left(64\,a^3\,\sqrt{a+b}\ f\,\sqrt{b\,\mathrm{Cos}[4\,e]-i\,b\,\mathrm{Sin}[4\,e]}\right)\right)\Big)\Big/$$

$$\left((a+b)^3\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^3\right)+\frac{1}{512\,a^3\,(a+b)^3\,f\,\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^3}\,(a+2\,b+a\,\mathrm{Cos}[2\,e+2\,f\,x])$$

$$\mathrm{Csc}[e]$$
$$\mathrm{Csc}[e+f\,x]$$
$$\mathrm{Sec}[2\,e]$$
$$\mathrm{Sec}[e+f\,x]^6$$

$$\big(8\,a^5\,f\,x\,\mathrm{Cos}[f\,x]+56\,a^4\,b\,f\,x\,\mathrm{Cos}[f\,x]+184\,a^3\,b^2\,f\,x\,\mathrm{Cos}[f\,x]+296\,a^2\,b^3\,f\,x\,\mathrm{Cos}[f\,x]+224\,a\,b^4\,f\,x\,\mathrm{Cos}[f\,x]+64\,b^5\,f\,x\,\mathrm{Cos}[f\,x]-$$
$$12\,a^5\,f\,x\,\mathrm{Cos}[3\,f\,x]-68\,a^4\,b\,f\,x\,\mathrm{Cos}[3\,f\,x]-132\,a^3\,b^2\,f\,x\,\mathrm{Cos}[3\,f\,x]-108\,a^2\,b^3\,f\,x\,\mathrm{Cos}[3\,f\,x]-32\,a\,b^4\,f\,x\,\mathrm{Cos}[3\,f\,x]-$$
$$8\,a^5\,f\,x\,\mathrm{Cos}[2\,e-f\,x]-56\,a^4\,b\,f\,x\,\mathrm{Cos}[2\,e-f\,x]-184\,a^3\,b^2\,f\,x\,\mathrm{Cos}[2\,e-f\,x]-296\,a^2\,b^3\,f\,x\,\mathrm{Cos}[2\,e-f\,x]-224\,a\,b^4\,f\,x\,\mathrm{Cos}[2\,e-f\,x]-$$
$$64\,b^5\,f\,x\,\mathrm{Cos}[2\,e-f\,x]-8\,a^5\,f\,x\,\mathrm{Cos}[2\,e+f\,x]-56\,a^4\,b\,f\,x\,\mathrm{Cos}[2\,e+f\,x]-184\,a^3\,b^2\,f\,x\,\mathrm{Cos}[2\,e+f\,x]-296\,a^2\,b^3\,f\,x\,\mathrm{Cos}[2\,e+f\,x]-$$
$$224\,a\,b^4\,f\,x\,\mathrm{Cos}[2\,e+f\,x]-64\,b^5\,f\,x\,\mathrm{Cos}[2\,e+f\,x]+8\,a^5\,f\,x\,\mathrm{Cos}[4\,e+f\,x]+56\,a^4\,b\,f\,x\,\mathrm{Cos}[4\,e+f\,x]+184\,a^3\,b^2\,f\,x\,\mathrm{Cos}[4\,e+f\,x]+$$
$$296\,a^2\,b^3\,f\,x\,\mathrm{Cos}[4\,e+f\,x]+224\,a\,b^4\,f\,x\,\mathrm{Cos}[4\,e+f\,x]+64\,b^5\,f\,x\,\mathrm{Cos}[4\,e+f\,x]+12\,a^5\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+68\,a^4\,b\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+$$
$$132\,a^3\,b^2\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+108\,a^2\,b^3\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]+32\,a\,b^4\,f\,x\,\mathrm{Cos}[2\,e+3\,f\,x]-12\,a^5\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-$$
$$68\,a^4\,b\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-132\,a^3\,b^2\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-108\,a^2\,b^3\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]-32\,a\,b^4\,f\,x\,\mathrm{Cos}[4\,e+3\,f\,x]+$$
$$12\,a^5\,f\,x\,\mathrm{Cos}[6\,e+3\,f\,x]+68\,a^4\,b\,f\,x\,\mathrm{Cos}[6\,e+3\,f\,x]+132\,a^3\,b^2\,f\,x\,\mathrm{Cos}[6\,e+3\,f\,x]+108\,a^2\,b^3\,f\,x\,\mathrm{Cos}[6\,e+3\,f\,x]+$$
$$32\,a\,b^4\,f\,x\,\mathrm{Cos}[6\,e+3\,f\,x]-4\,a^5\,f\,x\,\mathrm{Cos}[2\,e+5\,f\,x]-12\,a^4\,b\,f\,x\,\mathrm{Cos}[2\,e+5\,f\,x]-12\,a^3\,b^2\,f\,x\,\mathrm{Cos}[2\,e+5\,f\,x]-4\,a^2\,b^3\,f\,x\,\mathrm{Cos}[2\,e+5\,f\,x]+$$
$$4\,a^5\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]+12\,a^4\,b\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]+12\,a^3\,b^2\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]+4\,a^2\,b^3\,f\,x\,\mathrm{Cos}[4\,e+5\,f\,x]-4\,a^5\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]-$$
$$12\,a^4\,b\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]-12\,a^3\,b^2\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]-4\,a^2\,b^3\,f\,x\,\mathrm{Cos}[6\,e+5\,f\,x]+4\,a^5\,f\,x\,\mathrm{Cos}[8\,e+5\,f\,x]+12\,a^4\,b\,f\,x\,\mathrm{Cos}[8\,e+5\,f\,x]+$$
$$12\,a^3\,b^2\,f\,x\,\mathrm{Cos}[8\,e+5\,f\,x]+4\,a^2\,b^3\,f\,x\,\mathrm{Cos}[8\,e+5\,f\,x]-32\,a^5\,\mathrm{Sin}[f\,x]-64\,a^4\,b\,\mathrm{Sin}[f\,x]-30\,a^2\,b^3\,\mathrm{Sin}[f\,x]-120\,a\,b^4\,\mathrm{Sin}[f\,x]-$$
$$48\,b^5\,\mathrm{Sin}[f\,x]+32\,a^5\,\mathrm{Sin}[3\,f\,x]+64\,a^4\,b\,\mathrm{Sin}[3\,f\,x]+26\,a^3\,b^2\,\mathrm{Sin}[3\,f\,x]+86\,a^2\,b^3\,\mathrm{Sin}[3\,f\,x]+32\,a\,b^4\,\mathrm{Sin}[3\,f\,x]-$$
$$48\,a^5\,\mathrm{Sin}[2\,e-f\,x]-128\,a^4\,b\,\mathrm{Sin}[2\,e-f\,x]-128\,a^3\,b^2\,\mathrm{Sin}[2\,e-f\,x]-30\,a^2\,b^3\,\mathrm{Sin}[2\,e-f\,x]-120\,a\,b^4\,\mathrm{Sin}[2\,e-f\,x]-$$
$$48\,b^5\,\mathrm{Sin}[2\,e-f\,x]+48\,a^5\,\mathrm{Sin}[2\,e+f\,x]+128\,a^4\,b\,\mathrm{Sin}[2\,e+f\,x]+102\,a^3\,b^2\,\mathrm{Sin}[2\,e+f\,x]-86\,a^2\,b^3\,\mathrm{Sin}[2\,e+f\,x]-$$
$$136\,a\,b^4\,\mathrm{Sin}[2\,e+f\,x]-48\,b^5\,\mathrm{Sin}[2\,e+f\,x]-32\,a^5\,\mathrm{Sin}[4\,e+f\,x]-64\,a^4\,b\,\mathrm{Sin}[4\,e+f\,x]+26\,a^3\,b^2\,\mathrm{Sin}[4\,e+f\,x]+86\,a^2\,b^3\,\mathrm{Sin}[4\,e+f\,x]+$$
$$136\,a\,b^4\,\mathrm{Sin}[4\,e+f\,x]+48\,b^5\,\mathrm{Sin}[4\,e+f\,x]-8\,a^5\,\mathrm{Sin}[2\,e+3\,f\,x]-26\,a^3\,b^2\,\mathrm{Sin}[2\,e+3\,f\,x]-86\,a^2\,b^3\,\mathrm{Sin}[2\,e+3\,f\,x]-$$
$$32\,a\,b^4\,\mathrm{Sin}[2\,e+3\,f\,x]+32\,a^5\,\mathrm{Sin}[4\,e+3\,f\,x]+64\,a^4\,b\,\mathrm{Sin}[4\,e+3\,f\,x]-13\,a^3\,b^2\,\mathrm{Sin}[4\,e+3\,f\,x]-36\,a^2\,b^3\,\mathrm{Sin}[4\,e+3\,f\,x]-$$
$$16\,a\,b^4\,\mathrm{Sin}[4\,e+3\,f\,x]-8\,a^5\,\mathrm{Sin}[6\,e+3\,f\,x]+13\,a^3\,b^2\,\mathrm{Sin}[6\,e+3\,f\,x]+36\,a^2\,b^3\,\mathrm{Sin}[6\,e+3\,f\,x]+16\,a\,b^4\,\mathrm{Sin}[6\,e+3\,f\,x]+$$
$$8\,a^5\,\mathrm{Sin}[2\,e+5\,f\,x]+13\,a^3\,b^2\,\mathrm{Sin}[2\,e+5\,f\,x]+6\,a^2\,b^3\,\mathrm{Sin}[2\,e+5\,f\,x]-13\,a^3\,b^2\,\mathrm{Sin}[4\,e+5\,f\,x]-6\,a^2\,b^3\,\mathrm{Sin}[4\,e+5\,f\,x]+8\,a^5\,\mathrm{Sin}[6\,e+5\,f\,x]\big)$$

Problem 374: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^3}\,dx$$

Optimal (type 3, 230 leaves, 9 steps):

$$\frac{x}{a^3}-\frac{b^{5/2}\left(63 a^2+36 a b+8 b^2\right)\text{ArcTan}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^3 (a+b)^{9/2} f}+\frac{\left(8 a^3+32 a^2 b-15 a b^2-4 b^3\right)\text{Cot}[e+f x]}{8 a^2 (a+b)^4 f}-\frac{\left(8 a^2-39 a b-12 b^2\right)\text{Cot}[e+f x]^3}{24 a^2 (a+b)^3 f}-\frac{b\,\text{Cot}[e+f x]^3}{4 a (a+b) f\left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}-\frac{b (11 a+4 b)\text{Cot}[e+f x]^3}{8 a^2 (a+b)^2 f\left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 3340 leaves):

$$\left(\left(63 a^2+36 a b+8 b^2\right)(a+2 b+a\,\text{Cos}[2 e+2 f x])^3\,\text{Sec}[e+f x]^6\right.$$
$$\left(\left(\left(b^3\,\text{ArcTan}\left[\text{Sec}[f x]\left(\frac{\text{Cos}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4 e]-i\,b\,\text{Sin}[4 e]}}-\frac{i\,\text{Sin}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4 e]-i\,b\,\text{Sin}[4 e]}}\right)\right.\right.\right.$$
$$\left.\left.(-a\,\text{Sin}[f x]-2 b\,\text{Sin}[f x]+a\,\text{Sin}[2 e+f x])\right]\text{Cos}[2 e]\right)\Big/\left(64 a^3\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4 e]-i\,b\,\text{Sin}[4 e]}\right)-$$
$$\left(i\,b^3\,\text{ArcTan}\left[\text{Sec}[f x]\left(\frac{\text{Cos}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4 e]-i\,b\,\text{Sin}[4 e]}}-\frac{i\,\text{Sin}[2 e]}{2\sqrt{a+b}\,\sqrt{b\,\text{Cos}[4 e]-i\,b\,\text{Sin}[4 e]}}\right)\right.\right.$$
$$\left.\left.\left.(-a\,\text{Sin}[f x]-2 b\,\text{Sin}[f x]+a\,\text{Sin}[2 e+f x])\right]\text{Sin}[2 e]\right)\Big/\left(64 a^3\sqrt{a+b}\,f\sqrt{b\,\text{Cos}[4 e]-i\,b\,\text{Sin}[4 e]}\right)\right)\Big/$$
$$\left((a+b)^4\left(a+b\,\text{Sec}[e+f x]^2\right)^3\right)+\frac{1}{6144 a^3 (a+b)^4 f\left(a+b\,\text{Sec}[e+f x]^2\right)^3}(a+2 b+a\,\text{Cos}[2 e+2 f x])$$
$$\text{Csc}[e]$$
$$\text{Csc}[e+f x]^3$$
$$\text{Sec}[2 e]$$
$$\text{Sec}[e+f x]^6$$
$$\left(-36 a^6 f x\,\text{Cos}[f x]-336 a^5 b f x\,\text{Cos}[f x]-1560 a^4 b^2 f x\,\text{Cos}[f x]-3600 a^3 b^3 f x\,\text{Cos}[f x]-4260 a^2 b^4 f x\,\text{Cos}[f x]-2496 a b^5 f x\,\text{Cos}[f x]-\right.$$
$$576 b^6 f x\,\text{Cos}[f x]+36 a^6 f x\,\text{Cos}[3 f x]+240 a^5 b f x\,\text{Cos}[3 f x]+408 a^4 b^2 f x\,\text{Cos}[3 f x]-48 a^3 b^3 f x\,\text{Cos}[3 f x]-$$
$$732 a^2 b^4 f x\,\text{Cos}[3 f x]-672 a b^5 f x\,\text{Cos}[3 f x]-192 b^6 f x\,\text{Cos}[3 f x]+36 a^6 f x\,\text{Cos}[2 e-f x]+336 a^5 b f x\,\text{Cos}[2 e-f x]+$$
$$1560 a^4 b^2 f x\,\text{Cos}[2 e-f x]+3600 a^3 b^3 f x\,\text{Cos}[2 e-f x]+4260 a^2 b^4 f x\,\text{Cos}[2 e-f x]+2496 a b^5 f x\,\text{Cos}[2 e-f x]+$$
$$576 b^6 f x\,\text{Cos}[2 e-f x]+36 a^6 f x\,\text{Cos}[2 e+f x]+336 a^5 b f x\,\text{Cos}[2 e+f x]+1560 a^4 b^2 f x\,\text{Cos}[2 e+f x]+3600 a^3 b^3 f x\,\text{Cos}[2 e+f x]+$$
$$4260 a^2 b^4 f x\,\text{Cos}[2 e+f x]+2496 a b^5 f x\,\text{Cos}[2 e+f x]+576 b^6 f x\,\text{Cos}[2 e+f x]-36 a^6 f x\,\text{Cos}[4 e+f x]-336 a^5 b f x\,\text{Cos}[4 e+f x]-$$
$$1560 a^4 b^2 f x\,\text{Cos}[4 e+f x]-3600 a^3 b^3 f x\,\text{Cos}[4 e+f x]-4260 a^2 b^4 f x\,\text{Cos}[4 e+f x]-2496 a b^5 f x\,\text{Cos}[4 e+f x]-$$
$$576 b^6 f x\,\text{Cos}[4 e+f x]-36 a^6 f x\,\text{Cos}[2 e+3 f x]-240 a^5 b f x\,\text{Cos}[2 e+3 f x]-408 a^4 b^2 f x\,\text{Cos}[2 e+3 f x]+$$
$$48 a^3 b^3 f x\,\text{Cos}[2 e+3 f x]+732 a^2 b^4 f x\,\text{Cos}[2 e+3 f x]+672 a b^5 f x\,\text{Cos}[2 e+3 f x]+192 b^6 f x\,\text{Cos}[2 e+3 f x]+$$

$$36 a^6 f x \text{Cos}[4 e+3 f x]+240 a^5 b f x \text{Cos}[4 e+3 f x]+408 a^4 b^2 f x \text{Cos}[4 e+3 f x]-48 a^3 b^3 f x \text{Cos}[4 e+3 f x]-$$
$$732 a^2 b^4 f x \text{Cos}[4 e+3 f x]-672 a b^5 f x \text{Cos}[4 e+3 f x]-192 b^6 f x \text{Cos}[4 e+3 f x]-36 a^6 f x \text{Cos}[6 e+3 f x]-$$
$$240 a^5 b f x \text{Cos}[6 e+3 f x]-408 a^4 b^2 f x \text{Cos}[6 e+3 f x]+48 a^3 b^3 f x \text{Cos}[6 e+3 f x]+732 a^2 b^4 f x \text{Cos}[6 e+3 f x]+$$
$$672 a b^5 f x \text{Cos}[6 e+3 f x]+192 b^6 f x \text{Cos}[6 e+3 f x]-12 a^6 f x \text{Cos}[2 e+5 f x]-144 a^5 b f x \text{Cos}[2 e+5 f x]-$$
$$456 a^4 b^2 f x \text{Cos}[2 e+5 f x]-624 a^3 b^3 f x \text{Cos}[2 e+5 f x]-396 a^2 b^4 f x \text{Cos}[2 e+5 f x]-96 a b^5 f x \text{Cos}[2 e+5 f x]+$$
$$12 a^6 f x \text{Cos}[4 e+5 f x]+144 a^5 b f x \text{Cos}[4 e+5 f x]+456 a^4 b^2 f x \text{Cos}[4 e+5 f x]+624 a^3 b^3 f x \text{Cos}[4 e+5 f x]+$$
$$396 a^2 b^4 f x \text{Cos}[4 e+5 f x]+96 a b^5 f x \text{Cos}[4 e+5 f x]-12 a^6 f x \text{Cos}[6 e+5 f x]-144 a^5 b f x \text{Cos}[6 e+5 f x]-$$
$$456 a^4 b^2 f x \text{Cos}[6 e+5 f x]-624 a^3 b^3 f x \text{Cos}[6 e+5 f x]-396 a^2 b^4 f x \text{Cos}[6 e+5 f x]-96 a b^5 f x \text{Cos}[6 e+5 f x]+$$
$$12 a^6 f x \text{Cos}[8 e+5 f x]+144 a^5 b f x \text{Cos}[8 e+5 f x]+456 a^4 b^2 f x \text{Cos}[8 e+5 f x]+624 a^3 b^3 f x \text{Cos}[8 e+5 f x]+$$
$$396 a^2 b^4 f x \text{Cos}[8 e+5 f x]+96 a b^5 f x \text{Cos}[8 e+5 f x]-12 a^6 f x \text{Cos}[4 e+7 f x]-48 a^5 b f x \text{Cos}[4 e+7 f x]-$$
$$72 a^4 b^2 f x \text{Cos}[4 e+7 f x]-48 a^3 b^3 f x \text{Cos}[4 e+7 f x]-12 a^2 b^4 f x \text{Cos}[4 e+7 f x]+12 a^6 f x \text{Cos}[6 e+7 f x]+48 a^5 b f x \text{Cos}[6 e+7 f x]+$$
$$72 a^4 b^2 f x \text{Cos}[6 e+7 f x]+48 a^3 b^3 f x \text{Cos}[6 e+7 f x]+12 a^2 b^4 f x \text{Cos}[6 e+7 f x]-12 a^6 f x \text{Cos}[8 e+7 f x]-48 a^5 b f x \text{Cos}[8 e+7 f x]-$$
$$72 a^4 b^2 f x \text{Cos}[8 e+7 f x]-48 a^3 b^3 f x \text{Cos}[8 e+7 f x]-12 a^2 b^4 f x \text{Cos}[8 e+7 f x]+12 a^6 f x \text{Cos}[10 e+7 f x]+$$
$$48 a^5 b f x \text{Cos}[10 e+7 f x]+72 a^4 b^2 f x \text{Cos}[10 e+7 f x]+48 a^3 b^3 f x \text{Cos}[10 e+7 f x]+12 a^2 b^4 f x \text{Cos}[10 e+7 f x]-$$
$$128 a^6 \text{Sin}[f x]-440 a^5 b \text{Sin}[f x]-1152 a^4 b^2 \text{Sin}[f x]-1920 a^3 b^3 \text{Sin}[f x]+228 a^2 b^4 \text{Sin}[f x]+1320 a b^5 \text{Sin}[f x]+$$
$$432 b^6 \text{Sin}[f x]+48 a^6 \text{Sin}[3 f x]+104 a^5 b \text{Sin}[3 f x]+640 a^4 b^2 \text{Sin}[3 f x]+1511 a^3 b^3 \text{Sin}[3 f x]-528 a^2 b^4 \text{Sin}[3 f x]+$$
$$264 a b^5 \text{Sin}[3 f x]+144 b^6 \text{Sin}[3 f x]-32 a^6 \text{Sin}[2 e-f x]+384 a^5 b \text{Sin}[2 e-f x]+2048 a^4 b^2 \text{Sin}[2 e-f x]+3072 a^3 b^3 \text{Sin}[2 e-f x]+$$
$$228 a^2 b^4 \text{Sin}[2 e-f x]+1320 a b^5 \text{Sin}[2 e-f x]+432 b^6 \text{Sin}[2 e-f x]+32 a^6 \text{Sin}[2 e+f x]-384 a^5 b \text{Sin}[2 e+f x]-$$
$$2048 a^4 b^2 \text{Sin}[2 e+f x]-2919 a^3 b^3 \text{Sin}[2 e+f x]+642 a^2 b^4 \text{Sin}[2 e+f x]+1416 a b^5 \text{Sin}[2 e+f x]+432 b^6 \text{Sin}[2 e+f x]-$$
$$128 a^6 \text{Sin}[4 e+f x]-440 a^5 b \text{Sin}[4 e+f x]-1152 a^4 b^2 \text{Sin}[4 e+f x]-2073 a^3 b^3 \text{Sin}[4 e+f x]-642 a^2 b^4 \text{Sin}[4 e+f x]-$$
$$1416 a b^5 \text{Sin}[4 e+f x]-432 b^6 \text{Sin}[4 e+f x]-144 a^6 \text{Sin}[2 e+3 f x]-672 a^5 b \text{Sin}[2 e+3 f x]-960 a^4 b^2 \text{Sin}[2 e+3 f x]+$$
$$153 a^3 b^3 \text{Sin}[2 e+3 f x]+528 a^2 b^4 \text{Sin}[2 e+3 f x]-264 a b^5 \text{Sin}[2 e+3 f x]-144 b^6 \text{Sin}[2 e+3 f x]+48 a^6 \text{Sin}[4 e+3 f x]+$$
$$104 a^5 b \text{Sin}[4 e+3 f x]+640 a^4 b^2 \text{Sin}[4 e+3 f x]+1664 a^3 b^3 \text{Sin}[4 e+3 f x]-66 a^2 b^4 \text{Sin}[4 e+3 f x]-408 a b^5 \text{Sin}[4 e+3 f x]-$$
$$144 b^6 \text{Sin}[4 e+3 f x]-144 a^6 \text{Sin}[6 e+3 f x]-672 a^5 b \text{Sin}[6 e+3 f x]-960 a^4 b^2 \text{Sin}[6 e+3 f x]+66 a^2 b^4 \text{Sin}[6 e+3 f x]+$$
$$408 a b^5 \text{Sin}[6 e+3 f x]+144 b^6 \text{Sin}[6 e+3 f x]+80 a^6 \text{Sin}[2 e+5 f x]+480 a^5 b \text{Sin}[2 e+5 f x]+832 a^4 b^2 \text{Sin}[2 e+5 f x]+$$
$$294 a^2 b^4 \text{Sin}[2 e+5 f x]+96 a b^5 \text{Sin}[2 e+5 f x]-48 a^6 \text{Sin}[4 e+5 f x]-120 a^5 b \text{Sin}[4 e+5 f x]-294 a^2 b^4 \text{Sin}[4 e+5 f x]-$$
$$96 a b^5 \text{Sin}[4 e+5 f x]+80 a^6 \text{Sin}[6 e+5 f x]+480 a^5 b \text{Sin}[6 e+5 f x]+832 a^4 b^2 \text{Sin}[6 e+5 f x]-51 a^3 b^3 \text{Sin}[6 e+5 f x]-$$
$$132 a^2 b^4 \text{Sin}[6 e+5 f x]-48 a b^5 \text{Sin}[6 e+5 f x]-48 a^6 \text{Sin}[8 e+5 f x]-120 a^5 b \text{Sin}[8 e+5 f x]+51 a^3 b^3 \text{Sin}[8 e+5 f x]+$$
$$132 a^2 b^4 \text{Sin}[8 e+5 f x]+48 a b^5 \text{Sin}[8 e+5 f x]+32 a^6 \text{Sin}[4 e+7 f x]+104 a^5 b \text{Sin}[4 e+7 f x]+51 a^3 b^3 \text{Sin}[4 e+7 f x]+$$
$$18 a^2 b^4 \text{Sin}[4 e+7 f x]-51 a^3 b^3 \text{Sin}[6 e+7 f x]-18 a^2 b^4 \text{Sin}[6 e+7 f x]+32 a^6 \text{Sin}[8 e+7 f x]+104 a^5 b \text{Sin}[8 e+7 f x]\Big)$$

- **Problem 375: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Cot}[e+f x]^6}{\left(a+b \text{Sec}[e+f x]^2\right)^3} \, dx$$

Optimal (type 3, 285 leaves, 10 steps):

$$-\frac{x}{a^3}+\frac{b^{7/2}\left(99 a^2+44 a b+8 b^2\right) \text{ArcTan}\left[\frac{\sqrt{b}\ \text{Tan}[e+f x]}{\sqrt{a+b}}\right]}{8 a^3 (a+b)^{11/2} f}-\frac{\left(8 a^4+40 a^3 b+80 a^2 b^2-19 a b^3-4 b^4\right) \text{Cot}[e+f x]}{8 a^2 (a+b)^5 f}+\frac{\left(8 a^3+32 a^2 b-51 a b^2-12 b^3\right) \text{Cot}[e+f x]^3}{24 a^2 (a+b)^4 f}-\frac{\left(8 a^2-75 a b-20 b^2\right) \text{Cot}[e+f x]^5}{40 a^2 (a+b)^3 f}-\frac{b\,\text{Cot}[e+f x]^5}{4 a (a+b) f \left(a+b+b\,\text{Tan}[e+f x]^2\right)^2}-\frac{b (13 a+4 b) \text{Cot}[e+f x]^5}{8 a^2 (a+b)^2 f \left(a+b+b\,\text{Tan}[e+f x]^2\right)}$$

Result (type 3, 976 leaves):

$$-\frac{x (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Sec}[e+f x]^6}{8 a^3 \left(a+b\,\text{Sec}[e+f x]^2\right)^3}+\frac{(11 a \text{Cos}[e]+26 b \text{Cos}[e]) (a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x]^2 \text{Sec}[e+f x]^6}{120 (a+b)^4 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3}-\frac{(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Cot}[e] \text{Csc}[e+f x]^4 \text{Sec}[e+f x]^6}{40 (a+b)^3 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3}+\Bigg(\left(99 a^2+44 a b+8 b^2\right) (a+2 b+a \text{Cos}[2 e+2 f x])^3$$

$$\text{Sec}[e+f x]^6 \Bigg(-\Bigg(b^4 \text{ArcTan}\Big[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}-\frac{i \text{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}\right)$$

$$(-a \text{Sin}[f x]-2 b \text{Sin}[f x]+a \text{Sin}[2 e+f x])\Big] \text{Cos}[2 e]\Bigg) \Big/ \left(64 a^3 \sqrt{a+b}\ f \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}\right)+$$

$$\Bigg(i b^4 \text{ArcTan}\Big[\text{Sec}[f x] \left(\frac{\text{Cos}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}-\frac{i \text{Sin}[2 e]}{2 \sqrt{a+b} \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}}\right)$$

$$(-a \text{Sin}[f x]-2 b \text{Sin}[f x]+a \text{Sin}[2 e+f x])\Big] \text{Sin}[2 e]\Bigg) \Big/ \left(64 a^3 \sqrt{a+b}\ f \sqrt{b \text{Cos}[4 e]-i b \text{Sin}[4 e]}\right)\Bigg)\Bigg) \Big/$$

$$\left((a+b)^5 \left(a+b\,\text{Sec}[e+f x]^2\right)^3\right)+\frac{(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x]^5 \text{Sec}[e+f x]^6 \text{Sin}[f x]}{40 (a+b)^3 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3}+\frac{(a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x]^3 \text{Sec}[e+f x]^6 (-11 a \text{Sin}[f x]-26 b \text{Sin}[f x])}{120 (a+b)^4 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3}+$$

$$\left((a+2 b+a \text{Cos}[2 e+2 f x])^3 \text{Csc}[e] \text{Csc}[e+f x] \text{Sec}[e+f x]^6 \left(23 a^2 \text{Sin}[f x]+106 a b \text{Sin}[f x]+173 b^2 \text{Sin}[f x]\right)\right) \Big/ \left(120 (a+b)^5 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3\right)+$$

$$\frac{(a+2 b+a \text{Cos}[2 e+2 f x]) \text{Sec}[2 e] \text{Sec}[e+f x]^6 \left(a b^5 \text{Sin}[2 e]+2 b^6 \text{Sin}[2 e]-a b^5 \text{Sin}[2 f x]\right)}{16 a^3 (a+b)^4 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3}+$$

$$\Big((a+2 b+a \text{Cos}[2 e+2 f x])^2 \text{Sec}[2 e] \text{Sec}[e+f x]^6 \left(-21 a^2 b^4 \text{Sin}[2 e]-52 a b^5 \text{Sin}[2 e]-16 b^6 \text{Sin}[2 e]+21 a^2 b^4 \text{Sin}[2 f x]+6 a b^5 \text{Sin}[2 f x]\right)\Big) \Big/ \left(64 a^3 (a+b)^5 f \left(a+b\,\text{Sec}[e+f x]^2\right)^3\right)$$

Problem 376: Unable to integrate problem.

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]^2}\;\text{Tan}[e+f\,x]^5\,dx$$

Optimal (type 3, 111 leaves, 7 steps):

$$-\frac{\sqrt{a}\;\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{f}+\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{f}-\frac{(a+2\,b)\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}{3\,b^2\,f}+\frac{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}{5\,b^2\,f}$$

Result (type 8, 27 leaves):

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]^2}\;\text{Tan}[e+f\,x]^5\,dx$$

Problem 377: Unable to integrate problem.

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]^2}\;\text{Tan}[e+f\,x]^3\,dx$$

Optimal (type 3, 80 leaves, 6 steps):

$$\frac{\sqrt{a}\;\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{f}-\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{f}+\frac{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}{3\,b\,f}$$

Result (type 8, 27 leaves):

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]^2}\;\text{Tan}[e+f\,x]^3\,dx$$

Problem 378: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a+b\,\text{Sec}[e+f\,x]^2}\;\text{Tan}[e+f\,x]\,dx$$

Optimal (type 3, 54 leaves, 5 steps):

$$-\frac{\sqrt{a}\;\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{f}+\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{f}$$

Result (type 3, 307 leaves):

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\;\mathrm{Cos}[e+fx]\right.$$

$$\left(\frac{2}{1+e^{2i(e+fx)}}+\left(i\sqrt{a}\left(2fx+i\,\mathrm{Log}\left[a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]+\right.\right.\right.$$

$$\left.\left.i\,\mathrm{Log}\left[a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]\right)\right)\Big/$$

$$\left.\left.\left(\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right)\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}\right)\Big/\left(\sqrt{2}\,f\sqrt{a+2b+a\,\mathrm{Cos}[2e+2fx]}\right)$$

Problem 379: Unable to integrate problem.

$$\int \mathrm{Cot}[e+fx]\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 70 leaves, 7 steps):

$$\frac{\sqrt{a}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{\sqrt{a}}\right]}{f}-\frac{\sqrt{a+b}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{\sqrt{a+b}}\right]}{f}$$

Result (type 8, 25 leaves):

$$\int \mathrm{Cot}[e+fx]\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}\,dx$$

Problem 380: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Cot}[e+fx]^3\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}\,dx$$

Optimal (type 3, 109 leaves, 8 steps):

$$-\frac{\sqrt{a}\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{\sqrt{a}}\right]}{f}+\frac{(2a+b)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{\sqrt{a+b}}\right]}{2\sqrt{a+b}\,f}-\frac{\mathrm{Cot}[e+fx]^2\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{2f}$$

Result (type 3, 527 leaves):

$$\frac{1}{\sqrt{2}\, f \sqrt{a+2b+a\,\text{Cos}[2e+2fx]}} e^{i(e+fx)} \sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\, \text{Cos}[e+fx] \left(\frac{1+e^{2i(e+fx)}}{\left(-1+e^{2i(e+fx)}\right)^2} - \frac{1}{\sqrt{a+b}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\right.$$

$$\left(-2\,i\sqrt{a}\sqrt{a+b}\,fx+(2a+b)\,\text{Log}\left[1-e^{2i(e+fx)}\right]+\sqrt{a}\sqrt{a+b}\,\text{Log}\left[a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]+\right.$$

$$\sqrt{a}\sqrt{a+b}\,\text{Log}\left[a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]-$$

$$2a\,\text{Log}\left[a+b+a\,e^{2i(e+fx)}+b\,e^{2i(e+fx)}+\sqrt{a+b}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]-$$

$$\left.\left.b\,\text{Log}\left[a+b+a\,e^{2i(e+fx)}+b\,e^{2i(e+fx)}+\sqrt{a+b}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]\right)\right)\sqrt{a+b\,\text{Sec}[e+fx]^2}$$

Problem 381: Unable to integrate problem.

$$\int \text{Cot}[e+fx]^5 \sqrt{a+b\,\text{Sec}[e+fx]^2}\, dx$$

Optimal (type 3, 161 leaves, 9 steps) :

$$\frac{\sqrt{a}\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+fx]^2}}{\sqrt{a}}\right]}{f} - \frac{\left(8a^2+12ab+3b^2\right)\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+fx]^2}}{\sqrt{a+b}}\right]}{8(a+b)^{3/2} f} +$$

$$\frac{(4a+3b)\,\text{Cot}[e+fx]^2\sqrt{a+b\,\text{Sec}[e+fx]^2}}{8(a+b)\,f} - \frac{\text{Cot}[e+fx]^4\sqrt{a+b\,\text{Sec}[e+fx]^2}}{4f}$$

Result (type 8, 27 leaves) :

$$\int \text{Cot}[e+fx]^5 \sqrt{a+b\,\text{Sec}[e+fx]^2}\, dx$$

Problem 382: Unable to integrate problem.

$$\int \sqrt{a+b\,\text{Sec}[e+fx]^2}\, \text{Tan}[e+fx]^6\, dx$$

Optimal (type 3, 219 leaves, 10 steps) :

$$-\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}+\frac{\left(a^3+5 a^2 b+15 a b^2-5 b^3\right)\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{16\, b^{5/2} f}-$$

$$\frac{(a-b)\,(a+5 b)\,\text{Tan}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{16\, b^2 f}+\frac{(a-5 b)\,\text{Tan}[e+f x]^3\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{24\, b f}+\frac{\text{Tan}[e+f x]^5\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{6 f}$$

Result (type 8, 27 leaves) :

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\,\text{Tan}[e+f x]^6\,dx$$

- **Problem 383: Unable to integrate problem.**

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\,\text{Tan}[e+f x]^4\,dx$$

Optimal (type 3, 165 leaves, 9 steps) :

$$\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}-\frac{\left(a^2+6 a b-3 b^2\right)\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{8\, b^{3/2} f}+$$

$$\frac{(a-3 b)\,\text{Tan}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{8\, b f}+\frac{\text{Tan}[e+f x]^3\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{4 f}$$

Result (type 8, 27 leaves) :

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\,\text{Tan}[e+f x]^4\,dx$$

- **Problem 384: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\sqrt{a+b\,\text{Sec}[e+f x]^2}\,\text{Tan}[e+f x]^2\,dx$$

Optimal (type 3, 118 leaves, 8 steps) :

$$-\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}+\frac{(a-b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{2\sqrt{b}\, f}+\frac{\text{Tan}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{2 f}$$

Result (type 3, 526 leaves) :

$$\frac{1}{\sqrt{2}\, f \sqrt{a+2 b+a \operatorname{Cos}[2 e+2 f x]}}$$

$$e^{i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}\, \operatorname{Cos}[e+f x] \left(-\frac{i \left(-1+e^{2 i (e+f x)}\right)}{\left(1+e^{2 i (e+f x)}\right)^2}+\frac{1}{\sqrt{b} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}}\right.$$

$$\left(-2 \sqrt{a} \sqrt{b}\, f x+i \sqrt{a} \sqrt{b} \operatorname{Log}\left[a+2 b+a e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]-i \sqrt{a} \sqrt{b} \operatorname{Log}\left[a+a e^{2 i (e+f x)}+2 b e^{2 i (e+f x)}+\right.\right.$$

$$\left.\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]-a \operatorname{Log}\left[\frac{2 \left(\sqrt{b} \left(-1+e^{2 i (e+f x)}\right)-i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right) f}{(a-b) \left(1+e^{2 i (e+f x)}\right)}\right]+$$

$$\left.\left. b \operatorname{Log}\left[\frac{2 \left(\sqrt{b} \left(-1+e^{2 i (e+f x)}\right)-i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right) f}{(a-b) \left(1+e^{2 i (e+f x)}\right)}\right]\right)\right) \sqrt{a+b \operatorname{Sec}[e+f x]^2}$$

- **Problem 385: Unable to integrate problem.**

$$\int \sqrt{a+b \operatorname{Sec}[e+f x]^2}\, dx$$

Optimal (type 3, 79 leaves, 6 steps):

$$\frac{\sqrt{a} \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[e+f x]}{\sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}\right]}{f}+\frac{\sqrt{b} \operatorname{ArcTanh}\left[\frac{\sqrt{b} \operatorname{Tan}[e+f x]}{\sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}\right]}{f}$$

Result (type 8, 18 leaves):

$$\int \sqrt{a+b \operatorname{Sec}[e+f x]^2}\, dx$$

- **Problem 386: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cot}[e+f x]^2 \sqrt{a+b \operatorname{Sec}[e+f x]^2}\, dx$$

Optimal (type 3, 69 leaves, 6 steps):

$$-\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}-\frac{\text{Cot}[e+f x]\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{f}$$

Result (type 3, 306 leaves):

$$\left(e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\,\text{Cos}[e+fx]\left(-\frac{2i}{-1+e^{2i(e+fx)}}+\left(\sqrt{a}\left(-2fx+i\,\text{Log}\left[a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]-i\,\text{Log}\left[a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]\right)\right)\Big/\left(\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right)\sqrt{a+b\,\text{Sec}[e+fx]^2}\right)\Big/\left(\sqrt{2}\,f\,\sqrt{a+2b+a\,\text{Cos}[2e+2fx]}\right)$$

Problem 387: Unable to integrate problem.

$$\int \text{Cot}[e+f x]^4\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 114 leaves, 7 steps):

$$\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}+\frac{(3a+2b)\,\text{Cot}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3(a+b)f}-\frac{\text{Cot}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3f}$$

Result (type 8, 27 leaves):

$$\int \text{Cot}[e+f x]^4\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Problem 388: Unable to integrate problem.

$$\int \text{Cot}[e+f x]^6\sqrt{a+b\,\text{Sec}[e+f x]^2}\,dx$$

Optimal (type 3, 167 leaves, 8 steps):

$$-\frac{\sqrt{a}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}-\frac{\left(15a^2+25ab+8b^2\right)\text{Cot}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15(a+b)^2 f}-\frac{(b-5(a+b))\,\text{Cot}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15(a+b)f}-\frac{\text{Cot}[e+f x]^5\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{5f}$$

Result (type 8, 27 leaves) :

$$\int \text{Cot}[e+f x]^6 \sqrt{a+b \,\text{Sec}[e+f x]^2}\, dx$$

- **Problem 389: Unable to integrate problem.**

$$\int \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} \text{Tan}[e+f x]^5 \, dx$$

Optimal (type 3, 135 leaves, 8 steps) :

$$-\frac{a^{3/2} \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{f}+\frac{a \sqrt{a+b \,\text{Sec}[e+f x]^2}}{f}+\frac{\left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2}}{3 f}-\frac{(a+2 b) \left(a+b \,\text{Sec}[e+f x]^2\right)^{5/2}}{5 b^2 f}+\frac{\left(a+b \,\text{Sec}[e+f x]^2\right)^{7/2}}{7 b^2 f}$$

Result (type 8, 27 leaves) :

$$\int \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} \text{Tan}[e+f x]^5 \, dx$$

- **Problem 390: Unable to integrate problem.**

$$\int \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} \text{Tan}[e+f x]^3 \, dx$$

Optimal (type 3, 104 leaves, 7 steps) :

$$\frac{a^{3/2} \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{f}-\frac{a \sqrt{a+b \,\text{Sec}[e+f x]^2}}{f}-\frac{\left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2}}{3 f}+\frac{\left(a+b \,\text{Sec}[e+f x]^2\right)^{5/2}}{5 b f}$$

Result (type 8, 27 leaves) :

$$\int \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} \text{Tan}[e+f x]^3 \, dx$$

- **Problem 391: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} \text{Tan}[e+f x] \, dx$$

Optimal (type 3, 78 leaves, 6 steps) :

$$-\frac{a^{3/2} \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{f}+\frac{a \sqrt{a+b \,\text{Sec}[e+f x]^2}}{f}+\frac{\left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2}}{3 f}$$

Result (type 3, 343 leaves) :

$$\left(\sqrt{2}\, e^{i (e+f x)} \sqrt{4 b + a e^{-2 i (e+f x)} \left(1 + e^{2 i (e+f x)}\right)^2}\, \text{Cos}[e + f x]^3\right.$$

$$\left(\frac{8 \left(b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2\right)}{\left(1 + e^{2 i (e+f x)}\right)^3} + \left(3 i a^{3/2} \left(2 f x + i \text{Log}\left[a + 2 b + a e^{2 i (e+f x)} + \sqrt{a} \sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right] + \right.\right.\right.$$

$$\left.\left. i \text{Log}\left[a + a e^{2 i (e+f x)} + 2 b e^{2 i (e+f x)} + \sqrt{a} \sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right]\right)\right) \Big/$$

$$\left.\left.\left(\sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right)\right) \left(a + b \text{Sec}[e + f x]^2\right)^{3/2}\right) \Big/ \left(3 f \left(a + 2 b + a \text{Cos}[2 e + 2 f x]\right)^{3/2}\right)$$

- **Problem 392: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e + f x] \left(a + b \text{Sec}[e + f x]^2\right)^{3/2} dx$$

Optimal (type 3, 91 leaves, 8 steps) :

$$\frac{a^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a + b \text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{f} - \frac{(a + b)^{3/2} \text{ArcTanh}\left[\frac{\sqrt{a + b \text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{f} + \frac{b \sqrt{a + b \text{Sec}[e + f x]^2}}{f}$$

Result (type 3, 506 leaves) :

$$\frac{1}{f \left(a + 2 b + a \text{Cos}[2 e + 2 f x]\right)^{3/2}} \sqrt{2}\, e^{i (e+f x)} \sqrt{4 b + a e^{-2 i (e+f x)} \left(1 + e^{2 i (e+f x)}\right)^2}\, \text{Cos}[e + f x]^3 \left(\frac{2 b}{1 + e^{2 i (e+f x)}} + \frac{1}{\sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}}\right.$$

$$\left(-2 i a^{3/2} f x + 2 (a + b)^{3/2} \text{Log}\left[1 - e^{2 i (e+f x)}\right] + a^{3/2} \text{Log}\left[a + 2 b + a e^{2 i (e+f x)} + \sqrt{a} \sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right] + \right.$$

$$a^{3/2} \text{Log}\left[a + a e^{2 i (e+f x)} + 2 b e^{2 i (e+f x)} + \sqrt{a} \sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right] -$$

$$2 a \sqrt{a + b}\, \text{Log}\left[a + b + a e^{2 i (e+f x)} + b e^{2 i (e+f x)} + \sqrt{a + b} \sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right] -$$

$$\left.\left. 2 b \sqrt{a + b}\, \text{Log}\left[a + b + a e^{2 i (e+f x)} + b e^{2 i (e+f x)} + \sqrt{a + b} \sqrt{4 b e^{2 i (e+f x)} + a \left(1 + e^{2 i (e+f x)}\right)^2}\right]\right)\right) \left(a + b \text{Sec}[e + f x]^2\right)^{3/2}$$

- **Problem 393: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f x]^3 \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 114 leaves, 8 steps) :

$$-\frac{a^{3/2} \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{f}+\frac{(2 a-b) \sqrt{a+b} \,\text{ArcTanh}\left[\frac{\sqrt{a+b \,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{2 f}-\frac{(a+b) \,\text{Cot}[e+f x]^2 \sqrt{a+b \,\text{Sec}[e+f x]^2}}{2 f}$$

Result (type 3, 622 leaves) :

$$\frac{1}{f (a+2 b+a \,\text{Cos}[2 e+2 f x])^{3/2}}$$

$$\sqrt{2} \, e^{i (e+f x)} \sqrt{4 b+a \, e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \,\text{Cos}[e+f x]^3 \left(\frac{(a+b) \left(1+e^{2 i (e+f x)}\right)}{\left(-1+e^{2 i (e+f x)}\right)^2}-\frac{1}{\sqrt{a+b} \sqrt{4 b \, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}}\right.$$

$$\left(-2 i a^{3/2} \sqrt{a+b} \, f x+\left(2 a^2+a b-b^2\right) \text{Log}\left[1-e^{2 i (e+f x)}\right]+a^{3/2} \sqrt{a+b} \,\text{Log}\left[a+2 b+a \, e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b \, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]+\right.$$

$$a^{3/2} \sqrt{a+b} \,\text{Log}\left[a+a \, e^{2 i (e+f x)}+2 b \, e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b \, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]-$$

$$2 a^2 \,\text{Log}\left[a+b+a \, e^{2 i (e+f x)}+b \, e^{2 i (e+f x)}+\sqrt{a+b} \sqrt{4 b \, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]-$$

$$a b \,\text{Log}\left[a+b+a \, e^{2 i (e+f x)}+b \, e^{2 i (e+f x)}+\sqrt{a+b} \sqrt{4 b \, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]+$$

$$\left.\left.b^2 \,\text{Log}\left[a+b+a \, e^{2 i (e+f x)}+b \, e^{2 i (e+f x)}+\sqrt{a+b} \sqrt{4 b \, e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right]\right)\right) \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2}$$

- **Problem 394: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f x]^5 \left(a+b \,\text{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 159 leaves, 9 steps) :

$$\frac{a^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{f}-\frac{\left(8\,a^2+4\,a\,b-b^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a+b}}\right]}{8\,\sqrt{a+b}\,f}+$$
$$\frac{(4\,a-b)\,\text{Cot}[e+f\,x]^2\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{8\,f}-\frac{(a+b)\,\text{Cot}[e+f\,x]^4\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{4\,f}$$

Result (type 3, 684 leaves) :

$$\frac{1}{2\,\sqrt{2}\,f\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{3/2}}\,e^{i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\text{Cos}[e+f\,x]^3$$
$$\left(-\frac{\left(1+e^{2\,i\,(e+f\,x)}\right)\,\left(b\,\left(1+6\,e^{2\,i\,(e+f\,x)}+e^{4\,i\,(e+f\,x)}\right)+a\,\left(6-4\,e^{2\,i\,(e+f\,x)}+6\,e^{4\,i\,(e+f\,x)}\right)\right)}{\left(-1+e^{2\,i\,(e+f\,x)}\right)^4}+\frac{1}{\sqrt{a+b}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}}\right.$$
$$\left(-8\,i\,a^{3/2}\,\sqrt{a+b}\,f\,x+\left(8\,a^2+4\,a\,b-b^2\right)\,\text{Log}\left[1-e^{2\,i\,(e+f\,x)}\right]+4\,a^{3/2}\,\sqrt{a+b}\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+\right.$$
$$4\,a^{3/2}\,\sqrt{a+b}\,\text{Log}\left[a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]-$$
$$8\,a^2\,\text{Log}\left[a+b+a\,e^{2\,i\,(e+f\,x)}+b\,e^{2\,i\,(e+f\,x)}+\sqrt{a+b}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]-$$
$$4\,a\,b\,\text{Log}\left[a+b+a\,e^{2\,i\,(e+f\,x)}+b\,e^{2\,i\,(e+f\,x)}+\sqrt{a+b}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+$$
$$\left.\left.b^2\,\text{Log}\left[a+b+a\,e^{2\,i\,(e+f\,x)}+b\,e^{2\,i\,(e+f\,x)}+\sqrt{a+b}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]\right)\right)\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}$$

- **Problem 395: Unable to integrate problem.**

$$\int\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\,\text{Tan}[e+f\,x]^6\,dx$$

Optimal (type 3, 290 leaves, 11 steps) :

$$-\frac{a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}+\frac{\left(3 a^4+20 a^3 b+90 a^2 b^2-60 a b^3-5 b^4\right)\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{128\, b^{5/2} f}-$$

$$\frac{\left(3 a^3+17 a^2 b-55 a b^2-5 b^3\right)\text{Tan}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{128\, b^2 f}+\frac{\left(3 a^2-50 a b-5 b^2\right)\text{Tan}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{192\, b f}+$$

$$\frac{(9 a+b)\,\text{Tan}[e+f x]^5\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{48 f}+\frac{b\,\text{Tan}[e+f x]^7\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{8 f}$$

Result (type 8, 27 leaves) :

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\text{Tan}[e+f x]^6\,dx$$

- **Problem 396: Unable to integrate problem.**

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\text{Tan}[e+f x]^4\,dx$$

Optimal (type 3, 214 leaves, 10 steps) :

$$\frac{a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}-\frac{(a-b)\left(a^2+10 a b+b^2\right)\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{16\, b^{3/2} f}+$$

$$\frac{\left(a^2-8 a b-b^2\right)\text{Tan}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{16\, b f}+\frac{(7 a+b)\,\text{Tan}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{24 f}+\frac{b\,\text{Tan}[e+f x]^5\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{6 f}$$

Result (type 8, 27 leaves) :

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\text{Tan}[e+f x]^4\,dx$$

- **Problem 397: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\text{Tan}[e+f x]^2\,dx$$

Optimal (type 3, 166 leaves, 9 steps) :

$$-\frac{a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{f}+\frac{\left(3 a^2-6 a b-b^2\right)\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{8\sqrt{b}\, f}+$$

$$\frac{(5 a+b)\,\text{Tan}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{8 f}+\frac{b\,\text{Tan}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{4 f}$$

Result (type 3, 702 leaves) :

$$\frac{1}{2\sqrt{2}\, f\, (a+2b+a\,\text{Cos}[2(e+fx)])^{3/2}}$$

$$e^{i(e+fx)}\sqrt{4b+a\,e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\;\text{Cos}[e+fx]^3\left(-\frac{i\left(-1+e^{2i(e+fx)}\right)\left(5a\left(1+e^{2i(e+fx)}\right)^2-b\left(1-6e^{2i(e+fx)}+e^{4i(e+fx)}\right)\right)}{\left(1+e^{2i(e+fx)}\right)^4}+\right.$$

$$\frac{1}{\sqrt{b}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}}\left(-8a^{3/2}\sqrt{b}\,f\,x+4\,i\,a^{3/2}\sqrt{b}\,\text{Log}\left[a+2b+a\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]-\right.$$

$$4\,i\,a^{3/2}\sqrt{b}\,\text{Log}\left[a+a\,e^{2i(e+fx)}+2b\,e^{2i(e+fx)}+\sqrt{a}\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right]-$$

$$3a^2\,\text{Log}\left[\frac{4\left(\sqrt{b}\left(-1+e^{2i(e+fx)}\right)-i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)f}{\left(3a^2-6ab-b^2\right)\left(1+e^{2i(e+fx)}\right)}\right]+$$

$$6ab\,\text{Log}\left[\frac{4\left(\sqrt{b}\left(-1+e^{2i(e+fx)}\right)-i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)f}{\left(3a^2-6ab-b^2\right)\left(1+e^{2i(e+fx)}\right)}\right]+$$

$$\left.\left.b^2\,\text{Log}\left[\frac{4\left(\sqrt{b}\left(-1+e^{2i(e+fx)}\right)-i\sqrt{4b\,e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)f}{\left(3a^2-6ab-b^2\right)\left(1+e^{2i(e+fx)}\right)}\right]\right)\right)\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}$$

- **Problem 398: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}dx$$

Optimal (type 3, 118 leaves, 7 steps) :

$$\frac{a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{f}+\frac{\sqrt{b}\,(3a+b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{2f}+\frac{b\,\text{Tan}[e+fx]\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}{2f}$$

Result (type 3, 527 leaves) :

$$\frac{1}{f\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{3/2}}\sqrt{2}\,e^{i\,(e+f\,x)}\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\text{Cos}[e+f\,x]^3$$

$$\left(-\frac{i\,b\left(-1+e^{2\,i\,(e+f\,x)}\right)}{\left(1+e^{2\,i\,(e+f\,x)}\right)^2}+\frac{1}{\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}}\left(2\,a^{3/2}\,f\,x-i\,a^{3/2}\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]+\right.\right.$$

$$i\,a^{3/2}\,\text{Log}\left[a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right]-$$

$$3\,a\,\sqrt{b}\,\text{Log}\left[\frac{-2\,\sqrt{b}\left(-1+e^{2\,i\,(e+f\,x)}\right)f+2\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{b\,(3\,a+b)\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]-$$

$$\left.\left.b^{3/2}\,\text{Log}\left[\frac{-2\,\sqrt{b}\left(-1+e^{2\,i\,(e+f\,x)}\right)f+2\,i\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,f}{b\,(3\,a+b)\left(1+e^{2\,i\,(e+f\,x)}\right)}\right]\right)\right)\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}$$

- **Problem 399: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f\,x]^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\,dx$$

Optimal (type 3, 111 leaves, 8 steps) :

$$-\frac{a^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{f}+\frac{b^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{f}-\frac{(a+b)\,\text{Cot}[e+f\,x]\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{f}$$

Result (type 3, 410 leaves) :

$$\left(\sqrt{2}\, e^{i (e+f x)} \sqrt{4 b + a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2} \operatorname{Cos}[e+f x]^3\right.$$

$$\left(-\frac{2 i (a+b)}{-1+e^{2 i (e+f x)}} + \left(i a^{3/2} \operatorname{Log}\left[a+2 b+a e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right] - i a^{3/2} \operatorname{Log}\left[a+a e^{2 i (e+f x)}+2 b e^{2 i (e+f x)}+\right.\right.\right.$$

$$\left.\left.\left.\sqrt{a} \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right] - 2 \left(a^{3/2} f x + b^{3/2} \operatorname{Log}\left[\frac{\left(\sqrt{b} \left(-1+e^{2 i (e+f x)}\right) - i \sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right) f}{b^2 \left(1+e^{2 i (e+f x)}\right)}\right]\right)\right) \Big/$$

$$\left.\left(\sqrt{4 b e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right) \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2}\right) \Big/ \left(f \left(a+2 b+a \operatorname{Cos}[2 e+2 f x]\right)^{3/2}\right)$$

- **Problem 400: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \operatorname{Cot}[e+f x]^4 \left(a+b \operatorname{Sec}[e+f x]^2\right)^{3/2} dx$$

Optimal (type 3, 112 leaves, 7 steps) :

$$\frac{a^{3/2} \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Tan}[e+f x]}{\sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}\right]}{f} + \frac{(3 a-b) \operatorname{Cot}[e+f x] \sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}{3 f} - \frac{(a+b) \operatorname{Cot}[e+f x]^3 \sqrt{a+b+b \operatorname{Tan}[e+f x]^2}}{3 f}$$

Result (type 3, 354 leaves) :

$$\left(\sqrt{2}\, e^{i(e+fx)} \sqrt{4b + a\, e^{-2i(e+fx)} \left(1+e^{2i(e+fx)}\right)^2}\, \mathrm{Cos}[e+fx]^3 \left(\frac{8\, i \left(b\, e^{2i(e+fx)} + a\left(1 - e^{2i(e+fx)} + e^{4i(e+fx)}\right)\right)}{\left(-1+e^{2i(e+fx)}\right)^3} + \left(3\, a^{3/2} \left(2 f x - i\, \mathrm{Log}\left[a + 2b + a\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1+e^{2i(e+fx)}\right)^2}\right] + i\, \mathrm{Log}\left[a + a\, e^{2i(e+fx)} + 2b\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1+e^{2i(e+fx)}\right)^2}\right]\right)\right) \Big/ \left(\sqrt{4b\, e^{2i(e+fx)} + a\left(1+e^{2i(e+fx)}\right)^2}\right)\right) \left(a + b\,\mathrm{Sec}[e+fx]^2\right)^{3/2}\right) \Big/ \left(3 f \left(a + 2b + a\,\mathrm{Cos}[2e + 2fx]\right)^{3/2}\right)$$

Problem 401: Unable to integrate problem.

$$\int \mathrm{Cot}[e+fx]^6 \left(a + b\,\mathrm{Sec}[e+fx]^2\right)^{3/2} dx$$

Optimal (type 3, 165 leaves, 8 steps):

$$-\frac{a^{3/2}\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+fx]}{\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}\right]}{f} - \frac{\left(15a^2 + 10ab - 2b^2\right)\mathrm{Cot}[e+fx]\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}{15(a+b)f} + \frac{(5a-b)\,\mathrm{Cot}[e+fx]^3\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}{15f} - \frac{(a+b)\,\mathrm{Cot}[e+fx]^5\sqrt{a+b+b\,\mathrm{Tan}[e+fx]^2}}{5f}$$

Result (type 8, 27 leaves):

$$\int \mathrm{Cot}[e+fx]^6 \left(a + b\,\mathrm{Sec}[e+fx]^2\right)^{3/2} dx$$

Problem 402: Unable to integrate problem.

$$\int \frac{\mathrm{Tan}[e+fx]^5}{\sqrt{a + b\,\mathrm{Sec}[e+fx]^2}}\, dx$$

Optimal (type 3, 89 leaves, 6 steps):

$$-\frac{\mathrm{ArcTanh}\left[\frac{\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{\sqrt{a}}\right]}{\sqrt{a}\, f} - \frac{(a+2b)\sqrt{a+b\,\mathrm{Sec}[e+fx]^2}}{b^2 f} + \frac{\left(a+b\,\mathrm{Sec}[e+fx]^2\right)^{3/2}}{3b^2 f}$$

Result (type 8, 27 leaves):

$$\int \frac{\mathrm{Tan}[e+fx]^5}{\sqrt{a + b\,\mathrm{Sec}[e+fx]^2}}\, dx$$

Problem 403: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 56 leaves, 5 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{\sqrt{a}\,f}+\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{b\,f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Tan}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 404: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 33 leaves, 4 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{\sqrt{a}\,f}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Tan}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 405: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 70 leaves, 7 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{\sqrt{a}\,f}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{\sqrt{a+b}\,f}$$

Result (type 8, 25 leaves):

$$\int \frac{\text{Cot}[e+f x]}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 406: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 116 leaves, 8 steps) :

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{\sqrt{a}\,f}+\frac{(2 a+3 b)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{2\,(a+b)^{3/2}\,f}-\frac{\text{Cot}[e+f x]^2\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}{2\,(a+b)\,f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cot}[e+f x]^3}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 407: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^5}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 166 leaves, 9 steps) :

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{\sqrt{a}\,f}-\frac{\left(8 a^2+20 a b+15 b^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{8\,(a+b)^{5/2}\,f}+$$
$$\frac{(4 a+7 b)\,\text{Cot}[e+f x]^2\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}{8\,(a+b)^2\,f}-\frac{\text{Cot}[e+f x]^4\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}{4\,(a+b)\,f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cot}[e+f x]^5}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 408: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]^6}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 173 leaves, 9 steps) :

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{\sqrt{a}\,f}+\frac{\left(3 a^2+10 a b+15 b^2\right)\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{8 b^{5/2} f}-\frac{(3 a+7 b)\,\text{Tan}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{8 b^2 f}+\frac{\text{Tan}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{4 b f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Tan}[e+f x]^6}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 409: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]^4}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 120 leaves, 8 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{\sqrt{a}\,f}-\frac{(a+3 b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{2 b^{3/2} f}+\frac{\text{Tan}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{2 b f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Tan}[e+f x]^4}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 410: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]^2}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 80 leaves, 7 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{\sqrt{a}\,f}+\frac{\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{\sqrt{b}\,f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Tan}[e+f x]^2}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Problem 411: Unable to integrate problem.

$$\int \frac{1}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 3, 39 leaves, 3 steps):

$$\frac{\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{\sqrt{a}\,f}$$

Result (type 8, 18 leaves):

$$\int \frac{1}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Problem 412: Unable to integrate problem.

$$\int \frac{\mathrm{Cot}[e+f\,x]^2}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 3, 74 leaves, 6 steps):

$$-\frac{\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{\sqrt{a}\,f}-\frac{\mathrm{Cot}[e+f\,x]\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{(a+b)\,f}$$

Result (type 8, 27 leaves):

$$\int \frac{\mathrm{Cot}[e+f\,x]^2}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Problem 413: Unable to integrate problem.

$$\int \frac{\mathrm{Cot}[e+f\,x]^4}{\sqrt{a+b\,\mathrm{Sec}[e+f\,x]^2}}\,dx$$

Optimal (type 3, 119 leaves, 7 steps):

$$\frac{\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Tan}[e+f\,x]}{\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}\right]}{\sqrt{a}\,f}+\frac{(3\,a+5\,b)\,\mathrm{Cot}[e+f\,x]\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{3\,(a+b)^2\,f}-\frac{\mathrm{Cot}[e+f\,x]^3\,\sqrt{a+b+b\,\mathrm{Tan}[e+f\,x]^2}}{3\,(a+b)\,f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cot}[e+f x]^4}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

- **Problem 414: Unable to integrate problem.**

$$\int \frac{\text{Cot}[e+f x]^6}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

Optimal (type 3, 172 leaves, 8 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{\sqrt{a}\,f}-\frac{\left(15 a^2+40 a b+33 b^2\right)\text{Cot}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15\,(a+b)^3 f}+\frac{(5 a+9 b)\,\text{Cot}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15\,(a+b)^2 f}-\frac{\text{Cot}[e+f x]^5\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{5\,(a+b)\,f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cot}[e+f x]^6}{\sqrt{a+b\,\text{Sec}[e+f x]^2}}\,dx$$

- **Problem 415: Unable to integrate problem.**

$$\int \frac{\text{Tan}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 88 leaves, 6 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{3/2} f}+\frac{(a+b)^2}{a\,b^2 f\sqrt{a+b\,\text{Sec}[e+f x]^2}}+\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{b^2 f}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Tan}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

- **Problem 416: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 63 leaves, 5 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{a^{3/2}\,f}-\frac{a+b}{a\,b\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 6, 1695 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Sin}[e+f\,x]^3\,\text{Tan}[e+f\,x]^4\right)\Big/$$

$$\left(4\sqrt{2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{3/2}\left(6\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left.\left(3\,a\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)$$

$$\left(\left(9\,a\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Sin}[e+f\,x]^5\right)\Big/\right.$$

$$\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(6\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(9\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Sin}[e+f\,x]^3\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{3/2}\right.$$

$$\left(6\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(3\,a\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{Sin}[e+f\,x]^3\left(\frac{2\,a\,f\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{a+b}+\right.\right.$$

$$\left.\left.\frac{2}{3}\,f\,\text{AppellF1}\left[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\text{Tan}[e+f\,x]\right)\Big/$$

$$\left(4\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{3/2}\left(6\,(a+b)\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\right.\right.$$

$$\left(3\,a\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)$$

$$\text{Sin}[e+f x]^2\Bigg)\Bigg)-\Bigg(3\,(a+b)\,\text{AppellF1}\Big[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Sin}[e+f x]^3$$

$$\Bigg(2\,f\,\Bigg(3\,a\,\text{AppellF1}\Big[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+(a+b)\,\text{AppellF1}\Big[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Bigg)$$

$$\text{Cos}[e+f x]\,\text{Sin}[e+f x]+6\,(a+b)\,\Bigg(\frac{2\,a\,f\,\text{AppellF1}\Big[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{a+b}+$$

$$\frac{2}{3}\,f\,\text{AppellF1}\Big[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)+$$

$$\text{Sin}[e+f x]^2\,\Bigg(3\,a\,\Bigg(\frac{15\,a\,f\,\text{AppellF1}\Big[4,\frac{1}{2},\frac{7}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{4\,(a+b)}+$$

$$\frac{3}{4}\,f\,\text{AppellF1}\Big[4,\frac{3}{2},\frac{5}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)+$$

$$(a+b)\,\Bigg(\frac{9\,a\,f\,\text{AppellF1}\Big[4,\frac{3}{2},\frac{5}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{4\,(a+b)}+$$

$$\frac{9}{4}\,f\,\text{AppellF1}\Big[4,\frac{5}{2},\frac{3}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Cos}[e+f x]\,\text{Sin}[e+f x]\Bigg)\Bigg)\Bigg)\,\text{Tan}[e+f x]\Bigg)\Bigg/$$

$$\Bigg(4\,\sqrt{2}\,f\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{3/2}\,\Bigg(6\,(a+b)\,\text{AppellF1}\Big[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+\Bigg(3\,a\,\text{AppellF1}\Big[3,\frac{1}{2},$$

$$\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+(a+b)\,\text{AppellF1}\Big[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Bigg)\,\text{Sin}[e+f x]^2\Bigg)^2\Bigg)+$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\,\text{Sin}[e+f x]\,\text{Tan}[e+f x]^2\Bigg)\Bigg/\Bigg(4\,\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{3/2}$$

$$\Bigg(6\,(a+b)\,\text{AppellF1}\Big[2,\frac{1}{2},\frac{3}{2},3,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+\Bigg(3\,a\,\text{AppellF1}\Big[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]+$$

$$(a+b)\,\text{AppellF1}\Big[3,\frac{3}{2},\frac{3}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\Big]\Bigg)\,\text{Sin}[e+f x]^2\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 417: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 57 leaves, 5 steps) :

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{3/2} f}+\frac{1}{a f \sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 3, 425 leaves) :

$$-\frac{(a+2 b+a\,\text{Cos}[2 e+2 f x])^{3/2}\,\text{Sec}[e+f x]^2}{8 b f \sqrt{a+2 b+a\,\text{Cos}[2 (e+f x)]}\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}+\left(e^{i (e+f x)} \sqrt{4 b+a e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}\,(a+2 b+a\,\text{Cos}[2 e+2 f x])^{3/2}\left(\frac{\sqrt{a}\,(a+4 b)\left(1+e^{2 i (e+f x)}\right)}{b\left(4 b e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2\right)}+\left(4 i f x-2\,\text{Log}\left[a+2 b+a e^{2 i (e+f x)}+\sqrt{a}\sqrt{4 b e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\right]-2\,\text{Log}\left[a+a e^{2 i (e+f x)}+2 b e^{2 i (e+f x)}+\sqrt{a}\sqrt{4 b e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\right]\right)\Big/\left(\sqrt{4 b e^{2 i (e+f x)}+a\left(1+e^{2 i (e+f x)}\right)^2}\right)\right)\text{Sec}[e+f x]^3\right)\Big/\left(8 \sqrt{2}\,a^{3/2} f \left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}\right)$$

Problem 418: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 100 leaves, 8 steps) :

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{3/2} f}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{(a+b)^{3/2} f}-\frac{b}{a (a+b) f \sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 8, 25 leaves) :

$$\int \frac{\text{Cot}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Problem 419: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 153 leaves, 9 steps) :

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{a^{3/2}\,f}+\frac{(2\,a+5\,b)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a+b}}\right]}{2\,(a+b)^{5/2}\,f}-\frac{(a-2\,b)\,b}{2\,a\,(a+b)^2\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}-\frac{\text{Cot}[e+f\,x]^2}{2\,(a+b)\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 8, 27 leaves):

$$\int\frac{\text{Cot}[e+f\,x]^3}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Problem 420: Unable to integrate problem.

$$\int\frac{\text{Cot}[e+f\,x]^5}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 213 leaves, 10 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{a^{3/2}\,f}-\frac{\left(8\,a^2+28\,a\,b+35\,b^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a+b}}\right]}{8\,(a+b)^{7/2}\,f}+\frac{b\,\left(4\,a^2+11\,a\,b-8\,b^2\right)}{8\,a\,(a+b)^3\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}+\frac{(4\,a+9\,b)\,\text{Cot}[e+f\,x]^2}{8\,(a+b)^2\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}-\frac{\text{Cot}[e+f\,x]^4}{4\,(a+b)\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 8, 27 leaves):

$$\int\frac{\text{Cot}[e+f\,x]^5}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Problem 421: Unable to integrate problem.

$$\int\frac{\text{Tan}[e+f\,x]^6}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 172 leaves, 9 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{a^{3/2}\,f}-\frac{(3\,a+5\,b)\,\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{2\,b^{5/2}\,f}-\frac{(a+b)\,\text{Tan}[e+f\,x]^3}{a\,b\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}+\frac{(3\,a+2\,b)\,\text{Tan}[e+f\,x]\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}{2\,a\,b^2\,f}$$

Result (type 8, 27 leaves):

$$\int\frac{\text{Tan}[e+f\,x]^6}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}\,dx$$

Problem 422: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 116 leaves, 8 steps) :

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{3/2} f}+\frac{\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{b^{3/2} f}-\frac{(a+b)\,\text{Tan}[e+f x]}{a\,b\,f\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Tan}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Problem 423: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 71 leaves, 5 steps) :

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{3/2} f}+\frac{\text{Tan}[e+f x]}{a\,f\,\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 3, 764 leaves) :

$$-\left(\left(e^{i(e+fx)}\sqrt{4b+a e^{-2i(e+fx)}\left(1+e^{2i(e+fx)}\right)^2}\ (a+2b+a\cos[2e+2fx])^{3/2}\right.\right.$$
$$\left(-3 i a^{3/2}\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}-4 i\sqrt{a}\, b\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+\right.$$
$$3 i a^{3/2} e^{2i(e+fx)}\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+4 i\sqrt{a}\, b\, e^{2i(e+fx)}\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}+$$
$$4a^2 f x+4abfx+8a^2 e^{2i(e+fx)} f x+24ab e^{2i(e+fx)} f x+16b^2 e^{2i(e+fx)} f x+4a^2 e^{4i(e+fx)} f x+4ab e^{4i(e+fx)} f x-$$
$$2 i (a+b)\left(4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)\text{Log}\left[e^{-2ie}\left(a+2b+a e^{2i(e+fx)}+\sqrt{a}\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]+$$
$$\left.2 i (a+b)\left(4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)\text{Log}\left[e^{-2ie}\left(a+a e^{2i(e+fx)}+2b e^{2i(e+fx)}+\sqrt{a}\sqrt{4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2}\right)\right]\right)$$
$$\left.\left.\text{Sec}[e+fx]^3\right)\Big/\left(8\sqrt{2}\, a^{3/2}(a+b)\left(4b e^{2i(e+fx)}+a\left(1+e^{2i(e+fx)}\right)^2\right)^{3/2} f\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}\right)\right)+$$
$$\frac{(a+2b+a\cos[2e+2fx])^{3/2}\,\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]}{8(a+b) f\sqrt{a+2b+a\cos[2(e+fx)]}\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}$$

Problem 424: Unable to integrate problem.

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 77 leaves, 4 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+fx]}{\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}\right]}{a^{3/2} f}-\frac{b\,\text{Tan}[e+fx]}{a(a+b) f\sqrt{a+b+b\,\text{Tan}[e+fx]^2}}$$

Result (type 8, 18 leaves):

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}\,dx$$

Problem 425: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+fx]^2}{\left(a+b\,\text{Sec}[e+fx]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 119 leaves, 7 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{3/2} f}-\frac{b\,\text{Cot}[e+f x]}{a\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}-\frac{(a-b)\,\text{Cot}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{a\,(a+b)^2 f}$$

Result (type 8, 27 leaves) :

$$\int\frac{\text{Cot}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Problem 426: Unable to integrate problem.

$$\int\frac{\text{Cot}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 174 leaves, 8 steps) :

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{3/2} f}-\frac{b\,\text{Cot}[e+f x]^3}{a\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+\frac{(3a-b)\,(a+3b)\,\text{Cot}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3a\,(a+b)^3 f}-\frac{(a-3b)\,\text{Cot}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3a\,(a+b)^2 f}$$

Result (type 8, 27 leaves) :

$$\int\frac{\text{Cot}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Problem 427: Unable to integrate problem.

$$\int\frac{\text{Cot}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

Optimal (type 3, 241 leaves, 9 steps) :

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{3/2} f}-\frac{b\,\text{Cot}[e+f x]^5}{a\,(a+b)\,f\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}-\frac{\left(15a^3+55a^2 b+73a b^2-15b^3\right)\text{Cot}[e+f x]\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15a\,(a+b)^4 f}+\frac{\left(5a^2+14a b-15b^2\right)\text{Cot}[e+f x]^3\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15a\,(a+b)^3 f}-\frac{(a-5b)\,\text{Cot}[e+f x]^5\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{5a\,(a+b)^2 f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cot}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}\,dx$$

- **Problem 428: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 97 leaves, 6 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{5/2}\,f}+\frac{(a+b)^2}{3\,a\,b^2\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}+\frac{\frac{1}{a^2}-\frac{1}{b^2}}{f\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 6, 1699 leaves):

$$\left((a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Sin}[e+f x]^5\,\text{Tan}[e+f x]^6\right)\Big/$$
$$\Bigg(3\sqrt{2}\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{5/2}\left(8\,(a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\right.$$
$$\left.\left(5\,a\,\text{AppellF1}\left[4,\frac{1}{2},\frac{7}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[4,\frac{3}{2},\frac{5}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)$$
$$\Bigg(\left(5\,a\,(a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Sin}[e+f x]^7\right)\Big/$$
$$\left(3\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{7/2}\left(8\,(a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[4,\frac{1}{2},\frac{7}{2},5,\right.\right.\right.$$
$$\left.\left.\left.\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[4,\frac{3}{2},\frac{5}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)+$$
$$\left(5\,(a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Sin}[e+f x]^5\right)\Big/\left(3\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{5/2}\right.$$
$$\left(8\,(a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[4,\frac{1}{2},\frac{7}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\right.\right.$$
$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[4,\frac{3}{2},\frac{5}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)+$$
$$\left((a+b)\,\text{Sin}[e+f x]^5\left(\frac{15\,a\,f\,\text{AppellF1}\left[4,\frac{1}{2},\frac{7}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Cos}[e+f x]\,\text{Sin}[e+f x]}{4\,(a+b)}+\right.\right.$$

$$\frac{3}{4} f \, \text{AppellF1}\left[4, \frac{3}{2}, \frac{5}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]\Bigg) \, \text{Tan}[e+f x]\Bigg) \Big/$$

$$\Bigg(3 \sqrt{2} \, f \left(a+b-a \, \text{Sin}[e+f x]^2\right)^{5/2} \Bigg(8 (a+b) \, \text{AppellF1}\left[3, \frac{1}{2}, \frac{5}{2}, 4, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] +$$

$$\left(5 a \, \text{AppellF1}\left[4, \frac{1}{2}, \frac{7}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] + (a+b) \, \text{AppellF1}\left[4, \frac{3}{2}, \frac{5}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right]\right)$$

$$\text{Sin}[e+f x]^2\Bigg)\Bigg) - \Bigg((a+b) \, \text{AppellF1}\left[3, \frac{1}{2}, \frac{5}{2}, 4, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Sin}[e+f x]^5$$

$$\Bigg(2 f \left(5 a \, \text{AppellF1}\left[4, \frac{1}{2}, \frac{7}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] + (a+b) \, \text{AppellF1}\left[4, \frac{3}{2}, \frac{5}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right]\right)$$

$$\text{Cos}[e+f x] \, \text{Sin}[e+f x] + 8 (a+b) \Bigg(\frac{15 a f \, \text{AppellF1}\left[4, \frac{1}{2}, \frac{7}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]}{4 (a+b)} +$$

$$\frac{3}{4} f \, \text{AppellF1}\left[4, \frac{3}{2}, \frac{5}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]\Bigg) +$$

$$\text{Sin}[e+f x]^2 \Bigg(5 a \Bigg(\frac{28 a f \, \text{AppellF1}\left[5, \frac{1}{2}, \frac{9}{2}, 6, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]}{5 (a+b)} +$$

$$\frac{4}{5} f \, \text{AppellF1}\left[5, \frac{3}{2}, \frac{7}{2}, 6, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]\Bigg) +$$

$$(a+b) \Bigg(\frac{4 a f \, \text{AppellF1}\left[5, \frac{3}{2}, \frac{7}{2}, 6, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]}{a+b} +$$

$$\frac{12}{5} f \, \text{AppellF1}\left[5, \frac{5}{2}, \frac{5}{2}, 6, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] \text{Cos}[e+f x] \, \text{Sin}[e+f x]\Bigg)\Bigg)\Bigg) \, \text{Tan}[e+f x]\Bigg) \Big/$$

$$\Bigg(3 \sqrt{2} \, f \left(a+b-a \, \text{Sin}[e+f x]^2\right)^{5/2} \Bigg(8 (a+b) \, \text{AppellF1}\left[3, \frac{1}{2}, \frac{5}{2}, 4, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right] + \Bigg(5 a \, \text{AppellF1}\Bigg[4, \frac{1}{2},$$

$$\frac{7}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\Bigg] + (a+b) \, \text{AppellF1}\left[4, \frac{3}{2}, \frac{5}{2}, 5, \text{Sin}[e+f x]^2, \frac{a \, \text{Sin}[e+f x]^2}{a+b}\right]\Bigg) \, \text{Sin}[e+f x]^2\Bigg)^2\Bigg) +$$

$$\left((a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\text{Sin}[e+f x]^3\,\text{Tan}[e+f x]^2\right)\Big/\left(3\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f x]^2\right)^{5/2}\left(8\,(a+b)\,\text{AppellF1}\left[3,\frac{1}{2},\frac{5}{2},4,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[4,\frac{1}{2},\frac{7}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]+(a+b)\,\text{AppellF1}\left[4,\frac{3}{2},\frac{5}{2},5,\text{Sin}[e+f x]^2,\frac{a\,\text{Sin}[e+f x]^2}{a+b}\right]\right)\text{Sin}[e+f x]^2\right)\right)$$

- **Problem 429: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 89 leaves, 6 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{5/2}\,f}-\frac{a+b}{3\,a\,b\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}-\frac{1}{a^2\,f\,\sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 3, 613 leaves):

$$-\frac{(a+3\,b+a\,\text{Cos}[2\,(e+f x)])\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f x])^{5/2}\,\text{Sec}[e+f x]^4}{48\,b^2\,f\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^{3/2}\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}+\frac{(a+b+(a-2\,b)\,\text{Cos}[2\,(e+f x)])\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f x])^{5/2}\,\text{Sec}[e+f x]^4}{96\,b^2\,f\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^{3/2}\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}-\frac{1}{96\,\sqrt{2}\,a^{5/2}\,f\,\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,e^{i\,(e+f x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f x)}\,\left(1+e^{2\,i\,(e+f x)}\right)^2}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f x])^{5/2}\left(-\left(\sqrt{a}\,\left(1+e^{2\,i\,(e+f x)}\right)\left(-96\,b^3\,e^{2\,i\,(e+f x)}+a^3\left(1+e^{2\,i\,(e+f x)}\right)^2-32\,a\,b^2\left(1+e^{2\,i\,(e+f x)}\right)^2-6\,a^2\,b\left(1+e^{2\,i\,(e+f x)}+e^{4\,i\,(e+f x)}\right)\right)\right)\Big/\left(b^2\left(4\,b\,e^{2\,i\,(e+f x)}+a\left(1+e^{2\,i\,(e+f x)}\right)^2\right)^2\right)+\left(24\,i\,f\,x-12\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\left(1+e^{2\,i\,(e+f x)}\right)^2}\right]-12\,\text{Log}\left[a+a\,e^{2\,i\,(e+f x)}+2\,b\,e^{2\,i\,(e+f x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\left(1+e^{2\,i\,(e+f x)}\right)^2}\right]\right)\Big/\left(\sqrt{4\,b\,e^{2\,i\,(e+f x)}+a\left(1+e^{2\,i\,(e+f x)}\right)^2}\right)\right)\text{Sec}[e+f x]^5$$

- **Problem 430: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e+f x]}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 83 leaves, 6 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{a^{5/2}\,f}+\frac{1}{3\,a\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}+\frac{1}{a^2\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 3, 613 leaves):

$$-\frac{(a+3\,b+a\,\text{Cos}[2\,(e+f\,x)])\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{5/2}\,\text{Sec}[e+f\,x]^4}{48\,b^2\,f\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{3/2}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}+$$
$$\frac{(a+b+(a-2\,b)\,\text{Cos}[2\,(e+f\,x)])\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{5/2}\,\text{Sec}[e+f\,x]^4}{32\,b^2\,f\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{3/2}\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}+$$
$$\frac{1}{96\,\sqrt{2}\,a^{5/2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,e^{i\,(e+f\,x)}\,\sqrt{4\,b+a\,e^{-2\,i\,(e+f\,x)}\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,(a+2\,b+a\,\text{Cos}[2\,e+2\,f\,x])^{5/2}$$
$$\left(-\left(\sqrt{a}\,\left(1+e^{2\,i\,(e+f\,x)}\right)\,\left(-96\,b^3\,e^{2\,i\,(e+f\,x)}+a^3\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2-32\,a\,b^2\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2-6\,a^2\,b\,\left(1+e^{2\,i\,(e+f\,x)}+e^{4\,i\,(e+f\,x)}\right)\right)\right)\Big/\right.$$
$$\left(b^2\,\left(4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2\right)^2\right)+\left(24\,i\,f\,x-12\,\text{Log}\left[a+2\,b+a\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\right]-\right.$$
$$\left.\left.12\,\text{Log}\left[a+a\,e^{2\,i\,(e+f\,x)}+2\,b\,e^{2\,i\,(e+f\,x)}+\sqrt{a}\,\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\,\right]\right)\Big/\left(\sqrt{4\,b\,e^{2\,i\,(e+f\,x)}+a\,\left(1+e^{2\,i\,(e+f\,x)}\right)^2}\right)\right)\,\text{Sec}[e+f\,x]^5$$

- **Problem 431: Unable to integrate problem.**

$$\int\frac{\text{Cot}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 137 leaves, 9 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a}}\right]}{a^{5/2}\,f}-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}{\sqrt{a+b}}\right]}{(a+b)^{5/2}\,f}-\frac{b}{3\,a\,(a+b)\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{3/2}}-\frac{b\,(2\,a+b)}{a^2\,(a+b)^2\,f\,\sqrt{a+b\,\text{Sec}[e+f\,x]^2}}$$

Result (type 8, 25 leaves):

$$\int\frac{\text{Cot}[e+f\,x]}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Problem 432: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 200 leaves, 10 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{5/2}\,f}+\frac{(2 a+7 b)\,\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{2\,(a+b)^{7/2}\,f}-\frac{(3 a-2 b)\,b}{6 a\,(a+b)^2\,f\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}-\frac{\text{Cot}[e+f x]^2}{2\,(a+b)\,f\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}-\frac{b\left(a^2-6 a b-2 b^2\right)}{2 a^2\,(a+b)^3\,f\sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cot}[e+f x]^3}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Problem 433: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 268 leaves, 11 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a}}\right]}{a^{5/2}\,f}-\frac{\left(8 a^2+36 a b+63 b^2\right)\text{ArcTanh}\left[\frac{\sqrt{a+b\,\text{Sec}[e+f x]^2}}{\sqrt{a+b}}\right]}{8\,(a+b)^{9/2}\,f}+\frac{b\left(12 a^2+39 a b-8 b^2\right)}{24 a\,(a+b)^3\,f\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}+\frac{(4 a+11 b)\,\text{Cot}[e+f x]^2}{8\,(a+b)^2\,f\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}-\frac{\text{Cot}[e+f x]^4}{4\,(a+b)\,f\left(a+b\,\text{Sec}[e+f x]^2\right)^{3/2}}+\frac{b\left(4 a^3+15 a^2 b-32 a b^2-8 b^3\right)}{8 a^2\,(a+b)^4\,f\sqrt{a+b\,\text{Sec}[e+f x]^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{\text{Cot}[e+f x]^5}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Problem 434: Unable to integrate problem.

$$\int \frac{\text{Tan}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 157 leaves, 9 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{a^{5/2}\,f}+\frac{\text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{b^{5/2}\,f}-\frac{(a+b)\,\text{Tan}[e+f\,x]^3}{3\,a\,b\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^{3/2}}+\frac{\left(\frac{1}{a^2}-\frac{1}{b^2}\right)\text{Tan}[e+f\,x]}{f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 8, 27 leaves) :

$$\int\frac{\text{Tan}[e+f\,x]^6}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

- **Problem 435: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int\frac{\text{Tan}[e+f\,x]^4}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 120 leaves, 7 steps) :

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{a^{5/2}\,f}-\frac{(a+b)\,\text{Tan}[e+f\,x]}{3\,a\,b\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^{3/2}}+\frac{(a-3\,b)\,\text{Tan}[e+f\,x]}{3\,a^2\,b\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 3, 1414 leaves) :

$$\Big(i\, e^{i(e+fx)} \sqrt{4b + a\, e^{-2i(e+fx)} \left(1 + e^{2i(e+fx)}\right)^2}\ (a + 2b + a\, \text{Cos}[2e + 2fx])^{5/2}$$

$$\Big(-25 a^{7/2} - 58 a^{5/2} b - 32 a^{3/2} b^2 - 15 a^{7/2} e^{2i(e+fx)} - 108 a^{5/2} b\, e^{2i(e+fx)} - 192 a^{3/2} b^2 e^{2i(e+fx)} -$$

$$96\sqrt{a}\, b^3 e^{2i(e+fx)} + 15 a^{7/2} e^{4i(e+fx)} + 108 a^{5/2} b\, e^{4i(e+fx)} + 192 a^{3/2} b^2 e^{4i(e+fx)} + 96\sqrt{a}\, b^3 e^{4i(e+fx)} +$$

$$25 a^{7/2} e^{6i(e+fx)} + 58 a^{5/2} b\, e^{6i(e+fx)} + 32 a^{3/2} b^2 e^{6i(e+fx)} - 24\, i\, a^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} f x -$$

$$48\, i\, a b \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} f x - 24\, i\, b^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} f x -$$

$$12 a^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} \text{Log}\Big[e^{-2ie}\left(a + 2b + a\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2}\right)\Big] -$$

$$24 a b \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} \text{Log}\Big[e^{-2ie}\left(a + 2b + a\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2}\right)\Big] -$$

$$12 b^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} \text{Log}\Big[e^{-2ie}\left(a + 2b + a\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2}\right)\Big] +$$

$$12 a^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} \text{Log}\Big[e^{-2ie}\left(a + a\, e^{2i(e+fx)} + 2b\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2}\right)\Big] +$$

$$24 a b \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} \text{Log}\Big[e^{-2ie}\left(a + a\, e^{2i(e+fx)} + 2b\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2}\right)\Big] +$$

$$12 b^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^{3/2} \text{Log}\Big[e^{-2ie}\left(a + a\, e^{2i(e+fx)} + 2b\, e^{2i(e+fx)} + \sqrt{a}\sqrt{4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2}\right)\Big]\Big)$$

$$\text{Sec}[e + fx]^5\Big) \Big/ \left(96\sqrt{2}\, a^{5/2} (a + b)^2 \left(4b\, e^{2i(e+fx)} + a\left(1 + e^{2i(e+fx)}\right)^2\right)^2 f \left(a + b\, \text{Sec}[e + fx]^2\right)^{5/2}\right) +$$

$$\frac{(2a + 3b + a\,\text{Cos}[2(e + fx)])\,(a + 2b + a\,\text{Cos}[2e + 2fx])^{5/2}\,\text{Sec}[e + fx]^4\,\text{Tan}[e + fx]}{48\,(a + b)^2 f\,(a + 2b + a\,\text{Cos}[2(e + fx)])^{3/2}\left(a + b\,\text{Sec}[e + fx]^2\right)^{5/2}} -$$

$$\frac{(b + (3a + 2b)\,\text{Cos}[2(e + fx)])\,(a + 2b + a\,\text{Cos}[2e + 2fx])^{5/2}\,\text{Sec}[e + fx]^4\,\text{Tan}[e + fx]}{32\,(a + b)^2 f\,(a + 2b + a\,\text{Cos}[2(e + fx)])^{3/2}\left(a + b\,\text{Sec}[e + fx]^2\right)^{5/2}}$$

- **Problem 436: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.**

$$\int \frac{\text{Tan}[e + fx]^2}{\left(a + b\,\text{Sec}[e + fx]^2\right)^{5/2}}\, dx$$

Optimal (type 3, 119 leaves, 7 steps) :

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{5/2} f}+\frac{\text{Tan}[e+f x]}{3 a f \left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}+\frac{(2 a+3 b)\,\text{Tan}[e+f x]}{3 a^2 (a+b) f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}$$

Result (type 3, 1414 leaves) :

$$-\Bigg(\Bigg(i\,e^{i (e+f x)} \sqrt{4 b+a\,e^{-2 i (e+f x)} \left(1+e^{2 i (e+f x)}\right)^2}\,(a+2 b+a\,\text{Cos}[2 e+2 f x])^{5/2} \Bigg(-25 a^{7/2}-58 a^{5/2} b-32 a^{3/2} b^2-15 a^{7/2} e^{2 i (e+f x)}-$$
$$108 a^{5/2} b\,e^{2 i (e+f x)}-192 a^{3/2} b^2 e^{2 i (e+f x)}-96 \sqrt{a}\,b^3 e^{2 i (e+f x)}+15 a^{7/2} e^{4 i (e+f x)}+108 a^{5/2} b\,e^{4 i (e+f x)}+192 a^{3/2} b^2 e^{4 i (e+f x)}+$$
$$96 \sqrt{a}\,b^3 e^{4 i (e+f x)}+25 a^{7/2} e^{6 i (e+f x)}+58 a^{5/2} b\,e^{6 i (e+f x)}+32 a^{3/2} b^2 e^{6 i (e+f x)}-24 i a^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} f x-$$
$$48 i a b \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} f x-24 i b^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} f x-$$
$$12 a^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} \text{Log}\left[e^{-2 i e} \left(a+2 b+a\,e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]-$$
$$24 a b \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} \text{Log}\left[e^{-2 i e} \left(a+2 b+a\,e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]-$$
$$12 b^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} \text{Log}\left[e^{-2 i e} \left(a+2 b+a\,e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+$$
$$12 a^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} \text{Log}\left[e^{-2 i e} \left(a+a\,e^{2 i (e+f x)}+2 b\,e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+$$
$$24 a b \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} \text{Log}\left[e^{-2 i e} \left(a+a\,e^{2 i (e+f x)}+2 b\,e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]+$$
$$12 b^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^{3/2} \text{Log}\left[e^{-2 i e} \left(a+a\,e^{2 i (e+f x)}+2 b\,e^{2 i (e+f x)}+\sqrt{a} \sqrt{4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2}\right)\right]\Bigg)$$
$$\text{Sec}[e+f x]^5\Bigg)\Bigg/\left(96 \sqrt{2}\,a^{5/2} (a+b)^2 \left(4 b\,e^{2 i (e+f x)}+a \left(1+e^{2 i (e+f x)}\right)^2\right)^2 f \left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}\right)+$$
$$\frac{(2 a+3 b+a\,\text{Cos}[2 (e+f x)])\,(a+2 b+a\,\text{Cos}[2 e+2 f x])^{5/2}\,\text{Sec}[e+f x]^4\,\text{Tan}[e+f x]}{48 (a+b)^2 f\,(a+2 b+a\,\text{Cos}[2 (e+f x)])^{3/2} \left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}-$$
$$\frac{(b+(3 a+2 b)\,\text{Cos}[2 (e+f x)])\,(a+2 b+a\,\text{Cos}[2 e+2 f x])^{5/2}\,\text{Sec}[e+f x]^4\,\text{Tan}[e+f x]}{96 (a+b)^2 f\,(a+2 b+a\,\text{Cos}[2 (e+f x)])^{3/2} \left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}$$

Problem 437: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{1}{\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 125 leaves, 6 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}\right]}{a^{5/2}\,f}-\frac{b\,\text{Tan}[e+f\,x]}{3\,a\,(a+b)\,f\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^{3/2}}-\frac{b\,(5\,a+3\,b)\,\text{Tan}[e+f\,x]}{3\,a^2\,(a+b)^2\,f\,\sqrt{a+b+b\,\text{Tan}[e+f\,x]^2}}$$

Result (type 6, 1927 leaves):

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\right)\Big/$$

$$\left(4\sqrt{2}\,f\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{5/2}\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)$$

$$\left(\left(15\,a\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\,\text{Sin}[e+f\,x]^2\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{7/2}\right.\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^5\right)\Big/\left(4\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^3\,\text{Sin}[e+f\,x]^2\right)\Big/\left(\sqrt{2}\,\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-\right.\right.$$

$$\left.\left.\left.4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)+$$

$$\left(3\,(a+b)\,\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\right)\Big/$$

$$\left(4\sqrt{2}\,f\left(a+b-a\,\text{Sin}[e+f\,x]^2\right)^{5/2}\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]+\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\right.\right.\right.$$

$$\left.\left.\left.\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\text{Sin}[e+f\,x]^2\right)\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-2,\frac{5}{2},\frac{3}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]^4\,\text{Sin}[e+f\,x]\right.$$

$$\left(2\,f\left(5\,a\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\right)\right.$$

$$\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]+3\,(a+b)\left(\frac{5\,a\,f\,\text{AppellF1}\left[\frac{3}{2},-2,\frac{7}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\left.\frac{4}{3}\,f\,\text{AppellF1}\left[\frac{3}{2},-1,\frac{5}{2},\frac{5}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)+$$

$$\mathrm{Sin}[e+f\,x]^2 \Bigg(5\,a\,\Bigg(\frac{21\,a\,f\,\mathrm{AppellF1}\left[\frac{5}{2},\,-2,\,\frac{9}{2},\,\frac{7}{2},\,\mathrm{Sin}[e+f\,x]^2,\,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]}{5\,(a+b)}-$$

$$\frac{12}{5}\,f\,\mathrm{AppellF1}\left[\frac{5}{2},\,-1,\,\frac{7}{2},\,\frac{7}{2},\,\mathrm{Sin}[e+f\,x]^2,\,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]\Bigg)-$$

$$4\,(a+b)\,\Bigg(\frac{3\,a\,f\,\mathrm{AppellF1}\left[\frac{5}{2},\,-1,\,\frac{7}{2},\,\frac{7}{2},\,\mathrm{Sin}[e+f\,x]^2,\,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\mathrm{Cos}[e+f\,x]\,\mathrm{Sin}[e+f\,x]}{a+b}-$$

$$\Bigg(6\,(a+b)^3\,f\,\mathrm{Cot}[e+f\,x]\,\mathrm{Csc}[e+f\,x]^4\left(-1+\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right)^2\Bigg(\frac{\sqrt{a}\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[e+f\,x]}{\sqrt{a+b}}\right]\mathrm{Sin}[e+f\,x]}{\sqrt{a+b}\,\sqrt{1-\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}}}+$$

$$\frac{a^2\,\mathrm{Sin}[e+f\,x]^4}{3\,(a+b)^2\left(-1+\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right)^2}+\frac{a\,\mathrm{Sin}[e+f\,x]^2}{(a+b)\left(-1+\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right)}\Bigg)\Bigg)\Bigg/\left(a^3\left(1-\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right)^{3/2}\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(4\,\sqrt{2}\,f\,\left(a+b-a\,\mathrm{Sin}[e+f\,x]^2\right)^{5/2}\Bigg(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},\,-2,\,\frac{5}{2},\,\frac{3}{2},\,\mathrm{Sin}[e+f\,x]^2,\,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]+\Bigg(5\,a\,\mathrm{AppellF1}\left[\frac{3}{2},\,-2,\right.$$

$$\left.\frac{7}{2},\,\frac{5}{2},\,\mathrm{Sin}[e+f\,x]^2,\,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]-4\,(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},\,-1,\,\frac{5}{2},\,\frac{5}{2},\,\mathrm{Sin}[e+f\,x]^2,\,\frac{a\,\mathrm{Sin}[e+f\,x]^2}{a+b}\right]\Bigg)\,\mathrm{Sin}[e+f\,x]^2\Bigg)^2\Bigg)\Bigg)$$

- **Problem 438: Unable to integrate problem.**

$$\int \frac{\mathrm{Cot}[e+f\,x]^2}{\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 174 leaves, 8 steps) :

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{5/2} f}-\frac{b\,\text{Cot}[e+f x]}{3 a (a+b) f \left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}-\frac{b (7 a+3 b)\,\text{Cot}[e+f x]}{3 a^2 (a+b)^2 f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}-\frac{(a-3 b) (3 a+b)\,\text{Cot}[e+f x] \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3 a^2 (a+b)^3 f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cot}[e+f x]^2}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Problem 439: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 236 leaves, 9 steps) :

$$\frac{\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{5/2} f}-\frac{b\,\text{Cot}[e+f x]^3}{3 a (a+b) f \left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}-\frac{b (3 a+b)\,\text{Cot}[e+f x]^3}{a^2 (a+b)^2 f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}+\frac{(a-b) \left(3 a^2+14 a b+3 b^2\right)\,\text{Cot}[e+f x] \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3 a^2 (a+b)^4 f}-\frac{\left(a^2-10 a b-3 b^2\right)\,\text{Cot}[e+f x]^3 \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{3 a^2 (a+b)^3 f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cot}[e+f x]^4}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Problem 440: Unable to integrate problem.

$$\int \frac{\text{Cot}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

Optimal (type 3, 315 leaves, 10 steps) :

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{a}\ \text{Tan}[e+f x]}{\sqrt{a+b+b\,\text{Tan}[e+f x]^2}}\right]}{a^{5/2} f}-\frac{b\,\text{Cot}[e+f x]^5}{3 a (a+b) f \left(a+b+b\,\text{Tan}[e+f x]^2\right)^{3/2}}-$$

$$\frac{b (11 a+3 b)\,\text{Cot}[e+f x]^5}{3 a^2 (a+b)^2 f \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}-\frac{\left(15 a^4+70 a^3 b+128 a^2 b^2-70 a b^3-15 b^4\right) \text{Cot}[e+f x] \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15 a^2 (a+b)^5 f}+$$

$$\frac{\left(5 a^3+19 a^2 b-65 a b^2-15 b^3\right) \text{Cot}[e+f x]^3 \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{15 a^2 (a+b)^4 f}-\frac{\left(a^2-20 a b-5 b^2\right) \text{Cot}[e+f x]^5 \sqrt{a+b+b\,\text{Tan}[e+f x]^2}}{5 a^2 (a+b)^3 f}$$

Result (type 8, 27 leaves) :

$$\int \frac{\text{Cot}[e+f x]^6}{\left(a+b\,\text{Sec}[e+f x]^2\right)^{5/2}}\,dx$$

- **Problem 441: Result more than twice size of optimal antiderivative.**

$$\int \left(a+b\,\text{Sec}[e+f x]^2\right)^p (d\,\text{Tan}[e+f x])^m\,dx$$

Optimal (type 6, 105 leaves, 4 steps) :

$$\frac{1}{d f (1+m)}\text{AppellF1}\left[\frac{1+m}{2}, 1, -p, \frac{3+m}{2}, -\text{Tan}[e+f x]^2, -\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right] (d\,\text{Tan}[e+f x])^{1+m} \left(a+b+b\,\text{Tan}[e+f x]^2\right)^p \left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2929 leaves) :

$$\left((a+b) (3+m)\,\text{AppellF1}\left[\frac{1+m}{2}, -p, 1, \frac{3+m}{2}, -\frac{b\,\text{Tan}[e+f x]^2}{a+b}, -\text{Tan}[e+f x]^2\right] \text{Cos}[e+f x]\right.$$

$$\left.(a+2 b+a\,\text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^p \left(a+b\,\text{Sec}[e+f x]^2\right)^p \text{Sin}[e+f x]\,\text{Tan}[e+f x]^m (d\,\text{Tan}[e+f x])^m\right) \Big/$$

$$\left(f (1+m) \left((a+b) (3+m)\,\text{AppellF1}\left[\frac{1+m}{2}, -p, 1, \frac{3+m}{2}, -\frac{b\,\text{Tan}[e+f x]^2}{a+b}, -\text{Tan}[e+f x]^2\right]+\right.\right.$$

$$2 \left(b p\,\text{AppellF1}\left[\frac{3+m}{2}, 1-p, 1, \frac{5+m}{2}, -\frac{b\,\text{Tan}[e+f x]^2}{a+b}, -\text{Tan}[e+f x]^2\right]-\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3+m}{2}, -p, 2, \frac{5+m}{2}, -\frac{b\,\text{Tan}[e+f x]^2}{a+b}, -\text{Tan}[e+f x]^2\right]\right) \text{Tan}[e+f x]^2\right)$$

$$\left(\left((a+b) m (3+m)\,\text{AppellF1}\left[\frac{1+m}{2}, -p, 1, \frac{3+m}{2}, -\frac{b\,\text{Tan}[e+f x]^2}{a+b}, -\text{Tan}[e+f x]^2\right] \text{Cos}[e+f x]\right.\right.$$

$$\left.(a+2 b+a\,\text{Cos}[2 (e+f x)])^p \left(\text{Sec}[e+f x]^2\right)^{1+p} \text{Sin}[e+f x]\,\text{Tan}[e+f x]^{-1+m}\right) \Big/$$

$$\Bigg((1+m)\ \bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+2\ \Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)\ \text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\ \text{Tan}[e+f\,x]^2\bigg)\Bigg)+$$

$$\Bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\ (a+2\,b+a\,\text{Cos}[2\ (e+f\,x)])^p$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{-1+p}\ \text{Tan}[e+f\,x]^m\Bigg)\Big/$$

$$\Bigg((1+m)\ \bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+2\ \Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)\ \text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\ \text{Tan}[e+f\,x]^2\bigg)\Bigg)-$$

$$\Bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\ (a+2\,b+a\,\text{Cos}[2\ (e+f\,x)])^p$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{p}\ \text{Sin}[e+f\,x]^2\ \text{Tan}[e+f\,x]^m\Bigg)\Big/$$

$$\Bigg((1+m)\ \bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+2\ \Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)\ \text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\ \text{Tan}[e+f\,x]^2\bigg)\Bigg)-$$

$$\Bigg(2\,a\ (a+b)\ (3+m)\ p\,\text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\ \text{Cos}[e+f\,x]\ (a+2\,b+a\,\text{Cos}[2\ (e+f\,x)])^{-1+p}$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{p}\ \text{Sin}[e+f\,x]\ \text{Sin}[2\ (e+f\,x)]\ \text{Tan}[e+f\,x]^m\Bigg)\Big/$$

$$\Bigg((1+m)\ \bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+2\ \Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)\ \text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\ \text{Tan}[e+f\,x]^2\bigg)\Bigg)+$$

$$\Bigg(2\ (a+b)\ (3+m)\ p\,\text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\ \text{Cos}[e+f\,x]\ (a+2\,b+a\,\text{Cos}[2\ (e+f\,x)])^{p}$$

$$\left(\text{Sec}[e+f\,x]^2\right)^{p}\ \text{Sin}[e+f\,x]\ \text{Tan}[e+f\,x]^{1+m}\Bigg)\Big/$$

$$\Bigg((1+m)\ \bigg((a+b)\ (3+m)\ \text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+2\ \Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)+$$

$$\Big((a+b)\,(3+m)\,\text{Cos}[e+f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\,\text{Tan}[e+f\,x]^m$$

$$\Big(1/((a+b)\,(3+m))\,2\,b\,(1+m)\,p\,\text{AppellF1}\Big[1+\frac{1+m}{2},\ 1-p,\ 1,\ 1+\frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$1/(3+m)\,2\,(1+m)\,\text{AppellF1}\Big[1+\frac{1+m}{2},\ -p,\ 2,\ 1+\frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)\Big)\Big/$$

$$\Big((1+m)\,\Big((a+b)\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)-$$

$$\Big((a+b)\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Cos}[e+f\,x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p$$

$$\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[e+f\,x]\,\text{Tan}[e+f\,x]^m\,\Big(4\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3+m}{2},\ -p,\ 2,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+(a+b)\,(3+m)\,\Big(\frac{1}{(a+b)\,(3+m)}$$

$$2\,b\,(1+m)\,p\,\text{AppellF1}\Big[1+\frac{1+m}{2},\ 1-p,\ 1,\ 1+\frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\frac{1}{3+m}2\,(1+m)$$

$$\text{AppellF1}\Big[1+\frac{1+m}{2},\ -p,\ 2,\ 1+\frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)+2\,\text{Tan}[e+f\,x]^2\,\Big(b\,p\,\Big(-\frac{1}{5+m}$$

$$2\,(3+m)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\ 1-p,\ 2,\ 1+\frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\frac{1}{(a+b)\,(5+m)}$$

$$2\,b\,(3+m)\,(1-p)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\ 2-p,\ 1,\ 1+\frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)-(a+b)$$

$$\Big(\frac{1}{(a+b)\,(5+m)}2\,b\,(3+m)\,p\,\text{AppellF1}\Big[1+\frac{3+m}{2},\ 1-p,\ 2,\ 1+\frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\frac{1}{5+m}4\,(3+m)\,\text{AppellF1}\Big[1+\frac{3+m}{2},\ -p,\ 3,\ 1+\frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big((1+m)\,\Big((a+b)\,(3+m)\,\text{AppellF1}\Big[\frac{1+m}{2},\ -p,\ 1,\ \frac{3+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]+$$

$$2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3+m}{2},\ 1-p,\ 1,\ \frac{5+m}{2},\ -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\ -\text{Tan}[e+f\,x]^2\Big]-(a+b)$$

$$\text{AppellF1}\left[\frac{3+m}{2}, -p, 2, \frac{5+m}{2}, -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}, -\text{Tan}[e+f\,x]^2\right]\,\text{Tan}[e+f\,x]^2\Big)^2\Big)\Big)\Big)$$

- **Problem 445: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f\,x]\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 5, 114 leaves, 5 steps):

$$-\frac{\text{Hypergeometric2F1}\left[1, 1+p, 2+p, \frac{a+b\,\text{Sec}[e+f\,x]^2}{a+b}\right]\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{1+p}}{2\,(a+b)\,f\,(1+p)}+\frac{\text{Hypergeometric2F1}\left[1, 1+p, 2+p, 1+\frac{b\,\text{Sec}[e+f\,x]^2}{a}\right]\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^{1+p}}{2\,a\,f\,(1+p)}$$

Result (type 6, 2055 leaves):

$$\Bigg((a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Cot}[e+f\,x]\,\left(\text{Sec}[e+f\,x]^2\right)^p$$

$$\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\Bigg(\frac{\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-p}\,\text{Hypergeometric2F1}\left[-p, -p, 1-p, -\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]}{p}-$$

$$\left(2\,(a+b)\,\text{AppellF1}\left[1, -p, 1, 2, -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}, -\text{Tan}[e+f\,x]^2\right]\,\text{Sin}[e+f\,x]^2\right)\Big/$$

$$\Bigg(2\,(a+b)\,\text{AppellF1}\left[1, -p, 1, 2, -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}, -\text{Tan}[e+f\,x]^2\right]+\Bigg(b\,p\,\text{AppellF1}\left[2, 1-p, 1, 3, -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}, -\text{Tan}[e+f\,x]^2\right]-$$

$$(a+b)\,\text{AppellF1}\left[2, -p, 2, 3, -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}, -\text{Tan}[e+f\,x]^2\right]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(2\,f\,\Bigg(-a\,p\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[2\,(e+f\,x)]$$

$$\Bigg(\frac{\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-p}\,\text{Hypergeometric2F1}\left[-p, -p, 1-p, -\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]}{p}-$$

$$\left(2\,(a+b)\,\text{AppellF1}\left[1, -p, 1, 2, -\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}, -\text{Tan}[e+f\,x]^2\right]\,\text{Sin}[e+f\,x]^2\right)\Big/$$

$$\left(2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+\left(b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\Bigg)+$$

$$p\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]\left(\frac{\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-p}\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]}{p}-\right.$$

$$\left(2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sin}[e+f\,x]^2\right)\Big/$$

$$\left(2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+\left(b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\Bigg)+$$

$$\frac{1}{2}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\left(\frac{1}{b}2\,(a+b)\,\text{Cot}[e+f\,x]\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-1-p}\text{Csc}[e+f\,x]^2\right.$$

$$\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]+2\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-p}\text{Csc}[e+f\,x]$$

$$\left(\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{p}-\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\right)\text{Sec}[e+f\,x]-$$

$$\left(4\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\Big/$$

$$\left(2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+\left(b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)-$$

$$\left(2\,(a+b)\,\text{Sin}[e+f\,x]^2\left(\frac{b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{a+b}-\right.\right.$$

$$\left.\left.\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\Big/$$

$$\Big(2\,(a+b)\,\text{AppellF1}\Big[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+\Big(b\,p\,\text{AppellF1}\Big[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)+$$

$$\Big(2\,(a+b)\,\text{AppellF1}\Big[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sin}[e+f\,x]^2\,\Big(2\,\Big(b\,p\,\text{AppellF1}\Big[2,1-p,1,3,$$

$$-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Sec}[e+f\,x]^2$$

$$\text{Tan}[e+f\,x]+2\,(a+b)\,\Big(\frac{b\,p\,\text{AppellF1}\Big[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{a+b}-$$

$$\text{AppellF1}\Big[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)+$$

$$\text{Tan}[e+f\,x]^2\,\Big(b\,p\,\Big(-\frac{4}{3}\,\text{AppellF1}\Big[3,1-p,2,4,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\frac{1}{3\,(a+b)}4\,b\,(1-p)\,\text{AppellF1}\Big[3,2-p,1,4,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)-$$

$$(a+b)\,\Big(\frac{1}{3\,(a+b)}4\,b\,p\,\text{AppellF1}\Big[3,1-p,2,4,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\frac{8}{3}\,\text{AppellF1}\Big[3,-p,3,4,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(2\,(a+b)\,\text{AppellF1}\Big[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+\Big(b\,p\,\text{AppellF1}\Big[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)^2\Big)\Big)\Big)$$

- **Problem 446: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f\,x]^3\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 5, 157 leaves, 6 steps):

$$-\frac{\text{Cot}[e+f x]^2 \left(a+b \text{Sec}[e+f x]^2\right)^{1+p}}{2 (a+b) f}+\frac{(a+b-b p) \text{Hypergeometric2F1}\left[1,1+p,2+p,\frac{a+b \text{Sec}[e+f x]^2}{a+b}\right] \left(a+b \text{Sec}[e+f x]^2\right)^{1+p}}{2 (a+b)^2 f (1+p)}-\frac{\text{Hypergeometric2F1}\left[1,1+p,2+p,1+\frac{b \text{Sec}[e+f x]^2}{a}\right] \left(a+b \text{Sec}[e+f x]^2\right)^{1+p}}{2 a f (1+p)}$$

Result (type 6, 2951 leaves) :

$$\Bigg(2^{-1+p} \text{Cot}[e+f x]^3 \left(a+b \text{Sec}[e+f x]^2\right)^p \left(1+\text{Tan}[e+f x]^2\right)^p \left(\frac{a+b+b \text{Tan}[e+f x]^2}{1+\text{Tan}[e+f x]^2}\right)^p \Bigg(-\Bigg(2 (a+b) \text{AppellF1}\left[1,-p,1,2,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right] \text{Tan}[e+f x]^2\Bigg)\Big/ \Bigg(\left(1+\text{Tan}[e+f x]^2\right) \Bigg(-2 (a+b) \text{AppellF1}\left[1,-p,1,2,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+\Bigg(-b p \text{AppellF1}\left[2,1-p,1,3,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+(a+b) \text{AppellF1}\left[2,-p,2,3,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg) \text{Tan}[e+f x]^2\Bigg)\Bigg)+\frac{1}{(-1+p) p}\text{Cot}[e+f x]^2 \left(1+\frac{(a+b) \text{Cot}[e+f x]^2}{b}\right)^{-p} \Bigg(p \text{Hypergeometric2F1}\left[1-p,-p,2-p,-\frac{(a+b) \text{Cot}[e+f x]^2}{b}\right]-(-1+p) \text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b) \text{Cot}[e+f x]^2}{b}\right] \text{Tan}[e+f x]^2\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(f \Bigg(2^p p \text{Sec}[e+f x]^2 \text{Tan}[e+f x] \left(1+\text{Tan}[e+f x]^2\right)^{-1+p} \left(\frac{a+b+b \text{Tan}[e+f x]^2}{1+\text{Tan}[e+f x]^2}\right)^p \Bigg(-\Bigg(2 (a+b) \text{AppellF1}\left[1,-p,1,2,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right] \text{Tan}[e+f x]^2\Bigg)\Big/ \Bigg(\left(1+\text{Tan}[e+f x]^2\right) \Bigg(-2 (a+b) \text{AppellF1}\left[1,-p,1,2,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+\Bigg(-b p \text{AppellF1}\left[2,1-p,1,3,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+(a+b) \text{AppellF1}\left[2,-p,2,3,-\frac{b \text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg) \text{Tan}[e+f x]^2\Bigg)\Bigg)+\frac{1}{(-1+p) p}\text{Cot}[e+f x]^2 \left(1+\frac{(a+b) \text{Cot}[e+f x]^2}{b}\right)^{-p} \Bigg(p \text{Hypergeometric2F1}\left[1-p,-p,2-p,-\frac{(a+b) \text{Cot}[e+f x]^2}{b}\right]-(-1+p) \text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b) \text{Cot}[e+f x]^2}{b}\right] \text{Tan}[e+f x]^2\Bigg)\Bigg)+$$

$$2^{-1+p} p \left(1+\text{Tan}[e+f x]^2\right)^p \left(\frac{a+b+b \text{Tan}[e+f x]^2}{1+\text{Tan}[e+f x]^2}\right)^{-1+p} \left(\frac{2 b \text{Sec}[e+f x]^2 \text{Tan}[e+f x]}{1+\text{Tan}[e+f x]^2}-\frac{2 \text{Sec}[e+f x]^2 \text{Tan}[e+f x] \left(a+b+b \text{Tan}[e+f x]^2\right)}{\left(1+\text{Tan}[e+f x]^2\right)^2}\right)$$

$$\left(-\left(2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Tan}[e+f\,x]^2\right)\Big/\right.$$

$$\left(\left(1+\text{Tan}[e+f\,x]^2\right)\left(-2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+\left(-b\,p\,\text{AppellF1}\left[2,1-p,1,3,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)+$$

$$\frac{1}{(-1+p)\,p}\text{Cot}[e+f\,x]^2\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-p}\left(p\,\text{Hypergeometric2F1}\left[1-p,-p,2-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]-\right.$$

$$\left.\left.(-1+p)\,\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Tan}[e+f\,x]^2\right)\right)+$$

$$2^{-1+p}\left(1+\text{Tan}[e+f\,x]^2\right)^p\left(\frac{a+b+b\,\text{Tan}[e+f\,x]^2}{1+\text{Tan}[e+f\,x]^2}\right)^p\left(\frac{1}{(-1+p)\,p}\text{Cot}[e+f\,x]^2\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^{-p}\right.$$

$$\left(-2\,(1-p)\,p\,\text{Csc}[e+f\,x]\left(\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^p-\text{Hypergeometric2F1}\left[1-p,-p,2-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\right)\text{Sec}[e+f\,x]-\right.$$

$$2\,(-1+p)\,p\left(\left(1+\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right)^p-\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\right)\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\left.2\,(-1+p)\,\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f\,x]^2}{b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\left(4\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]^3\right)\Big/$$

$$\left(\left(1+\text{Tan}[e+f\,x]^2\right)^2\left(-2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+\left(-b\,p\,\text{AppellF1}\left[2,1-p,1,3,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)-$$

$$\left(4\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\Big/$$

$$\left(\left(1+\text{Tan}[e+f\,x]^2\right)\left(-2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+\left(-b\,p\,\text{AppellF1}\left[2,1-p,1,3,\right.\right.\right.\right.$$

$$\left.\left.\left.\left.-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)-$$

$$\left(2\,(a+b)\,\text{Tan}[e+f\,x]^2\left(\frac{b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{a+b}-\right.\right.$$

$$\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\left(1+\text{Tan}[e+f x]^2\right)\Bigg(-2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+\Bigg(-b\,p\,\text{AppellF1}\Big[2,1-p,1,$$

$$3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]+(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\text{Tan}[e+f x]^2\Bigg)\Bigg)+$$

$$\frac{1}{b\,(-1+p)}2\,(a+b)\,\text{Cot}[e+f x]^3\left(1+\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right)^{-1-p}\text{Csc}[e+f x]^2\Bigg(p\,\text{Hypergeometric2F1}\Big[1-p,-p,2-p,$$

$$-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\Big]-(-1+p)\,\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Tan}[e+f x]^2\Bigg)-\frac{1}{(-1+p)\,p}$$

$$2\,\text{Cot}[e+f x]\left(1+\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right)^{-p}\text{Csc}[e+f x]^2\Bigg(p\,\text{Hypergeometric2F1}\left[1-p,-p,2-p,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]-$$

$$(-1+p)\,\text{Hypergeometric2F1}\left[-p,-p,1-p,-\frac{(a+b)\,\text{Cot}[e+f x]^2}{b}\right]\text{Tan}[e+f x]^2\Bigg)+$$

$$\Bigg(2\,(a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Tan}[e+f x]^2\Bigg(2\,\Bigg(-b\,p\,\text{AppellF1}\Big[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},$$

$$-\text{Tan}[e+f x]^2\Big]+(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\Bigg)\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$2\,(a+b)\Bigg(\frac{b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{a+b}-$$

$$\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$\text{Tan}[e+f x]^2\Bigg(-b\,p\,\Bigg(-\frac{4}{3}\text{AppellF1}\left[3,1-p,2,4,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{1}{3\,(a+b)}4\,b\,(1-p)\,\text{AppellF1}\left[3,2-p,1,4,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$(a+b)\,\Bigg(\frac{1}{3\,(a+b)}4\,b\,p\,\text{AppellF1}\left[3,1-p,2,4,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{8}{3}\text{AppellF1}\left[3,-p,3,4,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(\left(1+\text{Tan}[e+f x]^2\right)\left(-2 (a+b)\,\text{AppellF1}\left[1,-p,1,2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+\left(-b\,p\,\text{AppellF1}\left[2,1-p,1,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+(a+b)\,\text{AppellF1}\left[2,-p,2,3,-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)^2\right)\right)\right)\right)$$

Problem 447: Result more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Sec}[e+f x]^2\right)^p\,\text{Tan}[e+f x]^4\,dx$$

Optimal (type 6, 88 leaves, 4 steps):

$$\frac{1}{5 f}\text{AppellF1}\left[\frac{5}{2},1,-p,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]^5\left(a+b+b\,\text{Tan}[e+f x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2777 leaves):

$$\left((a+2 b+a\,\text{Cos}[2 (e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^p\left(a+b\,\text{Sec}[e+f x]^2\right)^p\right.$$
$$\text{Tan}[e+f x]^5\left(\left(9 (a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Cos}[e+f x]^2\right)\Big/\right.$$
$$\left(3 (a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-\right.\right.$$
$$\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)+\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$
$$\left.\left.\left(-3\,\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\text{Hypergeometric2F1}\left[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]^2\right)\right)\right)\Big/$$
$$\left(3 f\left(\frac{1}{3}(a+2 b+a\,\text{Cos}[2 (e+f x)])^p\left(\text{Sec}[e+f x]^2\right)^{1+p}\left(\left(9 (a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Cos}[e+f x]^2\right)\Big/\right.\right.\right.$$
$$\left(3 (a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},\right.\right.\right.$$
$$\left.\left.\left.-\text{Tan}[e+f x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)+\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}$$
$$\left.\left(-3\,\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]+\text{Hypergeometric2F1}\left[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right]\text{Tan}[e+f x]^2\right)\right)-$$
$$\frac{2}{3}a\,p\,(a+2 b+a\,\text{Cos}[2 (e+f x)])^{-1+p}\left(\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[2 (e+f x)]\,\text{Tan}[e+f x]$$

$$\left(\left(9\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]^2\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)+\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

$$\left.\left(-3\,\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\text{Hypergeometric2F1}\left[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]^2\right)\right)+$$

$$\frac{2}{3}\,p\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]^2$$

$$\left(\left(9\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]^2\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)+\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

$$\left.\left(-3\,\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\text{Hypergeometric2F1}\left[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]^2\right)\right)+$$

$$\frac{1}{3}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]$$

$$\left(-\left(18\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\left(9\,(a+b)\,\text{Cos}[e+f\,x]^2\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$-\text{Tan}[e+f x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\Big)\,\text{Tan}[e+f x]^2\Big)-$$

$$\frac{1}{a+b}2\,b\,p\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\,\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-1-p}\Big(-3\,\text{Hypergeometric2F1}\Big[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+$$

$$\text{Hypergeometric2F1}\Big[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,\text{Tan}[e+f x]^2\Big)-$$

$$\Big(9\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Cos}[e+f x]^2\,\Big(4\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},$$

$$-\text{Tan}[e+f x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\Big)\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+$$

$$3\,(a+b)\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-$$

$$\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+$$

$$2\,\text{Tan}[e+f x]^2\,\Big(b\,p\,\Big(-\frac{6}{5}\,\text{AppellF1}\Big[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\Big[\frac{5}{2},2-p,1,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Big)-$$

$$(a+b)\,\Big(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\Big[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$\frac{12}{5}\,\text{AppellF1}\Big[\frac{5}{2},-p,3,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},$$

$$-\text{Tan}[e+f x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\Big]\Big)\,\text{Tan}[e+f x]^2\Big)^2+$$

$$\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{-p}\Big(2\,\text{Hypergeometric2F1}\Big[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$3\,\text{Csc}[e+f x]\,\text{Sec}[e+f x]\,\Big(-\text{Hypergeometric2F1}\Big[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b}\Big]+\left(1+\frac{b\,\text{Tan}[e+f x]^2}{a+b}\right)^{p}\Big)+$$

$$3\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\left(-\text{Hypergeometric2F1}\left[\frac{3}{2},-p,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^p\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 448: Result more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]^2\,dx$$

Optimal (type 6, 88 leaves, 4 steps):

$$\frac{1}{3\,f}\text{AppellF1}\left[\frac{3}{2},1,-p,\frac{5}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]^3\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2465 leaves):

$$\Bigg(\left(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]\right)^p\left(\text{Sec}[e+f\,x]^2\right)^p\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p$$

$$\text{Tan}[e+f\,x]^3\left(\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]^2\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.$$

$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)\Bigg)\Big/$$

$$\Bigg(f\,\Bigg(\left(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]\right)^p\left(\text{Sec}[e+f\,x]^2\right)^{1+p}\left(\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]^2\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)-$$

$$2\,a\,p\left(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)]\right)^{-1+p}\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Sin}[2\,(e+f\,x)]\,\text{Tan}[e+f\,x]\left(\text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\right.$$

$$\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]^2\right)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Bigg)+$$

$$2\,p\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]^2\,\Bigg(\text{Hypergeometric2F1}\Big[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Cos}[e+f\,x]^2\Big)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Bigg)\Bigg)+$$

$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\left(\text{Sec}[e+f\,x]^2\right)^p\,\text{Tan}[e+f\,x]\,\Bigg(-\frac{1}{a+b}2\,b\,p\,\text{Hypergeometric2F1}\Big[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Sec}[e+f\,x]^2$$

$$\text{Tan}[e+f\,x]\,\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-1-p}+\Big(6\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\Big)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{Cos}[e+f\,x]^2\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-$$

$$\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Bigg)\Bigg)\Big/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Bigg)+$$

$$\text{Csc}[e+f\,x]\,\text{Sec}[e+f\,x]\,\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}\,\Bigg(-\text{Hypergeometric2F1}\Big[\frac{1}{2},-p,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]+\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^p\Bigg)+$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Cos}[e+f\,x]^2\left(4\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.\right.$$

$$\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\Big)\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]+$$

$$3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$2\,\text{Tan}[e+f\,x]^2\left(b\,p\left(-\frac{6}{5}\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.\right.$$

$$\left.\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},2-p,1,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)-$$

$$(a+b)\left(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\right.$$

$$\left.\left.\left.\left.\left.\frac{12}{5}\,\text{AppellF1}\left[\frac{5}{2},-p,3,\frac{7}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)^2\right)\right)\right)$$

- **Problem 449: Result more than twice size of optimal antiderivative.**

$$\int\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 83 leaves, 3 steps) :

$$\frac{1}{f}\text{AppellF1}\left[\frac{1}{2},1,-p,\frac{3}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2137 leaves) :

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right.$$

$$\text{Cos}[e+f\,x]\ (a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\ \left(\text{Sec}[e+f\,x]^{2}\right)^{p}\ \left(a+b\,\text{Sec}[e+f\,x]^{2}\right)^{p}\,\text{Sin}[e+f\,x]\Bigg)\Bigg/$$

$$\Bigg(f\,\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]+2\,\Bigg(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\Bigg)\,\text{Tan}[e+f\,x]^{2}\Bigg)$$

$$\Bigg(\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\ (a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\ \left(\text{Sec}[e+f\,x]^{2}\right)^{-1+p}\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]+2\,\Bigg(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\Bigg)\,\text{Tan}[e+f\,x]^{2}\Bigg)-$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\ (a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\ \left(\text{Sec}[e+f\,x]^{2}\right)^{p}\,\text{Sin}[e+f\,x]^{2}\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]+2\,\Bigg(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\Bigg)\,\text{Tan}[e+f\,x]^{2}\Bigg)+$$

$$\Bigg(6\,(a+b)\,p\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\ (a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{p}\ \left(\text{Sec}[e+f\,x]^{2}\right)^{p}\,\text{Sin}[e+f\,x]^{2}\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]+2\,\Bigg(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\Bigg)\,\text{Tan}[e+f\,x]^{2}\Bigg)-$$

$$\Bigg(6\,a\,(a+b)\,p\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\,\text{Cos}[e+f\,x]\ (a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}$$

$$\left(\text{Sec}[e+f\,x]^{2}\right)^{p}\,\text{Sin}[e+f\,x]\,\text{Sin}[2\,(e+f\,x)]\Bigg)\Bigg/\Bigg(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]+$$

$$2\,\Bigg(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^{2}}{a+b},-\text{Tan}[e+f\,x]^{2}\Big]\Bigg)$$

$$\left.\text{Tan}[e+f x]^2\right)+\left(3\,(a+b)\,\text{Cos}[e+f x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^p\right.$$

$$\text{Sin}[e+f x]\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-\right.\right.$$

$$\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\text{Tan}[e+f x]^2\right)-$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Cos}[e+f x]\,(a+2\,b+a\,\text{Cos}[2\,(e+f x)])^p\,\left(\text{Sec}[e+f x]^2\right)^p\,\text{Sin}[e+f x]\right.$$

$$\left(4\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\right)\right.$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+3\,(a+b)\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{3\,(a+b)}-\right.$$

$$\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)+$$

$$2\,\text{Tan}[e+f x]^2\left(b\,p\left(-\frac{6}{5}\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\right.\right.$$

$$\left.\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},2-p,1,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)-$$

$$(a+b)\left(\frac{6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]}{5\,(a+b)}-\right.$$

$$\left.\left.\left.\left.\left.\frac{12}{5}\,\text{AppellF1}\left[\frac{5}{2},-p,3,\frac{7}{2},-\frac{b\,\text{Tan}[e+f x]^2}{a+b},-\text{Tan}[e+f x]^2\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\right)\right)\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)^2\Bigg)\Bigg)$$

- **Problem 450: Result more than twice size of optimal antiderivative.**

$$\int \text{Cot}[e+f\,x]^2\,\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 84 leaves, 4 steps):

$$-\frac{1}{f}\text{AppellF1}\left[-\frac{1}{2},1,-p,\frac{1}{2},-\text{Tan}[e+f\,x]^2,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Cot}[e+f\,x]\,\left(a+b+b\,\text{Tan}[e+f\,x]^2\right)^p\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 2469 leaves):

$$\Bigg((a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Cot}[e+f\,x]^3\,\left(\text{Sec}[e+f\,x]^2\right)^p$$

$$\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\left(-\text{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sin}[e+f\,x]^2\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]-\right.\right.$$

$$\left.\left.\left.(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)\Bigg)\Big/$$

$$\Bigg(f\,\Bigg(2\,p\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\left(\text{Sec}[e+f\,x]^2\right)^p\left(-\text{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sin}[e+f\,x]^2\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)\right)-$$

$$(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Csc}[e+f\,x]^2\,\left(\text{Sec}[e+f\,x]^2\right)^p\left(-\text{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}-\right.$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sin}[e+f\,x]^2\Big)\Big/$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)-$$

$$2\,a\,p\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^{-1+p}\,\text{Cot}[e+f\,x]\,\big(\text{Sec}[e+f\,x]^2\big)^p\,\text{Sin}[2\,(e+f\,x)]\,\Big(-\text{Hypergeometric2F1}\Big[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]$$

$$\Big(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big)^{-p}-\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sin}[e+f\,x]^2\Big)\Big/\Big(3\,(a+b)$$

$$\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]-$$

$$(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)\Big)+(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Cot}[e+f\,x]$$

$$\big(\text{Sec}[e+f\,x]^2\big)^p\,\Bigg(\frac{2\,b\,p\,\text{Hypergeometric2F1}\Big[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\Big(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\Big)^{-1-p}}{a+b}-$$

$$\Big(6\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Cos}[e+f\,x]\,\text{Sin}[e+f\,x]\Big)\Big/$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)-$$

$$\Bigg(3\,(a+b)\,\text{Sin}[e+f\,x]^2\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-$$

$$\frac{2}{3}\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Bigg)\Bigg)\Big/$$

$$\Big(3\,(a+b)\,\text{AppellF1}\Big[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]+2\,\Big(b\,p\,\text{AppellF1}\Big[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},$$

$$-\text{Tan}[e+f\,x]^2\Big]-(a+b)\,\text{AppellF1}\Big[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\Big]\Big)\,\text{Tan}[e+f\,x]^2\Big)-$$

$$\mathrm{Csc}[e+f\,x]\,\mathrm{Sec}[e+f\,x]\left(1+\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b}\right)^{-p}\left(\mathrm{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b}\right]-\left(1+\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b}\right)^{p}\right)+$$

$$\Bigg(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sin}[e+f\,x]^2\Bigg(4\Bigg(b\,p\,\mathrm{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},\right.$$

$$\left.-\mathrm{Tan}[e+f\,x]^2\right]-(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\Bigg)\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]+$$

$$3\,(a+b)\left(\frac{2\,b\,p\,\mathrm{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]}{3\,(a+b)}-\right.$$

$$\left.\frac{2}{3}\,\mathrm{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\right)+$$

$$2\,\mathrm{Tan}[e+f\,x]^2\Bigg(b\,p\,\Bigg(-\frac{6}{5}\,\mathrm{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-$$

$$\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\mathrm{AppellF1}\left[\frac{5}{2},2-p,1,\frac{7}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\Bigg)-$$

$$(a+b)\Bigg(\frac{1}{5\,(a+b)}6\,b\,p\,\mathrm{AppellF1}\left[\frac{5}{2},1-p,2,\frac{7}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-$$

$$\frac{12}{5}\,\mathrm{AppellF1}\left[\frac{5}{2},-p,3,\frac{7}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]+2\Bigg(b\,p\,\mathrm{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},\right.$$

$$\left.-\mathrm{Tan}[e+f\,x]^2\right]-(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b},-\mathrm{Tan}[e+f\,x]^2\right]\Bigg)\mathrm{Tan}[e+f\,x]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

- **Problem 451: Result more than twice size of optimal antiderivative.**

$$\int \mathrm{Cot}[e+f\,x]^4\left(a+b\,\mathrm{Sec}[e+f\,x]^2\right)^p\,dx$$

Optimal (type 6, 88 leaves, 4 steps):

$$-\frac{1}{3\,f}\mathrm{AppellF1}\left[-\frac{3}{2},1,-p,-\frac{1}{2},-\mathrm{Tan}[e+f\,x]^2,-\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b}\right]\mathrm{Cot}[e+f\,x]^3\left(a+b+b\,\mathrm{Tan}[e+f\,x]^2\right)^p\left(1+\frac{b\,\mathrm{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

Result (type 6, 3033 leaves):

$$\Big((a+2b+a\,\mathrm{Cos}[2\,(e+f\,x)])^{p}\,\mathrm{Cot}[e+f\,x]^{7}\,\left(\mathrm{Sec}[e+f\,x]^{2}\right)^{p}\,\left(a+b\,\mathrm{Sec}[e+f\,x]^{2}\right)^{p}$$

$$\left(\left(9\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\mathrm{Sin}[e+f\,x]^{2}\,\mathrm{Tan}[e+f\,x]^{2}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]+2\left(b\,p\,\mathrm{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]-\right.\right.$$

$$\left.\left.(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\right)\mathrm{Tan}[e+f\,x]^{2}\right)-\left(1+\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right)^{-p}$$

$$\left.\left(\mathrm{Hypergeometric2F1}\left[-\frac{3}{2},-p,-\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right]-3\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right]\mathrm{Tan}[e+f\,x]^{2}\right)\right)\Big)\Big/$$

$$\Big(3\,f\,\Big(\frac{2}{3}\,p\,(a+2b+a\,\mathrm{Cos}[2\,(e+f\,x)])^{p}\,\mathrm{Cot}[e+f\,x]^{2}\,\left(\mathrm{Sec}[e+f\,x]^{2}\right)^{p}$$

$$\left(\left(9\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\mathrm{Sin}[e+f\,x]^{2}\,\mathrm{Tan}[e+f\,x]^{2}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]+2\left(b\,p\,\mathrm{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\mathrm{Tan}[e+f\,x]^{2}\right]-(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\right)\mathrm{Tan}[e+f\,x]^{2}\right)-\left(1+\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right)^{-p}$$

$$\left.\left(\mathrm{Hypergeometric2F1}\left[-\frac{3}{2},-p,-\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right]-3\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right]\mathrm{Tan}[e+f\,x]^{2}\right)\right)-$$

$$(a+2b+a\,\mathrm{Cos}[2\,(e+f\,x)])^{p}\,\mathrm{Cot}[e+f\,x]^{2}\,\mathrm{Csc}[e+f\,x]^{2}\,\left(\mathrm{Sec}[e+f\,x]^{2}\right)^{p}$$

$$\left(\left(9\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\mathrm{Sin}[e+f\,x]^{2}\,\mathrm{Tan}[e+f\,x]^{2}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]+2\left(b\,p\,\mathrm{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\mathrm{Tan}[e+f\,x]^{2}\right]-(a+b)\,\mathrm{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\right)\mathrm{Tan}[e+f\,x]^{2}\right)-\left(1+\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right)^{-p}$$

$$\left.\left(\mathrm{Hypergeometric2F1}\left[-\frac{3}{2},-p,-\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right]-3\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b}\right]\mathrm{Tan}[e+f\,x]^{2}\right)\right)-$$

$$\frac{2}{3}\,a\,p\,(a+2b+a\,\mathrm{Cos}[2\,(e+f\,x)])^{-1+p}\,\mathrm{Cot}[e+f\,x]^{3}\,\left(\mathrm{Sec}[e+f\,x]^{2}\right)^{p}\,\mathrm{Sin}[2\,(e+f\,x)]$$

$$\left(\left(9\,(a+b)\,\mathrm{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\mathrm{Tan}[e+f\,x]^{2}}{a+b},-\mathrm{Tan}[e+f\,x]^{2}\right]\mathrm{Sin}[e+f\,x]^{2}\,\mathrm{Tan}[e+f\,x]^{2}\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)-\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}$$

$$\left.\left(\text{Hypergeometric2F1}\left[-\frac{3}{2},-p,-\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-3\,\text{Hypergeometric2F1}\left[-\frac{1}{2},-p,\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]^2\right)\right)+$$

$$\frac{1}{3}\,(a+2\,b+a\,\text{Cos}[2\,(e+f\,x)])^p\,\text{Cot}[e+f\,x]^3\,\left(\text{Sec}[e+f\,x]^2\right)^p$$

$$\left(\left(18\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sin}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\Big/\right.$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\left(18\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Tan}[e+f\,x]^3\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\left(9\,(a+b)\,\text{Sin}[e+f\,x]^2\,\text{Tan}[e+f\,x]^2\left(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-\right.\right.$$

$$\left.\left.\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\Big/$$

$$\left(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},-p,1,\frac{3}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]+2\left(b\,p\,\text{AppellF1}\left[\frac{3}{2},1-p,1,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.\right.\right.$$

$$\left.\left.\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},-p,2,\frac{5}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},-\text{Tan}[e+f\,x]^2\right]\right)\text{Tan}[e+f\,x]^2\right)+$$

$$\frac{1}{a+b}2\,b\,p\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-1-p}\left(\text{Hypergeometric2F1}\left[-\frac{3}{2},-p,-\frac{1}{2},-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\right.$$

$$3\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\,-p,\,\frac{1}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Tan}[e+f\,x]^2\Bigg)-$$

$$\Bigg(9\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sin}[e+f\,x]^2\,\text{Tan}[e+f\,x]^2\,\Bigg(4\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},\,1-p,\right.$$

$$\left.1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\Bigg)\,\text{Sec}[e+f\,x]^2$$

$$\text{Tan}[e+f\,x]+3\,(a+b)\,\Bigg(\frac{2\,b\,p\,\text{AppellF1}\left[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]}{3\,(a+b)}-$$

$$\frac{2}{3}\,\text{AppellF1}\left[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Bigg)+$$

$$2\,\text{Tan}[e+f\,x]^2\,\Bigg(b\,p\,\Bigg(-\frac{6}{5}\,\text{AppellF1}\left[\frac{5}{2},\,1-p,\,2,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\frac{1}{5\,(a+b)}6\,b\,(1-p)\,\text{AppellF1}\left[\frac{5}{2},\,2-p,\,1,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Bigg)-$$

$$(a+b)\,\Bigg(\frac{1}{5\,(a+b)}6\,b\,p\,\text{AppellF1}\left[\frac{5}{2},\,1-p,\,2,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$\frac{12}{5}\,\text{AppellF1}\left[\frac{5}{2},\,-p,\,3,\,\frac{7}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(3\,(a+b)\,\text{AppellF1}\left[\frac{1}{2},\,-p,\,1,\,\frac{3}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]+2\,\Bigg(b\,p\,\text{AppellF1}\left[\frac{3}{2},\,1-p,\,1,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\right.$$

$$\left.-\text{Tan}[e+f\,x]^2\right]-(a+b)\,\text{AppellF1}\left[\frac{3}{2},\,-p,\,2,\,\frac{5}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b},\,-\text{Tan}[e+f\,x]^2\right]\Bigg)\,\text{Tan}[e+f\,x]^2\Bigg)^2-$$

$$\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^{-p}\Bigg(-6\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\,-p,\,\frac{1}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-$$

$$3\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\left(\text{Hypergeometric2F1}\left[-\frac{1}{2},\,-p,\,\frac{1}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]-\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^p\right)-$$

$$3\,\text{Csc}[e+f\,x]\,\text{Sec}[e+f\,x]\,\left(-\text{Hypergeometric2F1}\left[-\frac{3}{2},\,-p,\,-\frac{1}{2},\,-\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right]+\left(1+\frac{b\,\text{Tan}[e+f\,x]^2}{a+b}\right)^p\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

- **Problem 457: Result is not expressed in closed-form.**

$$\int \frac{\operatorname{Tan}[e+f x]^5}{a+b \operatorname{Sec}[e+f x]^3} \, dx$$

Optimal (type 3, 219 leaves, 11 steps):

$$-\frac{\left(a^{2/3}+2 b^{2/3}\right) \operatorname{ArcTan}\left[\frac{b^{1/3}-2 a^{1/3} \operatorname{Cos}[e+f x]}{\sqrt{3} b^{1/3}}\right]}{\sqrt{3} a^{1/3} b^{4/3} f}-\frac{\left(a^{2/3}-2 b^{2/3}\right) \operatorname{Log}\left[b^{1/3}+a^{1/3} \operatorname{Cos}[e+f x]\right]}{3 a^{1/3} b^{4/3} f}+\frac{\left(a^{2/3}-2 b^{2/3}\right) \operatorname{Log}\left[b^{2/3}-a^{1/3} b^{1/3} \operatorname{Cos}[e+f x]+a^{2/3} \operatorname{Cos}[e+f x]^2\right]}{6 a^{1/3} b^{4/3} f}-\frac{\operatorname{Log}\left[b+a \operatorname{Cos}[e+f x]^3\right]}{3 a f}+\frac{\operatorname{Sec}[e+f x]}{b f}$$

Result (type 7, 251 leaves):

$$\frac{1}{3 a b f}\left(3 b \operatorname{Log}\left[\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right]-\operatorname{RootSum}\left[-8 a+12 a \#1-6 a \#1^2+a \#1^3-b \#1^3 \&, 1 \Big/ \left(4 a-4 a \#1+a \#1^2-b \#1^2\right)\left(-4 a^2 \operatorname{Log}\left[1-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+4 a b \operatorname{Log}\left[1-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2 a^2 \operatorname{Log}\left[1-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1-8 a b \operatorname{Log}\left[1-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1+a b \operatorname{Log}\left[1-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1^2-b^2 \operatorname{Log}\left[1-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1^2\right) \&\right]+3 a \operatorname{Sec}[e+f x]\right)$$

Problem 458: Result is not expressed in closed-form.

$$\int \frac{\operatorname{Tan}[e+f x]^3}{a+b \operatorname{Sec}[e+f x]^3} \, dx$$

Optimal (type 3, 166 leaves, 9 steps):

$$\frac{\operatorname{ArcTan}\left[\frac{b^{1/3}-2 a^{1/3} \operatorname{Cos}[e+f x]}{\sqrt{3} b^{1/3}}\right]}{\sqrt{3} a^{1/3} b^{2/3} f}-\frac{\operatorname{Log}\left[b^{1/3}+a^{1/3} \operatorname{Cos}[e+f x]\right]}{3 a^{1/3} b^{2/3} f}+\frac{\operatorname{Log}\left[b^{2/3}-a^{1/3} b^{1/3} \operatorname{Cos}[e+f x]+a^{2/3} \operatorname{Cos}[e+f x]^2\right]}{6 a^{1/3} b^{2/3} f}+\frac{\operatorname{Log}\left[b+a \operatorname{Cos}[e+f x]^3\right]}{3 a f}$$

Result (type 7, 242 leaves):

$$\frac{1}{3 a f}\left(-3 \operatorname{Log}\left[\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right]+\operatorname{RootSum}\left[-a-b+3 a \#1-3 b \#1-3 a \#1^2-3 b \#1^2+a \#1^3-b \#1^3 \&, \left(-a \operatorname{Log}\left[-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-b \operatorname{Log}\left[-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]-4 a \operatorname{Log}\left[-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1-2 b \operatorname{Log}\left[-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1+a \operatorname{Log}\left[-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1^2-b \operatorname{Log}\left[-\#1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \#1^2\right) \Big/ \left(a-b-2 a \#1-2 b \#1+a \#1^2-b \#1^2\right) \&\right]\right)$$

Problem 460: Result is not expressed in closed-form.

$$\int \frac{\operatorname{Cot}[e+f x]}{a+b \operatorname{Sec}[e+f x]^3} \, dx$$

Optimal (type 3, 295 leaves, 11 steps):

$$-\frac{b^{2/3}\,\text{ArcTan}\left[\frac{b^{1/3}-2\,a^{1/3}\,\text{Cos}[e+f\,x]}{\sqrt{3}\,b^{1/3}}\right]}{\sqrt{3}\,a^{1/3}\,\left(a^{4/3}+a^{2/3}\,b^{2/3}+b^{4/3}\right)\,f}+\frac{\text{Log}[1-\text{Cos}[e+f\,x]]}{2\,(a+b)\,f}+\frac{\text{Log}[1+\text{Cos}[e+f\,x]]}{2\,(a-b)\,f}-\frac{\left(a^{2/3}+b^{2/3}\right)\,b^{2/3}\,\text{Log}\left[b^{1/3}+a^{1/3}\,\text{Cos}[e+f\,x]\right]}{3\,a^{1/3}\,\left(a^2-b^2\right)\,f}+\frac{\left(a^{2/3}+b^{2/3}\right)\,b^{2/3}\,\text{Log}\left[b^{2/3}-a^{1/3}\,b^{1/3}\,\text{Cos}[e+f\,x]+a^{2/3}\,\text{Cos}[e+f\,x]^2\right]}{6\,a^{1/3}\,\left(a^2-b^2\right)\,f}-\frac{b^2\,\text{Log}\left[b+a\,\text{Cos}[e+f\,x]^3\right]}{3\,a\,\left(a^2-b^2\right)\,f}$$

Result (type 7, 290 leaves):

$$\frac{1}{3\,a\,(a-b)\,(a+b)\,f}\left(3\left(a\,(a+b)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right]+b^2\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+a\,(a-b)\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]\right)-b\,\text{RootSum}\left[-8\,a+12\,a\,\#1-6\,a\,\#1^2+a\,\#1^3-b\,\#1^3\,\&,\,\left(-4\,a^2\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+4\,a\,b\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+2\,a^2\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\#1-2\,a\,b\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\#1+a\,b\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\#1^2-b^2\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\#1^2\right)\Big/\left(4\,a-4\,a\,\#1+a\,\#1^2-b\,\#1^2\right)\,\&\right]\right)$$

- **Problem 461: Result is not expressed in closed-form.**

$$\int\frac{\text{Cot}[e+f\,x]^3}{a+b\,\text{Sec}[e+f\,x]^3}\,dx$$

Optimal (type 3, 393 leaves, 11 steps):

$$\frac{b^{4/3}\,\left(a^2-3\,a^{2/3}\,b^{4/3}+2\,b^2\right)\,\text{ArcTan}\left[\frac{b^{1/3}-2\,a^{1/3}\,\text{Cos}[e+f\,x]}{\sqrt{3}\,b^{1/3}}\right]}{\sqrt{3}\,a^{1/3}\,\left(a^2-b^2\right)^2\,f}-\frac{1}{4\,(a+b)\,f\,(1-\text{Cos}[e+f\,x])}-\frac{1}{4\,(a-b)\,f\,(1+\text{Cos}[e+f\,x])}-\frac{(2\,a+5\,b)\,\text{Log}[1-\text{Cos}[e+f\,x]]}{4\,(a+b)^2\,f}-\frac{(2\,a-5\,b)\,\text{Log}[1+\text{Cos}[e+f\,x]]}{4\,(a-b)^2\,f}-\frac{b^{4/3}\,\left(a^2+3\,a^{2/3}\,b^{4/3}+2\,b^2\right)\,\text{Log}\left[b^{1/3}+a^{1/3}\,\text{Cos}[e+f\,x]\right]}{3\,a^{1/3}\,\left(a^2-b^2\right)^2\,f}+\frac{b^{4/3}\,\left(a^2+3\,a^{2/3}\,b^{4/3}+2\,b^2\right)\,\text{Log}\left[b^{2/3}-a^{1/3}\,b^{1/3}\,\text{Cos}[e+f\,x]+a^{2/3}\,\text{Cos}[e+f\,x]^2\right]}{6\,a^{1/3}\,\left(a^2-b^2\right)^2\,f}-\frac{b^2\,\left(2\,a^2+b^2\right)\,\text{Log}\left[b+a\,\text{Cos}[e+f\,x]^3\right]}{3\,a\,\left(a^2-b^2\right)^2\,f}$$

Result (type 7, 336 leaves):

$$\frac{1}{24\,f}\left(-\frac{3\,\text{Csc}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{a+b}+\frac{12\,(-2\,a+5\,b)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(e+f\,x)\right]\right]}{(a-b)^2}-\frac{12\,(2\,a+5\,b)\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}\,(e+f\,x)\right]\right]}{(a+b)^2}+\right.$$

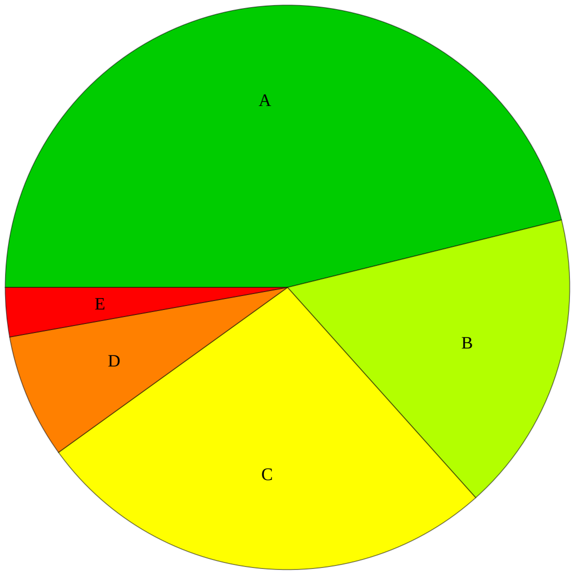
$$1\Big/\left(a\,\left(a^2-b^2\right)^2\right)8\,b^2\,\left(3\,\left(2\,a^2+b^2\right)\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+(-a+b)\,\text{RootSum}\left[-8\,a+12\,a\,\#1-6\,a\,\#1^2+a\,\#1^3-b\,\#1^3\,\&,\right.\right.$$

$$1\Big/\left(4\,a-4\,a\,\#1+a\,\#1^2-b\,\#1^2\right)\left(8\,a^2\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-4\,a\,b\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]-6\,a^2\,\text{Log}\left[1-\#1+\right.\right.$$

$$\left.\left.\left.\left.\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\#1+2\,a^2\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\#1^2+b^2\,\text{Log}\left[1-\#1+\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\#1^2\right)\,\&\right]\right)-\frac{3\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2}{a-b}\right)$$

Summary of Integration Test Results

5052 integration problems



A - 2332 optimal antiderivatives

B - 870 more than twice size of optimal antiderivatives

C - 1348 unnecessarily complex antiderivatives

D - 360 unable to integrate problems

E - 142 integration timeouts